Sustainability Factsheet: Climate change, net zero and the circular economy

Water is vital to health and wellbeing, to the economic prosperity of the East of England, and to maintaining a thriving natural environment that we can all enjoy. Yet we face growing challenges from population growth in our region and climate change. To meet these challenges, we all have to play our part in balancing the needs of society, business and the environment to enable a sustainable future.

Anglian Water's commitment to the environmental and social prosperity of our region goes back many years, even before we set out our Love Every Drop strategy in 2010. We first considered climate change in our assessment of water resources back in 1993 and our education programme has reached nearly half a million people since its launch in 2006. In 2015 we were awarded the Queen's Award for Enterprise: Sustainable Development in recognition of our work, while in 2017 we were named Responsible Business of the Year, in large part due to our community regeneration work in Wisbech.

You can read more about our sustainability commitments here
https://www.anglianwater.co.uk/about-us/who-we-are/sustainability/

In delivering on these sustainability commitments, we have designed the new facility to play an important role in combatting climate change, to be resilient to our changing climate and to provide a central role in the circular economy.

Anglian Water - net zero by 2030

To limit the most damaging impacts of climate change, society needs to reduce greenhouse gas emissions and adapt to the current and future changes in the climate.

Since 2007 we have set ambitious long-term goals to transform our business and reduce greenhouse gases. In 2019 along with other water companies in England we agreed a series of pledges as part of a new 'Public Interest Commitment' to show leadership at a national level. One of the pledges was to achieve net zero carbon emissions for the sector by 2030.

Our Climate Change Adaptation Report 2020 reiterates the pledges of the water industry in Water UK Net Zero 2030 Routemap and outlines the short and long term goals we are currently progressing to achieve our pledge.

'Water companies are not like other businesses. We provide a vital public service hinged on major infrastructure and yet we're also a large landowner and custodian of the natural environment, including the rivers and seas that provide over 28 million homes and businesses with drinking water and take our waste.' - Water UK

To achieve this pledge, we need to be innovative in designing new assets, reduce the energy we consume, and work collaboratively to increase our on-site renewable generation. We also need to measure with certainty the energy we use today and forecast our demand in the future.

The circular economy – clean water, nutrients, and energy

The "circular economy" is a concept that has long been talked about by governments, businesses, and charities as a way of working to create a more sustainable future. A common definition is that in a circular economy, the value of products and materials is maintained for as long as possible. Waste and resource use are minimised, and when a product reaches the end of its life, it is used again to create further value. This can bring major economic benefits, contribute to innovation, growth and job creation. The definitions of a what a circular economy looks like can vary, but at the very heart of the concept is a shift from a linear model of production and consumption to a more circular system.

The man-made water cycle is inherently circular: we abstract water from the environment to provide our customers with a vital resource, in the form of potable water. Once this is used it is discharged into the sewerage network as wastewater which is then taken away and treated and recycled back into rivers and streams. Other by- products of the water treatment process generates additional nutrients and energy which can also be returned back into the environment.

It's our view that every one of our assets has a big part to play in ensuring the cycle adds value to the community and environment we serve.

We know climate change projections suggest our rivers will have lower and slower flows, increasing the concentrations of any pollutants and risking their health. Significant projected housing and employment growth will also place further strain on our natural water resources, meaning that to ensure we continue to serve our customers and protect the environment, we must develop sustainable solutions that ensure supply meets demand. We understand we have a duty to manage water consumption, so that it is protected as a resource for future generations. We also know that soil and its nutrients, critical to the agricultural economy of our area, is being lost in water bodies. We therefore have a role to play in trying to minimise this and harness its value.

We have already committed to and adopted the concept of a circular economy within our wider business and at other water recycling centres and at our reservoirs. Examples include:

- Enhancing the environment, capturing carbon and creating natural filters through the creation and management of wetlands at our Water Recycling Centres. Our wetland habitat constructed in partnership with the Norfolk Rivers Trust at Ingoldisthorpe Water Recycling Centre helps to filter ammonia and phosphate from our final effluent before it is discharged into the River Ingol (a unique natural habitat, being one of only 200 chalk streams in the world);
- Working with partners to co-compost organic material at water recycling centres; and
- Partnering with companies such as Oasthouse Ventures to build the world's first low-carbon greenhouses. The greenhouses are the largest in the UK and will be warmed by the waste heat from our treatment facilities.

Our plans for the Cambridge Waste Water Treatment Plant Relocation Project

We see the new facility as a Water, Nutrient and Energy Recycling Centre, capable of adding value to the community we serve. We understand how important sustainability is to the Greater Cambridge area, and through the processes we use in our new facility we will play an important part in delivering more sustainable lifestyles.

The new facility will:

- be operationally net zero in its carbon emissions and energy neutral. Our main form of renewable energy generation will be Gas to Grid technology for the sludge treatment facility. This technology will enable us to upgrade the biogas generated by the sludge treatment process into biomethane and convey it into the existing gas network to offset natural gas usage previously from fossil fuels. It is anticipated that this will result in a calculated reduction of 4680 tonnes (t) of carbon dioxide (CO2) equivalent (e) (tCO2e)/yr against a 2010 baseline project, taking this element of the plant from producing carbon emissions to being a net remover of CO2 from the atmosphere. The facility will also be powered by solar panels, strategically placed throughout the facility.
- ensure that the health of the River Cam is protected and where possible, improved, through ensuring that the current flow to the river from the Cambridge WRC is maintained throughout the new facility's lifecycle.
- recycle nutrients, in the form of Ammonia and Phosphorus found in sewage, to aid the green economy.
- treat the biosolids captured as part of the wastewater treatment process, creating an enhanced soil conditioner for use by local agriculture.
- generate biogas which, when processed and exported into the local gas network, will be used to heat the homes of the local community as a renewable fuel source.
- minimise waste during construction and incorporate reused or recycled materials as much as possible. Waste materials arising from the decommissioning of the existing site will also be considered for their reuse or recycling possibility.
- Provide educational opportunities, through the creation of a Discovery Centre, for customers and communities to understand the role which water recycling centres play in the Circular Economy.

Additional opportunities we are looking into at our facility

In addition to the sustainability initiatives described above we are also considering other opportunities including:

Water re-use

We are exploring opportunities to see where the water we recycle can add the most value to the surrounding water resources and support the wider 'Water Resources East Plan', either through further processing or through the transfer of treated water to Cambridge Water or other suppliers

Heat recovery

Waste heat can be extracted during the sewage treatment process, a resource which is currently not fully utilised in the United Kingdom. If feasible, this innovative technology could reduce the amount of biogas required to heat the treatment processes and increase the volume available for public consumption.

Reduction of capital carbon

As a new infrastructure asset, the project has the potential to support the company's net zero carbon commitment, in line with Water UK Net Zero 2030 Routemap, by reducing capital carbon. Capital Carbon, also referred to as embedded or embodied carbon, describes the total amount of Green House Gas (GHG) emissions generated from the construction of infrastructure.

We are currently reviewing construction methodologies, material selection and carbon in the supply chain to help deliver Anglian Water's overall aim of reducing capital carbon by 70% compared with a 2010 baseline Options currently being reviewed to reduce capital carbon include:

- Low carbon concrete
- Pre-cast concrete to reduce waste and construction
- Local sourcing of construction materials
- Alternative materials for tunnels and pipelines
- Design for Manufacture and Assembly (DFMA) – efficient offsite manufacture of process plant and equipment
- Utilisation of spoil and demolition waste in construction
- Advanced process selection to reduce the overall size of the plant

Delivering a climate resilient design

In addition to delivering a net zero and energy neutral facility which contributes to the circular economy we must also ensure that what we build and operate is resilient to our changing climate. Our facility will be constructed to be resilient to climate change to the 2080s and beyond, drawing on predictions from the UK Climate Projections 2018 (UKCP18) climate analysis tool.

By designing a facility which can contain and manage higher network flows due to increased precipitation rates and that seeks ways to reuse waste-water in face of water scarcity we can build resilience into design.