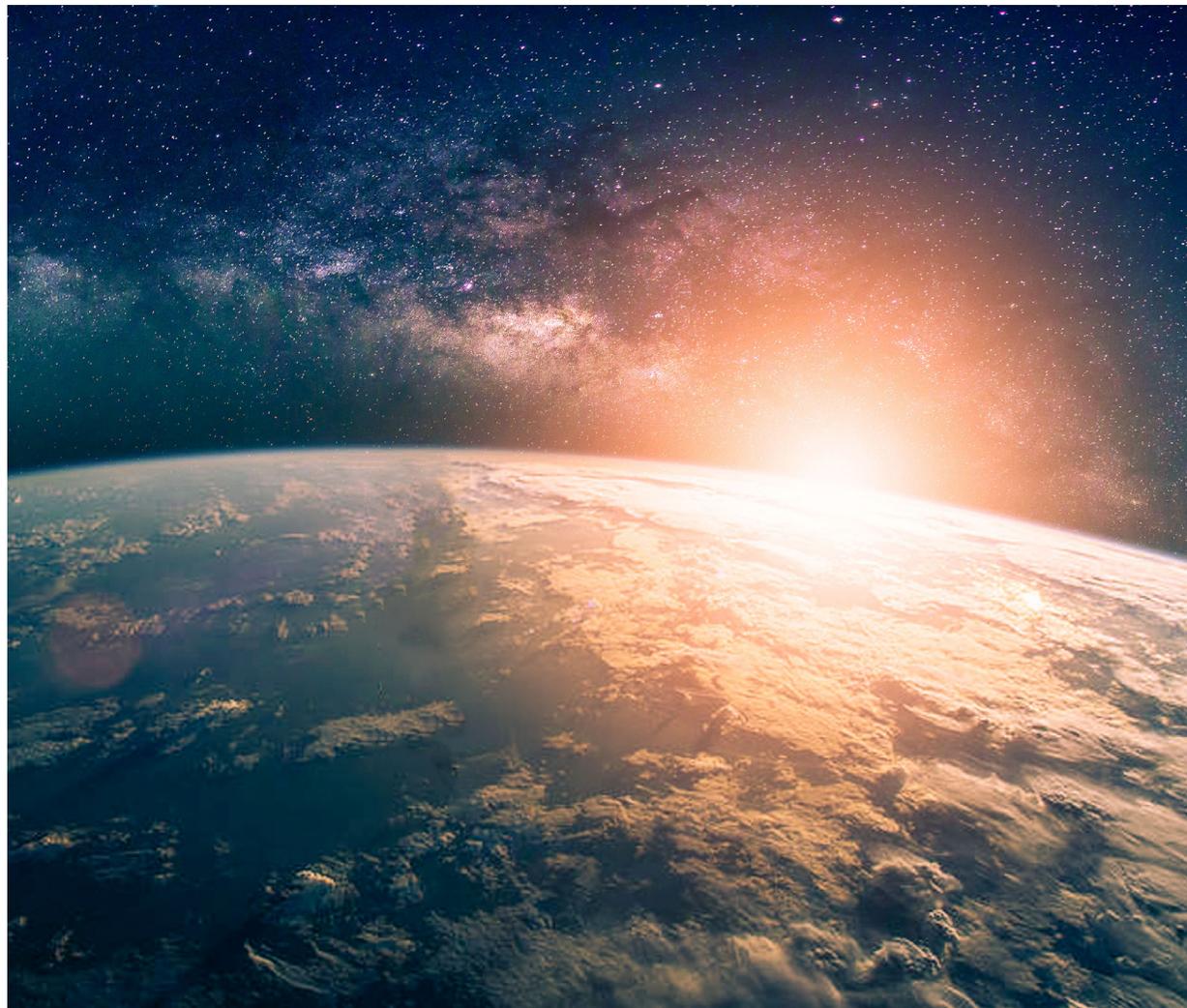

Regulating for the long-term:

Completing
Emission Possible

Contents

Summary	3
What are we trying to achieve?	4
Ofwat's Net Zero policy	11
What are the challenges for the water sector?	12
So what are the solutions?	18
Conclusions	24



Summary

Climate change poses the single greatest threat to our natural environment. Reducing greenhouse gas (GHG) emissions is a vital step in tackling that challenge. The Water sector in the UK has committed to addressing GHG emissions head on, and set out its ambition to eliminate the impact of operational emissions in the ‘Net Zero 2030 routemap’, published by Water UK in November 2020.

This commitment was welcomed by the UK government in its strategic policy statement for Ofwat¹.

We aim to move even faster. We have set ourselves the most ambitious target in the sector – to achieve Net Zero operational emissions by 2027².

To deliver these ambitious and the globally important goals the water sector will need to change the way it thinks, plans, and acts. Importantly, the regulatory approach will also need to adapt to accommodate and support progress towards a Net Zero water sector. This paper explores these challenges and provides some potential solutions to ensure we can deliver what is needed to reach net zero.

We welcome feedback on our proposals. Please email haveyoursay@nwl.co.uk to share your views.

Key actions

1. Standardising the measurement of operational emissions to set a baseline for each company to get to Net Zero operational emissions by 2030 that reflects their previous progress.
2. Improving the measurement of ‘Scope 3’ emissions over AMP 8, through collaboration and providing appropriate funding, so targets can be set in future that customers can trust.
3. Setting base cost allowances in a robust way to recognise the efficient additional costs of delivering a lower baseline of operational emissions, recognising that companies have delivered varying levels of reductions through existing base cost allowances.
4. Incentivising further operational emissions reductions while protecting customers using a common PC with a financial ODI, possibly with a rising ODI rate. The maximum incentive rate could be derived from a ‘double lock’ on carbon prices based on the non-traded carbon price and the UK ETS traded carbon price to ensure customers pay no more for emissions reductions than they will in the wider economy.
5. Requiring all enhancement investment schemes to consider GHG impacts of options.
6. Encouraging companies to make enhancement investment schemes for well evidenced GHG emissions reductions projects.
7. Creating a GHG emissions reduction fund to socialise the cost of GHG emissions reduction projects.
8. Continuing Ofwat’s successful innovation fund – to support collaboration and the development of new solutions.
9. Supporting use of appropriate offsets and insets by providing guidance / principles and monitoring their use.

What are we trying to achieve?

Achieving Net Zero and adapting to climate change is one of the biggest – and most important – challenges that society faces.

In their latest report, the Intergovernmental Panel on Climate Change (IPCC) state: **“The cumulative scientific evidence is unequivocal: Climate change is a threat to human well-being and planetary health. Any further delay in concerted anticipatory global action on adaptation and mitigation will miss a brief and rapidly closing window of opportunity to secure a liveable and sustainable future for all³.”**

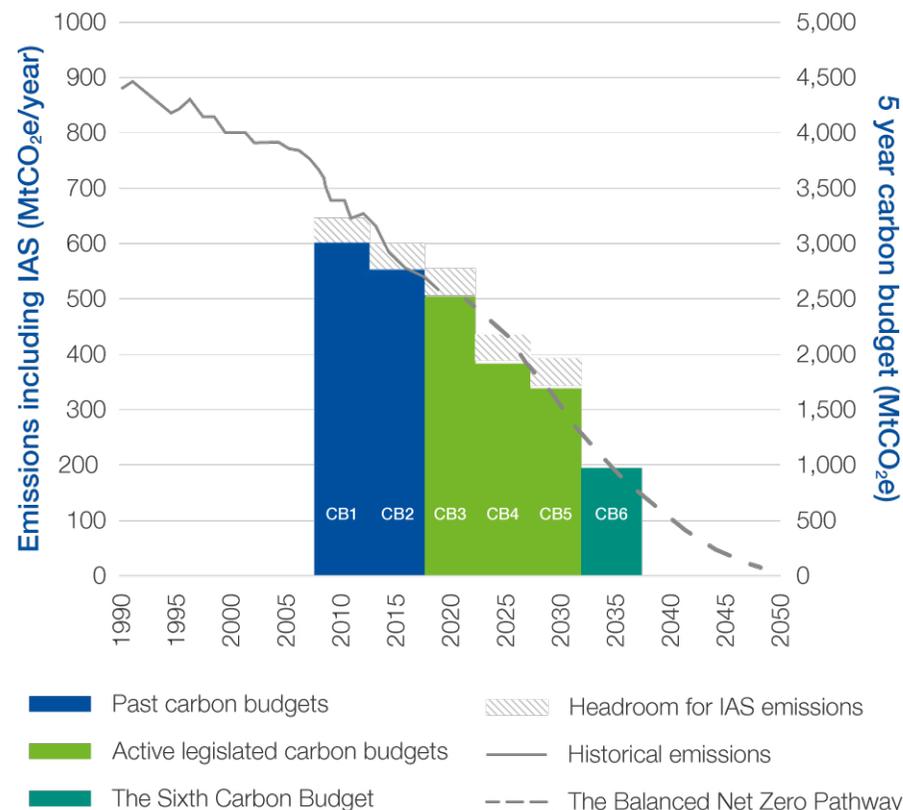
The water sector is responsible for almost a third of UK industrial and waste process emissions and directly contributes around 1% of the UK’s total greenhouse gas (GHG) emissions⁴.

To make the most of this window of opportunity we need to make extensive changes to how our industry operates. Without these changes we will fail to meet both the UK’s interim 2035 targets for GHG emissions and to achieve Net Zero emissions by 2050.

Climate change is a shared problem – climate action in the regions we serve will provide global benefits; arguably this means that our customers only receive a proportion of the benefit our actions create. It is therefore necessary to carefully consider how Net Zero is funded, focusing on deliverability, affordability and transparency. Yet these complexities should not be a reason to avoid or delay climate action.

The scale of the challenge is immense. Figure 1 shows that the level of emissions reduction since 1990 needs to be sustained and improved upon to deliver the UK’s legally binding 2050 targets.

Figure 1: Scale of the challenge - carbon emissions reductions



Source: The-Sixth-Carbon-Budget-The-UKs-path-to-Net-Zero.pdf

Notes: Emissions shown include emissions from international aviation and shipping (IAS) and on a Fifth Assessment Report (AR5) basis, including peatlands. Adjustments for IAS emissions to carbon budgets 1-3 based on historical IAS emissions data; adjustments to carbon budgets 4-5 based on IAS emissions under the Balanced Net Zero Pathway.

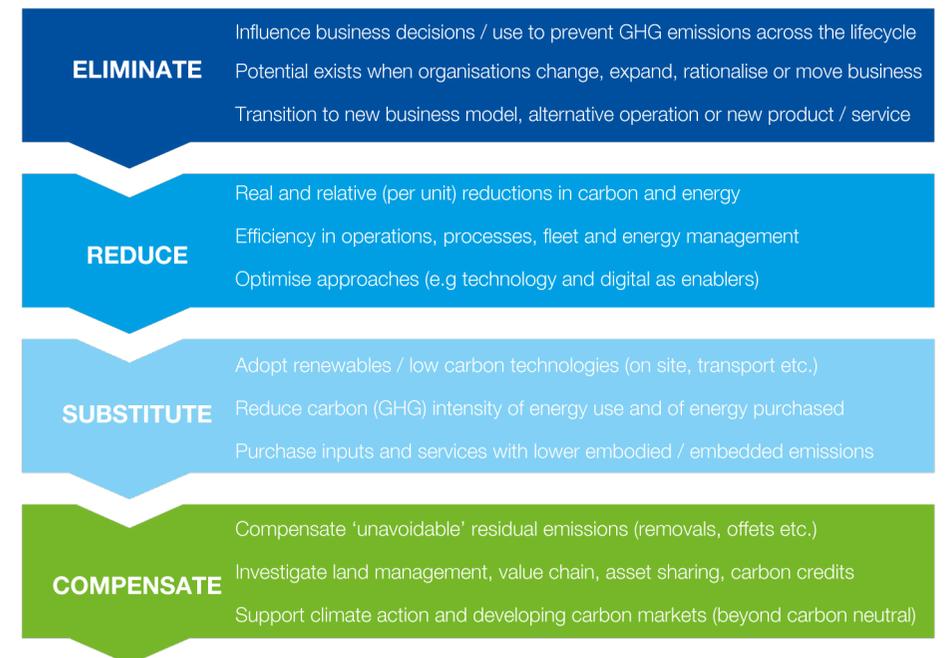
³Climate Change 2022 – Impacts, Adaptation and Vulnerability – Summary for Policymakers’, IPCC, February 2022, p.35 ⁴A-Blueprint-for-carbon-emissions-reductions-in-the-water-industry.pdf (ciwem.org) – not primary source

This requirement for sustained reductions is needed not just because to reach Net Zero we will have to make changes to the way we operate in achievable steps, but also because GHG emissions persist in the atmosphere, so to avoid building up a stock of them and so avoid the worst effects of global warming we need to continually reduce emissions – starting now⁵.

There are a range of actions companies can take to reduce their GHG emissions. Some actions are more expensive than others and different actions are more or less effective at reducing or ‘abating’ carbon. The effectiveness of emissions abatement can be considered both in terms of how large the measurable emissions reduction is, but also the quality of the emissions reduction.

Quality is best thought of in terms of the GHG management hierarchy (given in Figure 2) where the highest quality interventions are those that eliminate emissions entirely, whereas the lowest quality interventions are those that merely compensate for an ongoing emission.

Figure 2: Institute of environmental management & assessment (IEMA) GHG hierarchy



Source: iema.net/resources/reading-room/2020/11/26/pathways-to-net-zero-using-the-iema-ghg-management-hierarchy-november-2020

⁵See for example ‘Climate change: Key UN finding widely misinterpreted’, BBC News, April 2022.

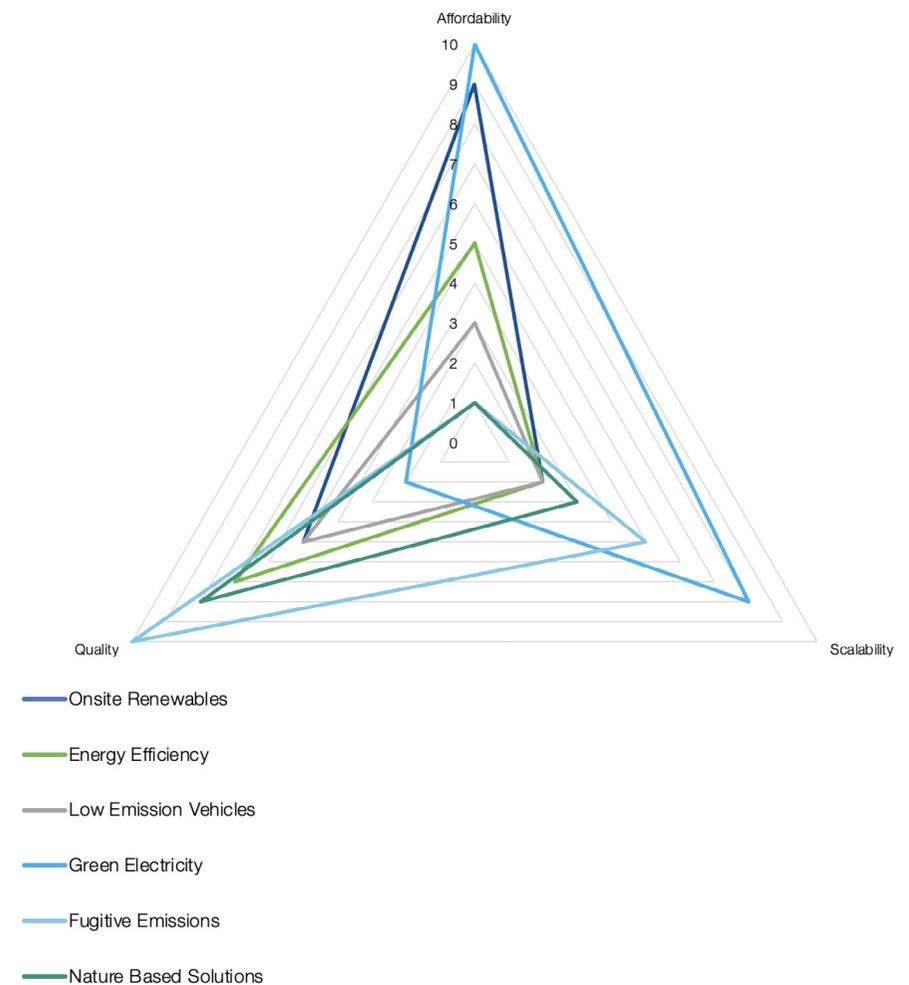
For example, purchasing renewable electricity is a relatively straightforward and lower-cost change to make with immediate and quantifiable GHG benefits. However the GHG reductions could arguably be better achieved by reducing or avoiding the electricity demand entirely as there is still a carbon cost of building solar panels and wind turbines. In contrast, reducing process emissions from wastewater treatment is a high-quality intervention as the emission itself can be reduced at source; however the systems to achieve this are high cost and complex to implement.

The costs of emissions abatement therefore vary, as well as each abatement activity's effectiveness in reducing GHG emissions. This allows us to consider the 'marginal cost of abatement' for each activity or change that we can make, and so the impact on affordability for our customers. The most efficient way to reduce emissions is to focus on changes with a low marginal cost of abatement and move on to higher cost abatement activities when lower cost options have been exhausted.

Similarly, it may be beneficial to transition from one intervention to another where the quality of an intervention can be improved, for example, purchasing renewable electricity through the grid can be incrementally replaced with on-site renewables and/or energy demand reductions.

Finally, scalability should be considered. A high quality and affordable emissions reduction intervention may still only have limited impact if it cannot be applied at scale. For example, our ability to deploy on site renewable generation is limited by the amount of land (and roof space) we have available. This trilemma of quality, affordability and scalability is illustrated in Figure 3.

Figure 3: Examples of GHG abatement trilemma



Source: NWL analysis.

Measuring emissions reductions

To address the climate crisis, all of the water companies in the UK came together to set ourselves the target of delivering Net Zero operational emissions by 2030⁶. We were the first sector in the world to make such an ambitious commitment.

We are going even faster than this already challenging ambition. As we set out in 'Emissions Possible' we will achieve Net Zero operational emissions by 2027⁷. These Operational Emissions cover our Scope 1 and Scope 2 emissions, and some limited Scope 3 emissions that are directly linked to our operations. Excluded from our commitment are the wider Scope 3 emissions associated with the products we purchase or the construction activity we undertake.

Scope one

- Fuel combustion
- Company vehicles
- Fugitive emissions⁸

Scope two

- Purchased electricity, heat and steam

Scope three

- Purchased goods and services
- Business travel
- Employee commuting
- Waste disposal
- Use of sold products
- Transportation and distribution (up and downstream)
- Investments
- Leased assets and franchises
- Construction

Source: Scope 1,2,3 emissions – from Carbon Trust: Briefing: What are Scope 3 emissions? | The Carbon Trust

⁶See 'Net Zero 2030 Routemap', Water UK, November 2020. ⁷See 'Emissions Possible – How Northumbrian Water will achieve net zero by 2027', Northumbrian Water Limited, July 2021. ⁸Fugitive emissions are emissions not caught by a capture system which are often due to equipment leaks, evaporative processes and windblown disturbances. (Source: European Environment Agency, accessed 15/03/2022)

We consider Net Zero operational emissions as the first crucial milestone on a journey towards Net Zero across all aspects of our business and supply chain.

Moving beyond focusing on operational emissions requires careful consideration to ensure that we do not miss emissions or create perverse incentives. We consider that only two definitions of emissions are logical:

- Operational emissions only – this is a practical definition of emissions as companies have very high degrees of control or influence over these emissions so are empowered to act and the data is readily available and high quality; or
- Total emissions including operational emissions and upstream supply chain emissions – this would require complicated data collection, validation and analysis, so while possible in the longer term, should be recognised as a major transformation of business practice.

Ofwat should avoid creating its own scope of emissions which includes only Operational and Capital emissions as:

- This definition would not align well with international reporting standards;
- Selecting only Capital emissions creates a blurred boundary (e.g., a construction of a pumping station would likely be considered a Capital emission yet purchasing a vehicle would not. This could drive companies to buying package plant which could be excluded from capital emissions.);
- As a simplistic example, regulation of only Operational and Capital carbon could stimulate development of low energy, low capital treatment processes but which have a high chemical demand – therefore not delivering environmental or cost advantages.

It is interesting to consider that if every business in our supply chain and our end users set themselves the same ambition to achieve Net Zero operational emissions then we would automatically deliver Net Zero total emissions as well. This raises questions about what water customers should pay for versus other parties.

Companies' progress towards net zero varies

It is likely that the companies with the most ambitious emissions reduction targets will have already implemented the interventions which have a lower marginal cost of abatement, while other companies may not yet have taken these steps. This is compounded by the fact that only a minority of companies requested a financial incentive to reduce GHG emissions for the 2020-25 period through the 2019 price review (PR19)⁹.

Consequently, while as a sector we are driving positive change, some companies have made more progress reducing emissions than others, and this disparity is likely to persist to the end of the current price review period (2025). Figure 4 and Figure 5 show the relative emissions intensity for water and wastewater respectively, with NWL ahead of the water sector's average emissions.

We have already taken many of the opportunities available to us within both our appointed and non-appointed businesses, including sourcing 100% of our power from green sources (including our UK first Power Purchase Agreement with the Race bank Offshore Wind Farm), generating hydroelectricity wherever possible, large scale solar being developed across our sites and being the first and only company to use 100% of its sewage sludge to generate renewable energy¹⁰. As we move into the next price review period some companies will therefore still have scope to make significant emissions reductions at low additional cost as the marginal cost of abatement is low for them.

For those ambitious companies that have made good progress in targeting these efficient GHG reductions, the next stage in emissions reduction will be more costly. For these companies the low hanging fruit has been picked; to reach the next tranche of emissions reduction more funding will be needed to deliver interventions with a higher abatement cost.

Figure 4: Estimated market-based net emissions intensity of water supplied

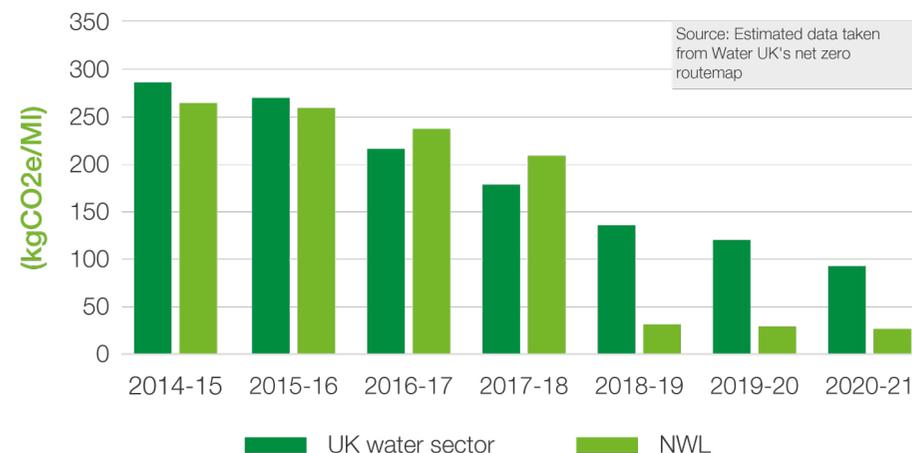
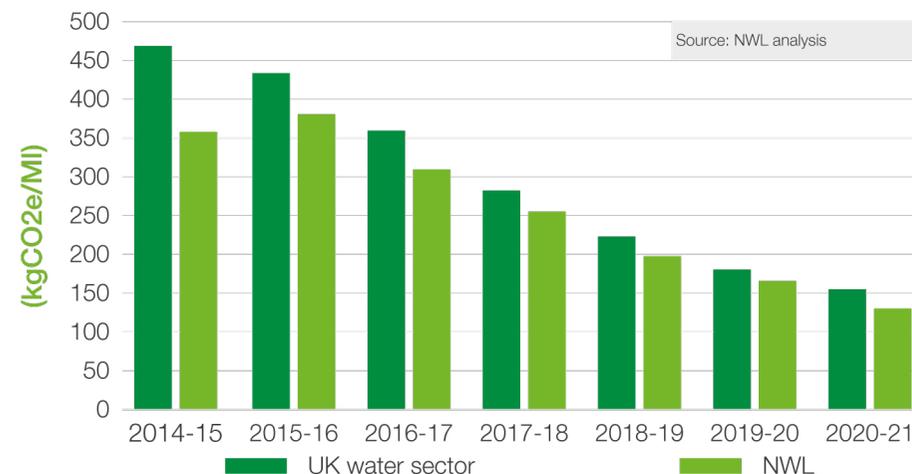


Figure 5: Estimated market-based net emissions intensity of wastewater treated

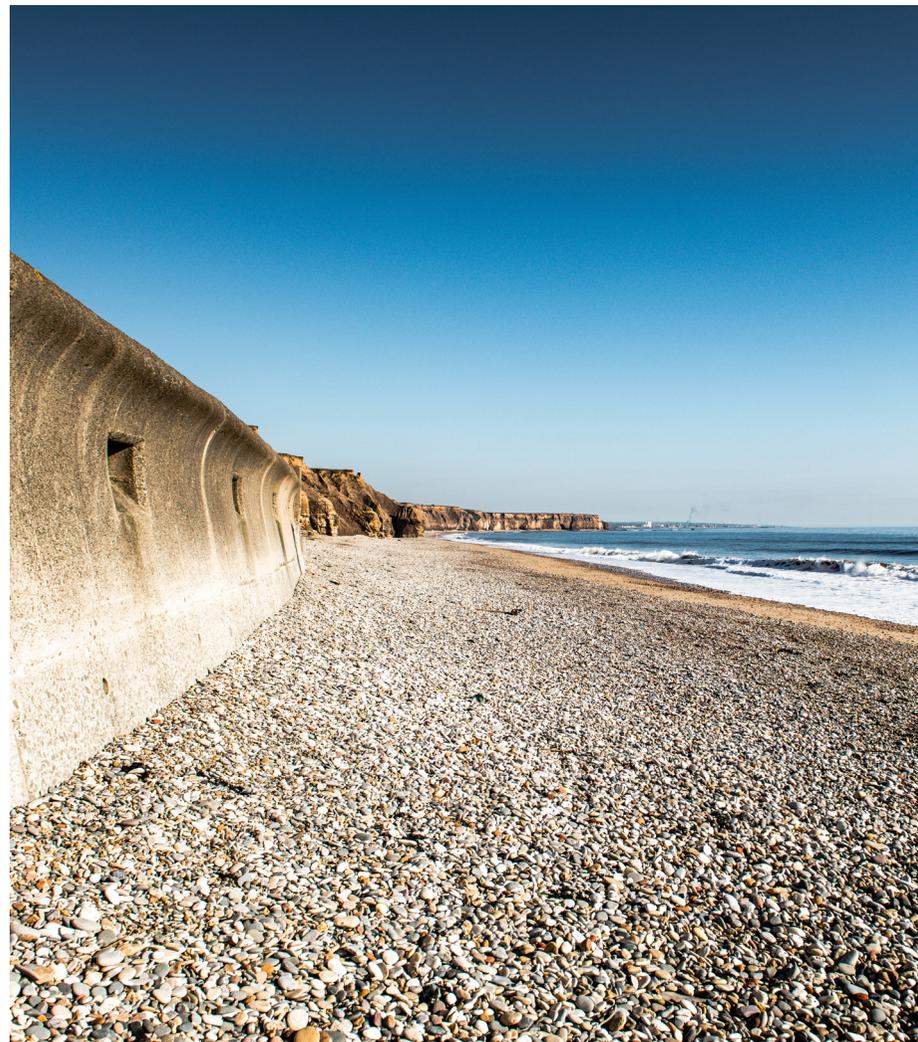


⁹As well as Northumbrian Water Limited, SES Water, Wessex Water, and Yorkshire Water have bespoke performance commitments with financial incentives to reduce their greenhouse gas emissions over the period 2020-2025. Anglian Water, Portsmouth Water, South East Water and South Staffordshire Water have bespoke performance commitments with non-financial incentives to reduce greenhouse gas emissions/ produce energy over the period 2020-2025. See company specific documents in [Ofwat's PR19 final determinations](#) for more information. ¹⁰We consider it important to do the right thing across both our appointed and non-appointed businesses and so seek opportunities to maximise the efficiency and the environmental benefit we can deliver, for example from the generation of electricity from Kielder Hydro, the output of which is currently owned by RWE.

Robust and assured offsets and insets will play an important role in reducing GHG emissions

The GHG emissions reduction hierarchy is a well-established approach. However, it should be recognised that offsets and insets have an important part to play in delivering efficient emissions reductions. The use of effective and robust offsets and insets enables the most efficient solutions to be adopted, allowing us to move towards net zero at the lowest cost to water customers.

This is because companies will only choose to use these mechanisms where they are cheaper than other interventions to reduce emissions. The real issue to address is to make sure that we have a high degree of confidence that the stated emissions reductions are being realised, and in this regard not all offsets are equal.



Ofwat's Net Zero policy

In 'PR24 and beyond: Creating tomorrow, together', May 2021, Ofwat recognised that addressing climate change and delivering Net Zero is one of the key challenges water companies will need to address in the short and long term.

We welcome Ofwat's commitment to consider how PR24 and future price controls can support water companies to meet the challenge of Net Zero and in particular Ofwat's increased focus on the long-term¹¹. To further expand on its Net Zero policy, Ofwat set out three principles in its 'Net zero principles position paper', January 2022.

1. Company Net Zero plans should be clearly linked to national government targets
2. Company actions on Net Zero should encompass both operational and embedded emissions
3. Companies should prioritise the elimination and reduction of GHG emissions before the use of offsets

We welcome Ofwat developing its views and policy in this area. We do however consider there are some important points that should be taken account of when applying these principles and make some comments on them below.

Delivering Government targets requires action now as part of a long-term plan

As a sector we need to do our part to deliver our fair share of the government's national targets. These are ambitious and will require continuous emissions reductions to ensure we keep on track for the 2035 and 2050 targets. We must not delay progress on emissions reductions in the near term as this would risk making the needed reductions unachievable, while also increasing the risks of more extreme climate change. We will need to balance our drive for Net Zero against the affordability needs of our customers and other environmental and service requirements, but in order to deliver our long-term goals we must act now.

In the near-term we should focus on reducing operational emissions and improving measurement of embedded emissions

Action to reduce emissions will be needed across all of the activities of the water sector to deliver national Net Zero targets. However, in the near term, the ability to measure, understand and control operational emissions is much greater than for embedded emissions and so we consider this should be where we concentrate our efforts. Regarding the Scope 3 emissions from construction and the supply chain, efforts in 2025-30 should focus on maturing our ability to precisely measure these emissions, as there is not yet a robust approach or set of tools for doing so – limiting the efficacy of economic regulation on these emissions.

Robust and assured offsets and insets will play an important role in reducing GHG emissions. Following the GHG emissions reduction hierarchy will result in the best environmental outcomes. However offsets and insets will play an important part in delivering Net Zero.

¹¹See 'PR24 and beyond: Final guidance on long-term delivery strategies', Ofwat, April 2022.

What are the challenges for the water sector?

The water sector faces a number of challenges in measuring and addressing GHG emissions, and balancing progress against other customer priorities.

The state of the art in measuring emissions is evolving

Ofwat faces a huge challenge trying to support the development of a consistent approach to reporting on GHG emissions and emissions reductions. In **'Consultation on regulatory reporting for 2021-22 – Responses document'**, October 2021, Ofwat notes that companies are not yet reporting on Scope 3 emissions in a comprehensive or consistent manner due to a lack of an agreed definition, frameworks and tools. Ofwat has set out an ambitious timetable for standardising reporting of GHG emissions, including mandatory reporting of embedded emissions by 2022-23¹².

We fully support standardised reporting of operational emissions. We consider that all companies should report their operational emissions using the latest UK Water Industry Research (UKWIR) Carbon Accounting Workbook in each year. Reporting on emissions is an area that is constantly developing and being able to adapt to the latest developments is vital.

We welcome Ofwat's recent consultation and conclusions on revising the measurement approach for existing (2020-25) GHG emission reduction performance commitments (PCs) as it recognises the importance of keeping pace with the ever-evolving state of the art in GHG measurement¹³.

As a company we are striving to improve our measurement of Scope 3 emissions. For example, we are working with academics at Newcastle University to develop an approach to whole life carbon accounting that is suitable for regulated companies that includes Scope 3 emissions. We consider that this level of intellectual rigour is necessary to ensure that our baseline is robust so we can deliver genuine emissions reductions.

We also have our use of the Carbon Accounting Workbook to measure emissions audited in line with ISO14064-1 and would welcome a universal requirement to meet that standard to ensure all companies are reporting on the same basis.

We do not believe that a standardised approach to reporting Scope 3 emissions will be cost beneficial, in customers interests or deliverable on the timescales set by Ofwat. For Scope 3 emissions, far less data is currently available across the industry's value chain. Reporting Scope 3 emissions is currently a significant challenge across the economy, and more time will be needed to establish consistent measurement and reporting arrangements in this area.

¹²See 'Consultation on regulatory reporting for 2021-22 – Responses document', Ofwat, October 2021, p.14. ¹³Consultation – Changes to the CAW version reference in 2020-25 PCs', Ofwat, February 2022. ¹⁴See 'Response to Ofwat consultation: Consultation on regulatory reporting for the 2021-22 reporting year', Water UK, July 2021, which provides further information on the challenges of reporting in this area.

Net zero is one of many competing priorities for customers

There is a clear sense of urgency among the public about the need for the UK to reach Net Zero. But it is only one of several competing priorities. We know from our own customer research that customers also value improved levels of service and local environmental improvements, such as reducing pollution¹⁵. And all of this needs to be delivered against a backdrop of rising inflation and a cost-of-living crisis, which the Ipsos MORI April 2022 issues index found to be the number one issue for adults in Great Britain¹⁶.

Further targeted research by Ipsos MORI found that while people in the UK support getting to Net Zero, their support for individual policy options reduced materially when the impact on them and their budgets as individuals was better understood¹⁷.

Companies are starting from different places on net zero in 2025-30

This has two consequences.

Firstly, the need for action now needs to be tempered by the constraints of customer support for increased bills to fund Net Zero. This should also be reflected in considering how to ensure that Net Zero is delivered in the most efficient way.

Secondly, because support for Net Zero has developed over time, and companies have made different choices about reducing emissions, the water companies currently have different levels of emissions. These varying starting points will need to be reflected in the funding and targets set for water companies at PR24.

Companies have more control and understanding of operational emissions than embedded emissions

To reduce emissions, companies need to have control of those emissions, or be able to meaningfully influence others who can control them.

This controllability is what drives the distinction between “Scope 1, Scope 2 and Scope 3” emissions.

Scope 1 and scope 2 emissions (the majority of our operational emissions) are more easily measured than Scope 3 emissions. This is key to ensure that we can demonstrate we have delivered the emissions reductions we claim. If we cannot do so, we risk being accused of ‘greenwashing’ and losing the trust and confidence of our customers¹⁸. By focusing on reducing operational emissions we therefore can lower the risk of ‘greenwashing’ as companies’ actual performance can be more effectively monitored.

Measuring and reducing Scope 3 emissions is complex and the approach needed varies depending on the source of the emissions.

As an example, we can control how far the vehicles we own are driven and by reducing our mileage we can directly reduce operational emissions. We can also control what type of vans we buy or lease, and so use vans with more efficient power trains, which will again reduce our operational emissions. But even where we can choose which vehicles we acquire, we can only estimate the Scope 3 emissions from the manufacturing of the vehicle; there are currently no legal requirements on our supply chain to provide or audit information on embedded emissions. Depending on our relationships with our suppliers we may be able to introduce some level of reporting, but our ability to validate it may be limited.

Measuring and reducing the Scope 3 emissions from capital programmes is somewhat easier – by reducing the use of emission intensive materials such as concrete or steel we can reduce the emissions from our construction activity.

¹⁵Research carried out by Explain for Northumbrian Water in 2021 found similar levels of support from household customers for Northumbrian Water’s ambitions to ‘deliver world class customer service’ (81% in the North East, 88% in Essex and Suffolk) as for ‘have zero pollutions as a result of their assets and operations’ (87% in both areas) and ‘be leading in the sustainable use of natural resources, through achieving zero avoidable waste by 2025 and being carbon neutral by 2027’ (94% and 87% respectively). (Research carried out through online workshops with 49 respondents in the North East and 51 in Essex and Suffolk.) ¹⁶‘Issues Index’, Ipsos MORI April 2022. ¹⁷‘Net Zero Policies’, Ipsos MORI UK Knowledge Panel, October 2021. ¹⁸For example, see ‘The troubling evolution of corporate greenwashing’ The Guardian, 20 August 2016.

However, as the sector's focus is already on maximum service benefit for minimum cost, we already take extensive steps to avoid unnecessary capital investment – the inherent cost driver within the price review process serves as the most effective way to minimise Scope 3 emissions from the Capital Programme. Further, where we consider the use of low-carbon materials in our Capital Programme, we encounter the same risk as for the vehicle example above – with water companies relying on data which is difficult to audit to identify an emission reduction.

In addition, for operational emissions, as the general business of water companies does not change year-on-year we can measure the improved performance over time. However, the Scope 3 emissions associated with construction projects are 'lumpy' – for example, if in one year we must build two pumping stations and in the next year we need to only build one pumping station, it would be untrue to suggest that we had reduced our Scope 3 emissions by 50% as the reduction occurred without intervention¹⁹.

As such, the Scope 3 baseline is the emissions for the standard solution, and any improvement being the emissions resulting from delivering an alternative approach – this approach requires emission data for both the project as delivered and the counterfactual "standard" solution. As the counterfactual is notional, there is a risk that the baseline is not accurate, making incentivisation difficult.

As can be seen, we therefore have some influence, but much less control over Scope 3 emissions. Given this and the lack of transparency over realised Scope 3 emissions reductions, there is a risk that an economic incentive applied to Scope 3 emissions would be an inefficient or ineffective use of customers' money.

Focusing primarily on operational emissions in the near-term instead would focus water companies on the emissions they directly control. It seems fair for water companies, and hence ultimately water customers, to bear the costs of decarbonising these activities. Reducing Scope 3 emissions in contrast requires the decarbonisation of the supply chain.

In many cases water companies are only one of many customers of their upstream suppliers – for example concrete and steel are used across the economy. Is it fair for water companies and their customers to effectively pay for the initial decarbonisation of these other sectors? While we can be conscientious purchasers and trial new approaches and innovations, it may not be a sensible use of our customers' money to invest in widespread reduction of Scope 3 emissions in the immediate future.

We therefore think it is most appropriate in the near term for the water sector to focus on reducing operational emissions, in line with both Water UK's '[Net Zero 2030 routemap](#)', November 2020, and NWL's '[Emission Possible: How Northumbrian Water will reach Net Zero by 2027](#)', July 2021. There are plenty of gains still to be made across the water industry, for example moving to low emissions vehicles and using renewable energy for all heat and power requirements.

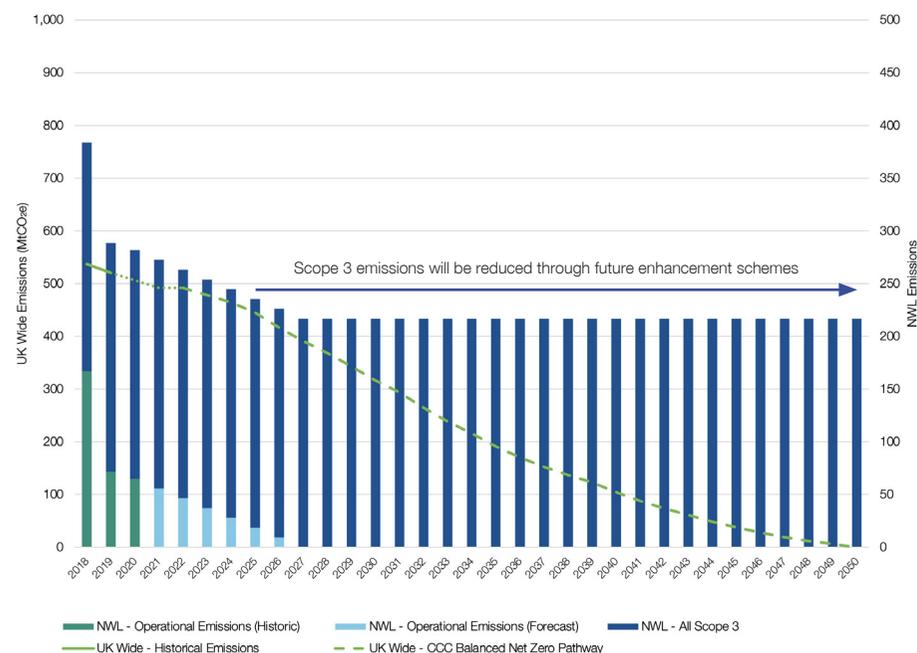
¹⁹One possible solution to this would be to "depreciate" emissions over the life of the asset. However, while this would help balance the decision between opex and capex, it would increase complexity and create the illusion of lower emissions today, which would be counterproductive from an environmental perspective.

But we will also need to make progress on scope 3 emissions

We consider operational emissions is the right place to focus the sector's immediate efforts. But even between now and 2030, some progress will need to be made on Scope 3 emissions to keep us on track to deliver the government's 2050 target. Figure 7 shows the historical (teal) and planned (light blue) reductions in NWL's operational emissions, keeping other Scope 3 emissions (dark blue) constant. As can be seen, our planned reduction in operational emissions will deliver the reductions necessary to keep us on track to deliver our contribution to meeting the UK wide balanced Net Zero pathway (green dotted line) until around 2030. From then on Scope 3 emissions reductions will be needed.

As Figure 6 shows, delivering our operational emissions commitment (in teal) allows us the time needed to develop a Scope 3 emissions methodology and reduction plan, which will meet the levels of reduction included in the Committee on Climate Change's (CCC's) sixth carbon budget²⁰. Allowing the time for the water industry to develop its Scope 3 emissions reduction plans is key to ensuring the reductions are operationally deliverable and affordable so the industry can deliver best value for our customers and the environment.

Figure 6: Pathway to 2050 Net Zero target



Source: Northumbrian Water Limited analysis. Note: the UK wide forward trajectory is from the Sixth Carbon Budget. The government's 2050 Net Zero target is based on reductions in emissions from 1990 levels to 2050, but industry level and company level data on emissions in 1990 are not available.

²⁰See 'Sixth Carbon Budget', Committee on Climate Change, December 2020.

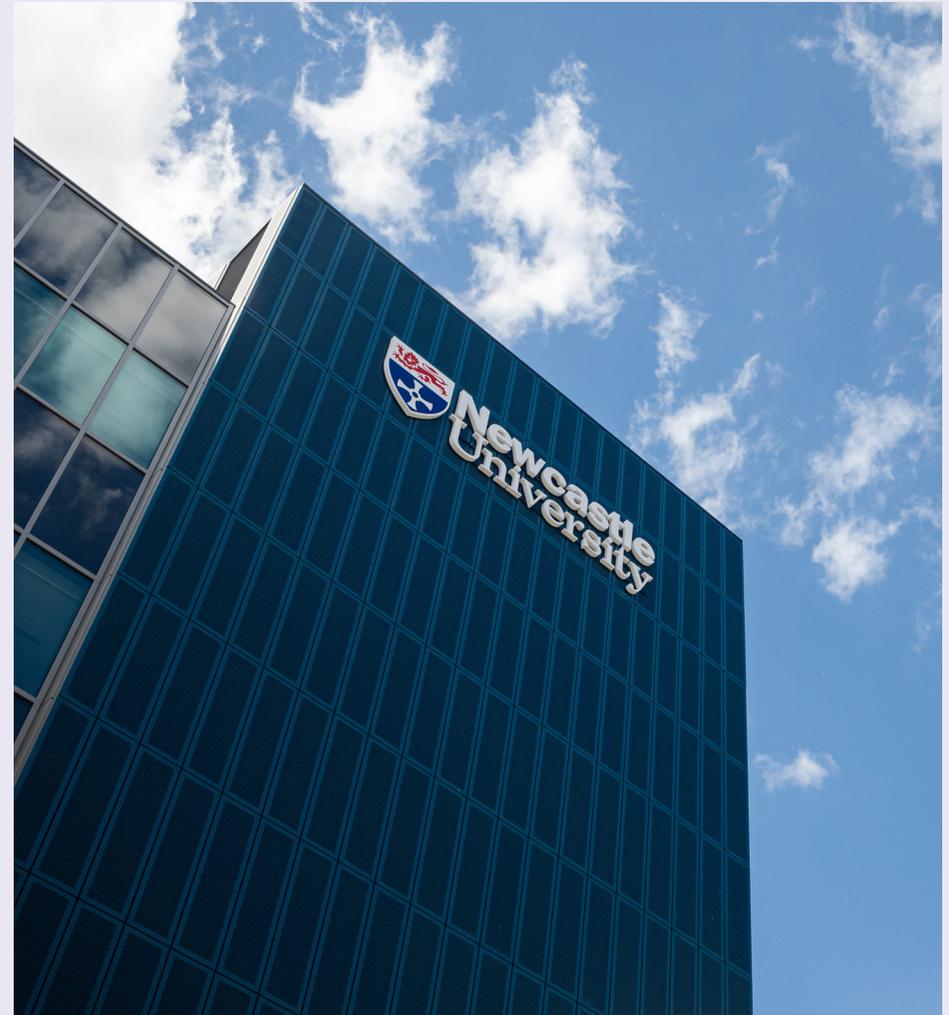
Case study: Whole Life GHG Emissions Accounting

Understanding the GHG emissions across the full life cycle of the processes and products we use is key to reducing our Scope 3 GHG emissions.

As an innovative company we want to not only adopt the leading approaches, but to push the boundaries and work with partners to develop better ways of measuring Scope 3 emissions.

We are working with academics and a PhD student at Newcastle University to explore and develop a robust approach to whole life GHG emissions accounting. We exploring top-down and bottom-up carbon accounting methodologies including input-output based accounting, process-based accounting, consumption-based accounting and hybrid accounting methods.

Through this collaboration we aim to develop a rigorous approach to identifying Scope 3 emissions so that we can use our customers' money most effectively to reduce emissions.



Innovation is needed to deliver Net Zero

Not all the water sector's GHG emissions can be eliminated with current technology. Innovation therefore has an important role to play – to develop new ways of working and new technologies to reduce the sectors' emissions in ways that we do not yet know are possible. This will no doubt take many and varied forms – from the development of low carbon concrete in the supply chain²¹, to the increased use of bioresources to generate biogas for use in place of natural gas²², to innovating through projects like our industry-first Organics Ammonia Recovery Project, through which we aim to not only increase river water quality but also generate green hydrogen²³.

Supporting innovation, through initiatives such as Ofwat's Innovation Fund²⁴ and our Innovation Festival, will continue to be a key enabler in the delivery of the sector's Net Zero ambition.

Not all emissions can be eliminated

In '**Net zero principles position paper**', January 2022, Ofwat set out a principle that companies should prioritise the elimination and reduction of GHG emissions before the use of offsets. This is aligned with the IEMA's GHG management hierarchy and is good practice in emissions reduction. It should be noted though that not all operational emissions can currently be cost effectively eliminated. Process emissions from wastewater treatment for example are significant and difficult to directly avoid or reduce. This is why a "Net Zero" rather than "Absolute Zero" GHG emissions target is appropriate.

To address process emissions, we need firstly to create opportunities to trial and test new innovative approaches to reducing these emissions directly.

Secondly, where these emissions cannot be efficiently reduced in the near-term, to achieve Net Zero – while maintaining affordability – we need to have the flexibility to use a range of options including, where appropriate, offsets and insets.

Delivering the sector's 2030 Net Zero operating emissions commitment will likely require the use of offsets²⁵ to keep us on track to deliver the legally binding 2050 targets without putting undue upward pressure on bills.

Using offsets and insets creates its own challenges – not all offsets and insets are equally robust. Some, such as the green gas certification scheme²⁶ have well established assurance processes in place to ensure that genuine environmental benefits are delivered and double counting of benefits is avoided.

The Renewable Energy Guarantees of Origin (REGOs) scheme provides similar guarantees for renewable electricity and is run by Ofgem²⁷.

We consider that it is important that Ofwat recognises the validity of these and other similarly accredited offset and inset schemes as legitimate and efficient means of delivering Net Zero in the water sector. Doing so will ensure that customers' money is only used for offsets and insets that are robust and will create trust and confidence in our activities.

Carbon offset: a reduction in GHG emissions – or an increase in carbon storage (e.g. through land restoration or the planting of trees) – that is used to compensate for emissions that occur elsewhere²⁸.

Carbon inset: an offset of emissions through a project within its own value chain. In contrast to a typical carbon offset project, emissions are avoided, reduced or sequestered upstream or downstream within the company's own value chain²⁹.

²¹See 'Roadmap to Beyond Net Zero', UK Concrete, October 2020. ²²See 'Power from poo', in 'Emissions Possible – How Northumbrian Water will achieve net zero by 2027', Northumbrian Water Ltd, July 2021. ²³See 'Turning ammonia into fuel', in 'Emissions Possible', Northumbrian Water Ltd, July 2021. ²⁴See Ofwat Innovation Fund - Ofwat Water Innovation Fund (challenges.org), accessed 27 March 2022. ²⁵See: 'Emission Possible: How Northumbrian Water will reach Net Zero by 2027', Northumbrian Water, July 2021. ²⁶See Green Gas Certification Scheme, accessed 18 March 2022. ²⁷See Renewable Energy Guarantees of Origin (REGO) Ofgem, accessed 18 March 2022. ²⁸See Carbon offset guide, accessed 18 March 2022. ²⁹See: MyClimate.org, accessed 18 March 2022.

So what are the solutions?

Between now and 2030 the sector needs to press ahead with carbon reductions to keep us on track to deliver the long-term goal of a Net Zero sector in line with the Government's 2050 Net Zero target.

The regulatory regime will need to evolve for the next price review to support this progress, while being sure to balance the Net Zero ambition with customer preferences and affordability concerns. The various challenges identified above need to be addressed through a package of solutions. We present here a set of proposals to answer these challenges and support our collective goal of delivering a Net Zero water sector.

In the near term - the next price review

Improve emissions data and knowledge across the whole value chain

As has been discussed, each company will be going into the next price review having made differing amounts of progress towards delivering Net Zero. Establishing the baseline operational emissions for each company will be key to Ofwat effectively targeting funding to efficiently decarbonise across the sector – this baseline needs to be considered in terms of emission levels but also the marginal cost of emissions interventions taken and still available to each company. We consider that for consistency the measurement of GHG emissions should be made in line with the latest version of the Carbon Accounting Workbook (CAW)³⁰.

Alongside refining operational emissions data, further work is needed to develop the approach to measuring Scope 3 emissions.

This will take time – and is not a costless exercise. It would be best to focus this effort where it can have the greatest impact – on enhancement investment schemes where there are material and measurable Scope 3 emissions that water companies have scope to control or influence.

Ofwat has considerable experience in developing new data sets with the sector, for example through the development of the Annual Performance Reports³¹. It may be helpful to use tools such as confidence grading of company data to promote the development of this data for the water sector. However, development of carbon accounting standards should not be seen as a UK water sector issue in isolation. National and international carbon reporting standards are being developed across a range of sectors³². We should seek to build on the developments being made elsewhere to ensure the water sector follows an approach that is robust and consistent with the wider economy.

³⁰'Carbon Accounting Workbook', UKWIR, purchase required. ³¹See Annual performance report - Ofwat, accessed 27 March 2022. Due to the relatively liquid nature of the wholesale electricity market, low and high carbon electricity are subject to inflation above CPIH and similar price volatility and so the regulatory regime needs to separately acknowledge and account for this. ³²See for example 'The global GHG accounting & reporting standard for the financial industry', Partnership for Carbon Accounting Financials, November 2020.

Continue to fund lower emissions approaches already included in base costs

Before considering how further progress can be made on operational emissions, we must first solidify the significant progress on operational emissions reductions that has already been achieved by several companies. Ofwat should commit to funding the GHG emissions reductions already made, with reference to each company's baseline emissions, as it would any existing level of service – through base costs.

For example, buying low carbon electricity is one of the simplest ways for water companies to reduce their emissions, but there remains a small but significant (and growing) difference in costs between low and high carbon electricity. This difference is in the order of a few pounds per tonne of carbon equivalent GHG avoided.

Going forward, renewable energy purchases should be recognised as part of the accepted efficient way of operating a low carbon business – and so the funding mechanism for energy costs in the price review should enable the funding of low carbon energy³³.

If base cost allowances are set for all companies to reflect the efficient additional costs of reducing emissions incurred by those companies that have already done so, then it would be reasonable to expect all companies to achieve equivalent absolute levels of emissions taking into account the other drivers of base costs.

Fund further operational emissions reductions through outcome delivery incentives

If base cost allowances fund a consistent level of reduced emissions across companies, then the incentivisation of further operational emissions reductions will become simpler. All companies could be assumed to be able to achieve a given level of emissions without any additional funding³⁴.

Any further reductions in emissions would need to be funded to take account of the increasing marginal cost of abatement. To ensure that only efficient emissions reductions are delivered we consider it would be prudent to use a measure of the social value of carbon emission reductions to set the maximum incentive rate.

There are several options to consider.

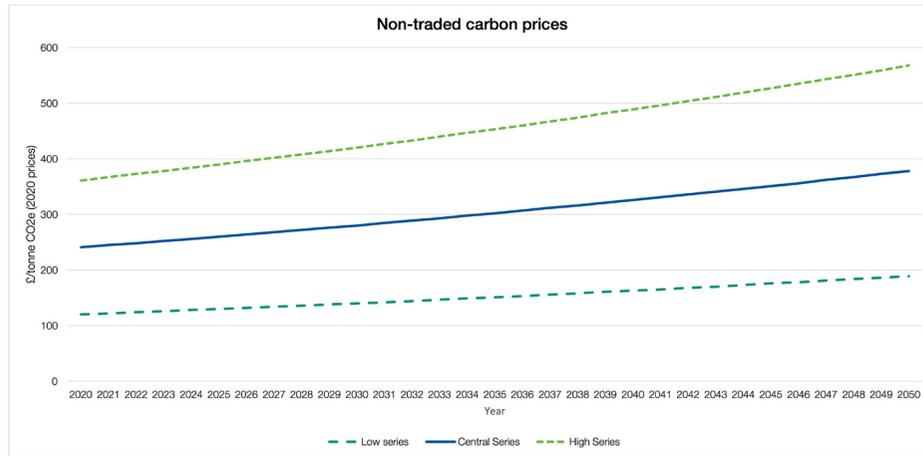
- The Government has estimated the non-traded value of GHG emissions³⁵. These are scientifically derived valuations, which are used elsewhere in the water sector; for example they are specified by the Environment Agency as a carbon prices to use when

assessing the contribution to Net Zero of actions in the Water Industry National Environment Programme (WINEP)³⁶. Non-traded prices are shown in Figure 7.

- The traded price of carbon, specifically the UK Emissions Trading Scheme (ETS), provides a market-based approach to identifying the price of GHG emissions³⁷. There is a well-established and liquid market for the trade of carbon credits in the EU ETS³⁸, and from 1 January 2021 in the UK ETS. Traded prices are shown in Figure 8. However, as the number of emissions allowances is set through a cap-and-trade system the market provides an imperfect estimate of the value of emissions.
- Customer valuations could provide an additional source of information about for the value of emissions reductions. However, this approach would require the use of willingness to pay analysis, which Ofwat has previously recognised the limitations of and encouraged companies not to rely on³⁹.

³³Note that there is a separate but related issue around how energy price volatility and levels are accounted for in revenue allowances. ³⁴A performance commitment with underperformance payments for not reaching this level of emissions could then be appropriate. ³⁵Valuation of greenhouse gas emissions: for policy appraisal and evaluation', Department for Business, Energy & Industrial Strategy, September 2021. ³⁶See 'Water Industry National Environment Programme Options Assessment Guidance', Environment Agency, December 2020. (Available on request.) ³⁷Participating in the UK ETS', Department for Business, Energy & Industrial Strategy February 2022. ³⁸EU Emissions Trading System (EU ETS)', European Commission, accessed April 2022. ³⁹See for example 'Ofwat's customer engagement policy statement and expectations for PR19', Ofwat, May 2016, p.14.

Figure 7: Non-traded carbon prices



Source: See "Policy paper Valuation of greenhouse gas emissions: for policy appraisal and evaluation", BEIS, 2 September 2021."

The non-traded and traded prices have been arrived at through a scientific approach. The traded price also reflects the marginal costs and benefits of reducing emissions. We therefore consider that it would be appropriate to use the traded and non-traded prices for setting the maximum incentive rate for GHG emissions reductions.

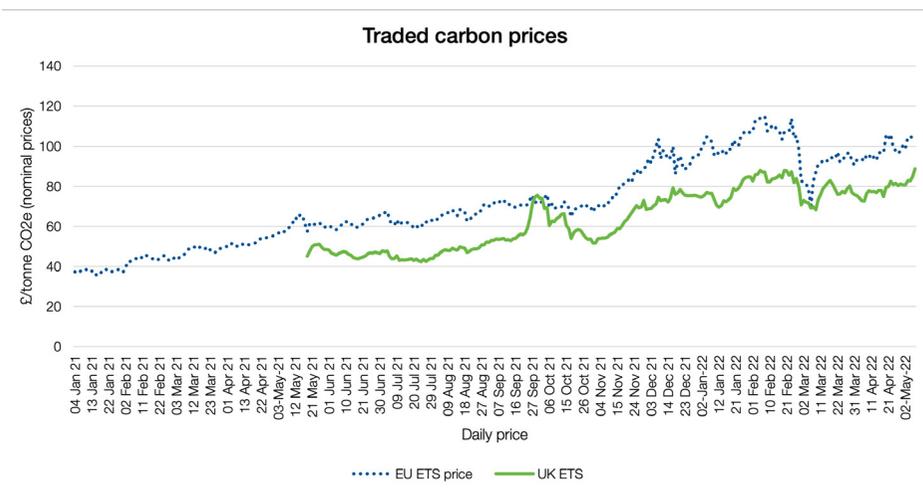
However, rather than rely on either the traded or non-traded price, Ofwat could further protect customers by implementing a "double lock" on the maximum outcome delivery incentive (ODI) rates. That is to say, the ODI rate could be set at the lowest of the non-traded price or the traded price of carbon. This would ensure that emissions reductions in the water sector were being incentivised at a rate that was at least as low, or lower than the price set in the wider economy.

However, this rate will not reflect the increasing marginal costs of abatement. We therefore consider that a sliding scale of incentive rates would be appropriate, so that as more emissions reductions are realised by a company over the period, their incentive rate would step up from a lower rate. This would be similar in approach to the enhanced ODIs approach in the PR19 methodology, or a rising block approach⁴⁰. These steps would need to reflect the increase in the marginal cost of abatement. This would ensure that all companies would have the incentive to reach zero operational emissions by 2030, while minimising the costs for customers.

This could be implemented through a ratchet approach, so that companies that have achieved given levels of emissions reductions in each year would get a higher incentive rate in the following year. Following this approach companies would need to be able to demonstrate progress in order to unlock higher incentive rates.

⁴⁰"Delivering Water 2020: Our final methodology for the 2019 price review", Ofwat, December 2017, p.62-64.

Figure 9: Traded EU ETS and UK ETS prices



Source: See Carbon pricing | Ember (ember-climate.org). Conversion to GBP using Bank of England Exchange rate.

All companies should be set the same ultimate target – of reducing operational emissions to zero by 2030. This will result in the companies that are further ahead being set less stretching targets than those further behind in the next price review. The companies further behind need to catch up, and the companies in front will face higher abatement costs, so there would be no benefit in setting a common percentage target, as was done for leakage in PR19. A common percentage increase across all companies would therefore not be appropriate.

Invest in Scope 3 emissions reductions through a GHG reduction fund

Reducing operational emissions is necessary, but not sufficient to keep the sector on track to deliver the emission reductions needed by 2030 to maintain the required pathway to reach Net Zero by 2050. But the data on Scope 3 emissions is not yet good enough to support an emissions reductions incentive funded by customer bills to deliver reductions across the value chain. This is because, unlike for operational emissions where a clear baseline exists

(last year's emissions), for capital schemes a baseline must be devised for each scheme in the form of a counterfactual. It would be inefficient to fully engineer this counterfactual and the preferred solution as this would result in additional costs for customers. This measurement challenge means there is a risk that companies could get the carbon emissions of the counterfactual – and hence the estimate of the GHG reduction – wrong and so over or under state the GHG emissions reductions from the preferred option.

As a sector we also face the physical challenge of not yet having the technology to reduce emissions in certain areas, such as in process emissions, and so we need to trial new approaches to address these engineering challenges. As the focus on achieving Net Zero increases there will no doubt be an increase in innovation across the economy from which we as a sector can learn from and drawn on.

Instead of a company level incentive, reductions of emissions beyond operational emissions should be driven on enhancement investment schemes with a significant focus on reducing GHG emissions. These enhancement investment schemes will deliver GHG benefits for the industry – to ensure we deliver the most efficient emissions reductions, the schemes with the lowest marginal cost of abatement for the sector should be chosen, and then the costs of these socialised across all customers. We consider that this could be delivered through a GHG emissions reduction fund.

Creating a fund akin to the innovation fund would enable the cost of implementing sector specific solutions to be socialised across water customers, and facilitate partnering with and learning from other sectors. By socialising the costs, efficiency could be improved as only the projects with the lowest marginal cost of abatement across the sector would be taken forward. Because GHG emissions are a global, not a local issue, initial delivery of reductions by a subset of water companies would result in an equivalent benefit to the environment, but likely at lower cost

to customers. As with the innovation fund, we would expect learning from these projects to be shared across and beyond the sector. To implement this effectively the fund would need to be run by a team with appropriate skills and experience to ensure that the environmental gain proposed by any project is a true deliverable and measurable GHG reduction.

Customers could be further protected by limiting the marginal abatement cost of the fund and with the total emissions reductions delivered by the fund capped at what is necessary for the sector to stay on target to deliver UK government targets.

Alongside this it should be recognised that we do not yet have all the technical solutions we need. The innovation fund is a proven platform for supporting the development of new approaches and should be maintained as well. Some future innovation fund competitions could also be focused on Net Zero issues, such as how to reduce process emissions.

Support appropriate offsets and insets

Even with innovation, some emissions will be too difficult or too costly to efficiently reduce or remove directly in the near-term. The right thing to do for customers and the environment in these cases is to use offsets and insets to reach Net Zero. But we need to ensure that the offsets and insets used are robust and appropriate.

We propose that Ofwat develop a set of principles for water companies to follow when sourcing offset and inset credits to ensure we can deliver these emission reductions while maintaining the trust and confidence of our customers.

These principles should cover:

- **Relevance:** the offsets or insets should deliver demonstrable GHG emissions reductions.
- **Confidence:** there should be a high degree of confidence that the GHG reductions have been delivered. Schemes that can be more easily monitored, for example schemes in the UK, may be more appropriate.
- **Assurance:** there should be a suitable level of assurance in place to guarantee the origin of the GHG reductions and to avoid double counting of benefits.

In the long-term for 2030 and beyond

The water sector and the UK already have a clear ambition for the long-term – we need to reach Net Zero by 2050. Steady progress will need to be made across the sector every year and through every price review to deliver that long-term ambition. As companies we will need to think strategically about how we can best deliver that goal – through increased monitoring and measurement of emissions, building consideration of emissions into our plans and investing in innovation.

Our regulators will need to support us in delivering those steady and sustained emissions reductions. We will need to balance delivering Net Zero at pace against affordability, providing excellent service to our customers and increasing the value derived from our natural capital.

We encourage Ofwat to consider how it can support the development of improved data and evidence to inform the long-term approach to GHG emission reductions. And we welcome the renewed focus from Ofwat on the long-term nature of the water sector, as set out in its guidance on long-term delivery strategies⁴¹.



⁴¹See 'PR24 and beyond: Final guidance on long-term delivery strategies', Ofwat, April 2022.

Conclusions

Water and wastewater companies have historically been major contributors to the UK's GHG. The sector is already working together to better understand and reduce its emissions, with ambitious targets and progress as set out in the Net Zero routemap.

In doing so we have been targeting the low hanging fruit. For some companies some of this fruit is still ripe for the picking, but for those that have already made strong progress in reducing their emissions, the next step will be tougher – and the marginal cost will be higher.

And there is more to do to ensure as a sector we evolve and improve our approach to measure Scope 3 emissions and deliver genuine emissions reductions in capital schemes. The regulatory regime needs to adapt to support the delivery of Net Zero as a globally important outcome. By taking the following actions Ofwat would help move us a significant step towards this goal in the next regulatory cycle.

Key actions

1. Standardising the measurement of operational emissions to set a baseline for each company to get to Net Zero operational emissions by 2030 that reflects their previous progress.
2. Improving the measurement of 'Scope 3' emissions over AMP 8, through collaboration and providing appropriate funding, so targets can be set in future that customers can trust.
3. Setting base cost allowances in a robust way to recognise the efficient additional costs of delivering a lower baseline of operational emissions, recognising that companies have delivered varying levels of reductions through existing base cost allowances.
4. Incentivising further operational emissions reductions while protecting customers using a common PC with a financial ODI, possibly with a rising ODI rate. The maximum incentive rate could be derived from a 'double lock' on carbon prices based on the non-traded carbon price and the UK ETS traded carbon price to ensure customers pay no more for emissions reductions than they will in the wider economy.
5. Requiring all enhancement investment schemes to consider GHG impacts of options.
6. Encouraging companies to make enhancement investment schemes for well evidenced GHG emissions reductions projects.
7. Creating a GHG emissions reduction fund to socialise the cost of GHG emissions reduction projects.
8. Continuing Ofwat's successful innovation fund – to support collaboration and the development of new solutions.
9. Supporting use of appropriate offsets and insets by providing guidance / principles and monitoring their use.

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