

Decarbonising water resources

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Overview

The increasing impact of climate change on the UK's water supply is irrefutable: we have experienced the hottest summers on record in two of the last three years, and at the same time we are experiencing record flooding. When combined with changes in consumer behaviour that Covid-19 has brought to the fore, there is a compelling need for significant investment in water resource capacity.

Although the sector has commenced this journey and is developing a number of schemes for PR24, there is an urgent need to find lower-carbon solutions. Traditional solutions are very carbon intensive, with 1MU/d typically creating 400 tonnes of carbon – meaning that the additional supply-demand capacity the Government has identified in its Infrastructure Plans will add 350,000 tonnes of carbon into the atmosphere unless we take action¹.

We see an opportunity to take a significant first step towards decoupling water supply from carbon emissions and achieving a net-zero carbon water sector. Our proposal seeks to create the UK's first net-zero carbon water supply², addressing 25% of our region's long-term water deficit and improving our resilience to extreme flooding events.

We propose to work with our customers and other sectors to reduce water use, and to trial new approaches to reducing and offsetting unavoidable chemical and energy use in water treatment. Critically, this project will allow us to reveal the challenges, opportunities and costs of decarbonisation ahead of PR24 – for the whole water sector. The learnings we generate will be shared across the sector through our demonstrator water treatment works.

This document is a summary of our detailed triple-track approach to decarbonising new water resources in order to achieve net-zero carbon. Our proposal includes:

- reducing water demand, including a groundbreaking grey water partnership with 3,000 high-use businesses in the East Midlands;
- diverting flood waters from the River Severn into combined flood and drought water storage, simultaneously tackling flood and drought challenges; and
- creating new low-carbon/reduced-chemical treatment capacity at two existing treatment works.

As well as creating 109MU/d of net-zero water supply, this £206m proposal will stimulate economic growth, helping society recover from the impact of the Covid-19 pandemic. This includes creating around 460 jobs, delivering visible amenity improvements to local communities and 46 hectares of biodiversity benefit. In our independently conducted research, 75% of household customers were supportive of our proposals, with a further 20% saying they did not mind in principle.

A central feature of our response to the Green Recovery is ensuring bills remain affordable. We have invested

¹ HM Government, Response to the National Infrastructure Assessment - recommendation 47, November 2020.

² For this project, 'net-zero carbon' will be achieved by minimising carbon and then offsetting unavoidable emissions through renewable energy and tree planting. Our long-term aim is to identify solutions that will enable the remaining deficit to be decarbonised without offsets.



Creating the UK's first ever net-zero carbon water supply is hugely exciting – we can help Britain to build back better by creating over four hundred and fifty new jobs, improve our natural resilience to drought and flooding, and help the Government and water sector deliver on their net-zero ambitions.

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Liv Garfield,
Chief Executive



outperformance to enable us to move quickly, having purchased the abstraction licence at the Rugeley power plant. We have also been working with third parties such as the River Severn Partnership to improve the value to customers, which is helping us access solutions that are around 20% cheaper than the industry unit rate. Most importantly, we are limiting the impact on bills in the current period to 15% for the entire £730m package of six Green Recovery proposals. This equates to around £6 extra per year (on the average household bill) – which our independently conducted research found over 70% of our customers would be willing to pay.

Environmental benefits	Economic benefits	Social benefits
<ul style="list-style-type: none"> ● Creating 109MU/d of additional, sustainable water supply with net-zero carbon impact. ● Our use of natural processes to help treat the water will enhance 46 hectares of habitat to deliver a net gain in biodiversity ● These innovative methods will reduce the need for intensive treatment and so will reduce carbon dioxide emissions by 83 kilo-tonnes over the next 25 years 	<ul style="list-style-type: none"> ● Our proposals will create approximately 240 jobs within Severn Trent and our supply chain and a further 220 in the wider supply chain ● Protecting 4,000 homes and businesses in the Shrewsbury area from flooding (worth £400m in avoided damage and freeing up land for housing and commercial growth over the lifetime of the scheme) 	<ul style="list-style-type: none"> ● Creating raw water storage will provide a blue space for increased physical activity and recreation for around 170,000 visitors per year ● Increasing our production capacity will enable us to continue to keep pace with demand for water during hot dry weather - in line with our customers' expectations

About this document

The Green Recovery has provided us with a welcome opportunity to be bold, move faster, and think outside our traditional remit.

This is one of six proposals, that we have prepared for consideration by Defra and Industry Regulators. Like the others, it has been chosen because it represents a 'knotty problem' we need to untie to benefit the UK in the long term; it will require multi-agency collaboration in order to deliver at scale and pace; and, importantly, customers are energised by this topic.

Why decarbonise our water resources?

The combined challenges of climate change, population growth, and the need to limit the quantity of water we abstract in order to protect the environment, mean that we expect an estimated 400M/d shortfall in water supply across our region by 2040.

There is consistent and increasing urgency from Government and Industry Regulators for progress towards increased water resilience, carbon and climate change targets. Since our AMP7 plans were approved in January 2019, the emphasis on tackling climate change has grown significantly, opening up a number of new 'no-regrets' actions for decarbonising our water supply.

June 2017	The Committee on Climate Change identified ³ tackling water resource issues as one of the five priority areas for the UK. It predicts that demand for water in England will exceed supply by between 1.1 and 3.1bn litres a day by 2050. In the Midlands, we are facing a potential shortfall of 400M/d by 2040.
January 2018	The Government's 25 Year Environment Plan ⁴ pledged that we will be the first generation to leave the environment in a better condition than we found it. The plan mandates that all infrastructure development leads to an environmental net gain.
April 2018	The National Infrastructure Commission report, <i>Preparing for a drier future</i> ⁵ , recommended that we plan for a more extreme drought event of 1 in 500 years, in part to adapt to climate change. We estimate that using traditional solutions to achieve this greater level of drought resilience would lead the water sector to emit 530,000 extra tonnes of carbon ⁶ .
June 2019	The UK became the first major economy to pass a net-zero emissions law. The new target will require the UK to bring all greenhouse gas emissions to net zero by 2050 ⁷ .
March 2020	The Environment Agency report, <i>Meeting our future water needs, a national framework</i> ⁸ , explicitly recognised the need for a greater level of ambition for restoring, protecting and improving the environment (which includes all aspects of natural capital and carbon) when establishing plans to meet the growing demand.
July 2020	This greater ambition was taken forward into the revised Water Resources Management Plan guidelines that were published for consultation.
November 2020	In her speech on climate change and water, the Chair of the Environment Agency emphasised the need to "shift gears on the climate emergency" ⁹ .

We need to move faster to deliver policies that match our ambitions, leaving a sustainable legacy in an affordable way.

Our vision for decarbonising water resources

Our vision for this proposal is to address 25% of our long-term water deficit with a net-positive environmental benefit: specifically, no net increase in carbon. In order to achieve this, we need to find innovative solutions to avoid the 124,000 tonnes of carbon that would be created if we implemented our approved Water Resource Management Plan¹⁰. This includes using techniques and materials that use less carbon than traditional concrete construction, planting even more trees and restoring habitats, and increasing the amount of green energy we generate. We are also investigating innovative ways of lowering energy use in operation and capturing carbon from our treatment processes.

Our aim is to reimagine water economics (through innovation, collaboration and holistic thinking) so that a decarbonised, environmentally net-positive, long-term plan is also best value for customers. The aim is to also identify solutions that will enable the remaining long-term deficit to be decarbonised, so no further offsetting will be required.

The benefits of this proposal

Our proposals will unlock significant economic, social and environmental benefits in both the short and long term¹¹.

Short-term benefits:

- Economic growth and around 460 jobs created through our delivery and the multiplier effect across the supply chain.
- 46 hectares of improved biodiversity, in particular through wetland treatment as part of in-river pre-treatment solutions and as part of the development of flood water/drought resilience storage.
- Insights to help shape PR24, by revealing costs and other data that Ofwat can utilise when assessing plans.

Medium-term benefits:

- Increased health and wellbeing through greening, creating access to low-cost, local recreation natural endowments, as part of the water storage development.
- Insight generation for developing cost-efficient, decarbonised and reduced-chemical water treatment, which will be shared openly with other water companies and other interested stakeholders.
- Improved service through enhancements that better meet peak demand requirements during hot weather.

Long-term benefits:

- Increased drought resilience through the future reuse of highly treated effluent from our bathing rivers proposal¹².
- Increased flood resilience – the flood/drought storage is a critical input into the River Severn Water Management Scheme (flood alleviation), which will reduce the risk of flooding for 3,000 homes and 1,000 businesses.

³ <https://www.theccc.org.uk/2017/09/12/pressure-preparing-uk-water-shortages/>

⁴ https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/693158/25-year-environment-plan.pdf

⁵ <https://nic.org.uk/app/uploads/NIC-Preparing-for-a-Drier-Future-26-April-2018.pdf>

⁶ See full business case for assumptions

⁷ <https://www.gov.uk/government/news/uk-becomes-first-major-economy-to-pass-net-zero-emissions-law>

⁸ <https://www.gov.uk/government/publications/meeting-our-future-water-needs-a-national-framework-for-water-resources>

⁹ <https://www.gov.uk/government/speeches/climate-change-and-water-are-we-doing-enough-fast-enough--2>

¹⁰ Approved by the Secretary of State in 2019

¹¹ Evidence for these benefits is provided in the full business case.

¹² Costs for this interconnectivity are not included in this proposal and would form part of our AMP8 plans.

Why now?

The Green Recovery is our catalyst to decouple water supply from carbon emissions. With the Government identifying a need for 4,000Ml/d of new supply-demand capacity and more immediate schemes due to start at PR24 through RAPID, we need to disrupt the paradigm that 1Ml/d leads to 400 tonnes of carbon reaching the atmosphere.

Our approach will gain increased water supply and drought resilience with net-positive environmental benefits and net-zero carbon impact, whilst keeping bills affordable. This investment will achieve:

1.

Accelerating the achievement of Government priorities

Revealing the costs and benefits of the bolder ambitions set out in guidance and framework documents will help the sector make better-informed decisions in PR24, fast-tracking action by at least five years.

2.

Skills and jobs for the UK's green recovery

Our proposal offers the opportunity to deliver wider benefits that are common to the Green Recovery objectives, right at the heart of communities. Delivering our proposal will directly create around 240 much-needed jobs within our region and protect a further 220 other jobs across our supply chain that are exposed to the economic downturn from Covid-19.

3.

Near-term, visible customer benefits that meet changing expectations

Hot-weather events are becoming more frequent and lasting longer, and peak demand for water has increased 9% between 2007 and 2020. This trend increased during the pandemic as the volume of peak demand increased by 2% compared to historic hot weather periods (peak pandemic demand was up to 40% higher than average demand). As an essential service, our systems need to be resilient to changing weather and demand patterns, even through periods of unusually high peak demand.

4.

Sharing learning across the industry

The costs and value of the benefits of decarbonising water resources are not fully known. Our proposal includes creating a demonstrator water treatment works, which we will make available for others to learn from. Recent disruption has also revealed the fragility of the sector's chemical supply chain. By trialling new reduced-chemical water resource solutions, we can enhance the sector's resilience to external shocks.

5.

Time-bound opportunity to share costs and benefits with other organisations

The opportunity to access flood water to support our drought resilience plans is time bound, as it is reliant on collaboration with the River Severn Partnership's existing flood resilience plans. Given the cost of this source is around 20% lower than the industry unit cost £1.2m/Ml/d¹³ of new resource, we want to lock in long-term savings for our customers.

6.

Economic circumstances create the optimal conditions for investment

With the cost of debt at a record low, and inflation well below the assumptions at PR19, we have the opportunity to invest at a very low cost and keep bills affordable.

¹³Based on PR19 supply-demand models.

Our proposal

Our £206m, triple-track approach to create 109MI/d of resilience, drought and peak demand headroom with no net-carbon impact includes the following elements:

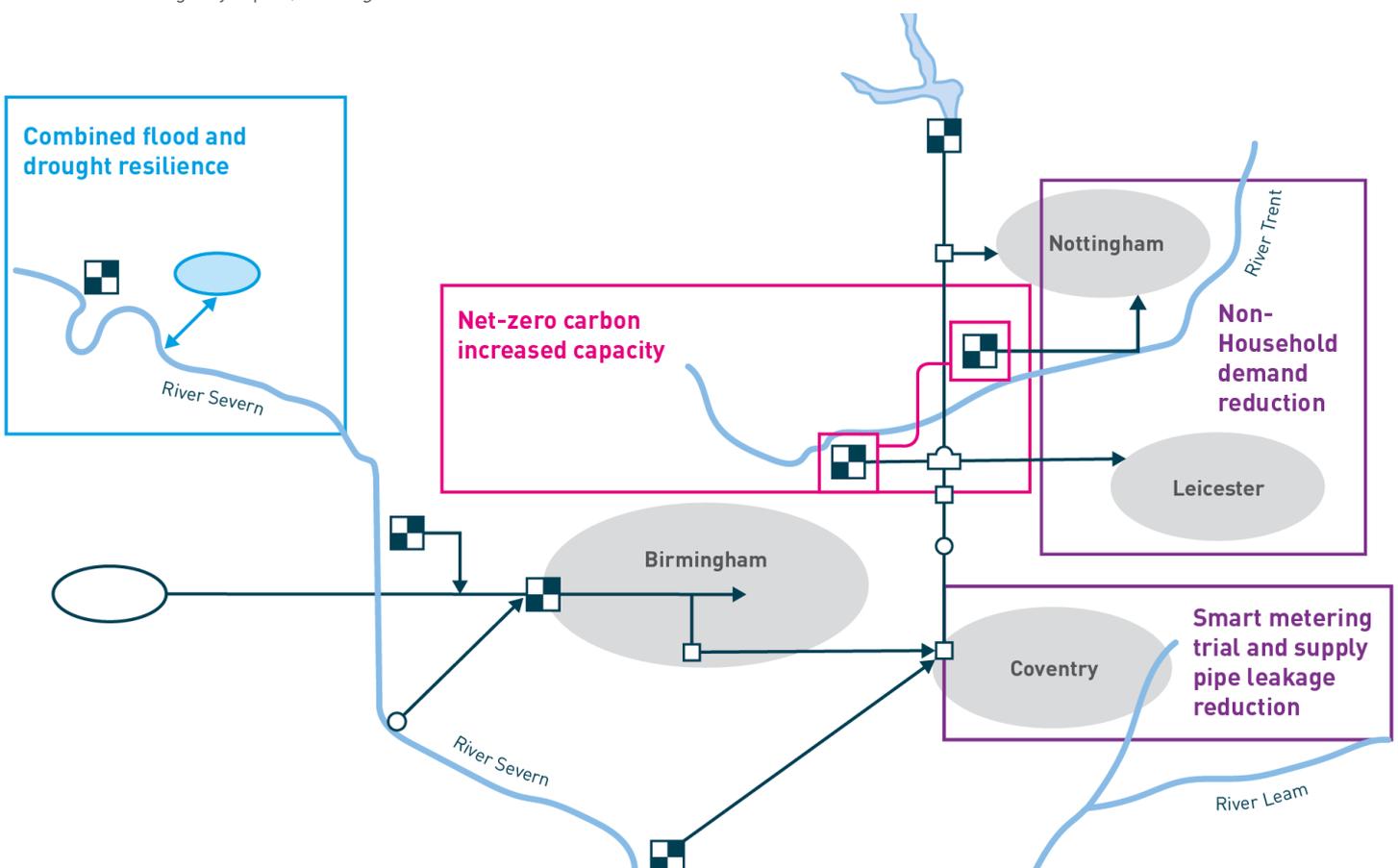
- Reduce water demand by 8MI/d through a combination of accelerated metering (3MI/d), tackling customer pipe leakage (1MI/d)¹⁴ and groundbreaking partnerships with 3,000 high-use business customers in the East Midlands to set up grey water systems reducing reliance on the mains water supply (4MI/d).
- Divert potential flood water from the River Severn into a combined flood/ drought storage reservoir and then reuse this water by gravity transfer at our existing water treatment works further down the River Severn. This will be a collaborative proposal with the River Severn Partnership, not only increasing flood and drought resilience by 40MI/d, but also providing a beautiful public amenity that offers health and wellbeing benefits.
- Create new low-carbon/reduced-chemical treatment capacity for 65MI/d, split across two existing treatment works in the East Midlands. This will involve a new abstraction on the River Trent using a licence we have already procured, and new low-chemical treatment facilities that seek to maximise the use of natural processes, and by doing so, improve the biodiversity of 46 hectares of habitat. The energy to operate these upgrades will be new renewable energy capacity. We will share insights on technology for low-carbon, reduced-chemical and biodiversity-enhancing water treatment, and lead the sector in meeting ambitions set out in the Environment Agency report, *Meeting our future water needs*.

Programme costs

Expenditure of £206m will be phased between 2021/22 and 2025.

We propose maximising third-party funding and synergies, aligning benefits to deliver more for customers. We have sought challenge and assurance on our solution selection and cost estimates. Our costs are benchmarked against the PR19 final determination, which sets the benchmark for cost efficiency. The majority of the expenditure will not be recovered from customers until after the costs and benefits are robustly demonstrated. We will work with regulators and stakeholders to keep challenging the scope, delivery and possibilities for those we serve.

The accompanying business case gives further depth to these proposals, programme, timeline and costs and evidence to demonstrate cost efficiency.



¹⁴ The costs associated with metering and supply pipe leakage are covered in separate proposals.