RESEARCH AND INNOVATION PRIORITIES

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Chris Jones, R&D Manager

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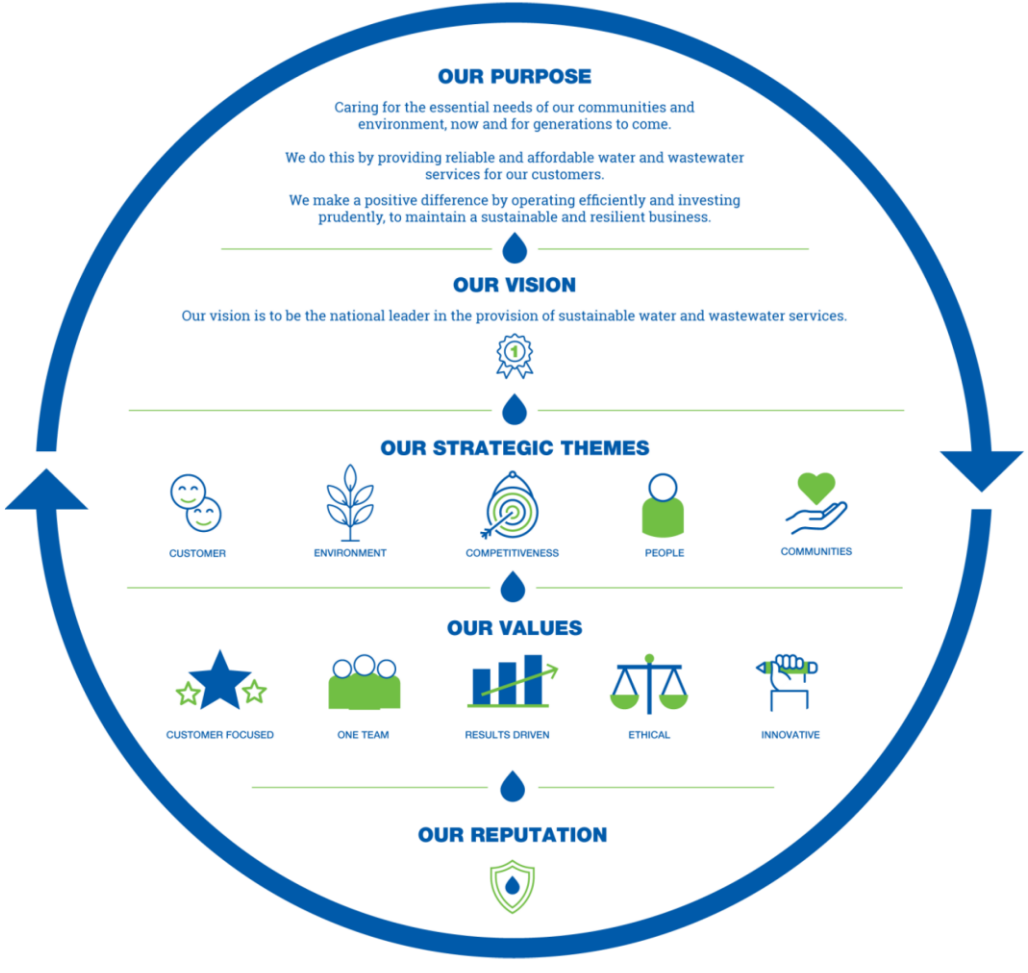
RESEARCH AND INNOVATION PRIORITIES
SHAPED BY OUR PURPOSE, VISION AND VALUES



Our Values

Customer focused - We aim to exceed the expectations of our external and internal customers.

- Results-driven - We take personal responsibility for achieving excellent business results.

- Ethical - We are open and honest and meet our commitments with a responsible approach to the environment and our communities.

- Innovative - We continuously strive for innovative and better ways to deliver our business.

- One team - We work together consistently, promoting co-operation and mutual support, to achieve our corporate objectives.

RESEARCH AND INNOVATION PRIORITIES
ALIGNED WITH STRATEGIC THEMES AND LONG-TERM GOALS

Reliable service and unrivalled customer experience

Deliver clean, clear and great tasting drinking water and world class service

Caring for the long-term needs of the environment

Restore and enhance our local and global environment

Sustainability and resilience

Be the national leader in the provision of sustainable and resilient water and wastewater services in a changing world

Affordable and inclusive services

Provide affordable water and wastewater services for all of our customers, always

Efficiency and prudent investment

Lead in efficiency and innovation in the water sector

Caring for our communities

Support communities and economies in our regions

RESEARCH AND INNOVATION PRIORITIES
ADDRESSING OUR LONG-TERM TARGETS

Customer Service

- Consistently deliver high quality water – Compliance Risk Index (CRI) of zero.
- Leading levels of customer service – as defined by current metrics (C-MeX, D-MeX and BR-MeX).
- Reliable water supplies – reduce interruptions to supply greater than 3 hours to less than 2 minutes/customer/year on average by 2050.
- Eliminate the impact of lead on customers – replace all lead customer supply pipes by 2050.
- Reduce internal sewer flooding – by 60% (from our 2024/25 performance levels) by 2050.
- Reduce external sewer flooding – by 60% (from our 2024/25 performance levels) by 2050.

Environment (1 of 2)

- Reduce household water per capita consumption – to 122 l/p/d by 2038 and110 l/p/d by 2050.
- Reduce non-household water demand – by 9% by 2038, excluding growth (from 2019/20 levels).
- Halve leakage – achieve a 55% reduction in leakage in our North East levels by 2050 (61.1 Ml/d) and a 40% reduction in leakage in our Essex and Suffolk regions by 2050 (40.1 Ml/d), to achieve the national target of 50% companywide (from 2017/18 baseline).
- Eliminate harm from storm overflow discharges – year on year reductions in number of storm overflows operating more than 10 times a year on average, and none doing so by 2050.

Environment (2 of 2)

- Leading levels of water quality – eliminate the detrimental impacts of our operations and assets on waterbodies as soon as is practical. Work with partners so that, where possible, waterbodies in our regions can achieve good ecological status.
- Leading levels of pollution incidents – zero serious pollutions now and always, zero pollutions as a result of our assets and operations and reduce the number of category 1 – 3 pollutions by 50% by 2040 (from 2022 baseline).
- Enhance biodiversity – all our construction activities, including those that do not require planning permission, will result in a net gain in biodiversity of 10% or the local requirement where higher.
- Excellent bathing waters – all bathing waters at good or excellent status by 2030.
- Protect water environments – target 100% discharge permit compliance and maintain at least 99%.

RESEARCH AND INNOVATION PRIORITIES
ADDRESSING OUR LONG-TERM TARGETS

Sustainability and resilience

- Deliver Net Zero – achieve Net Zero Scope 1, 2 and 3 emissions by 2050.
- Halve carbon impact of new assets – reduce embodied carbon by 50% for new assets by 2040 (from 2025/26 baseline).
- Increase renewable generation – 100% of our electricity will come from additional* renewable generation by 2040.
- Reduce chemical and energy use – by 20% for all new assets by 2035 (from 2019/20 baseline).
- Resilient water supplies – household customers continue to have a sufficient and secure supply of water by planning to be resilient to 1 in 500-year drought.
- Leading asset management practices – achieve AMMA assessment of leading or optimising for all measures of asset management maturity by 2030 and leading by 2035.

RESEARCH AND INNOVATION PRIORITIES
ADDRESSING OUR LONG-TERM TARGETS

Affordable and inclusive services

- Eliminate Water Poverty – by 2030 no customer will spend more than 5% of their disposable income after housing costs on water and wastewater services and we will maintain this.

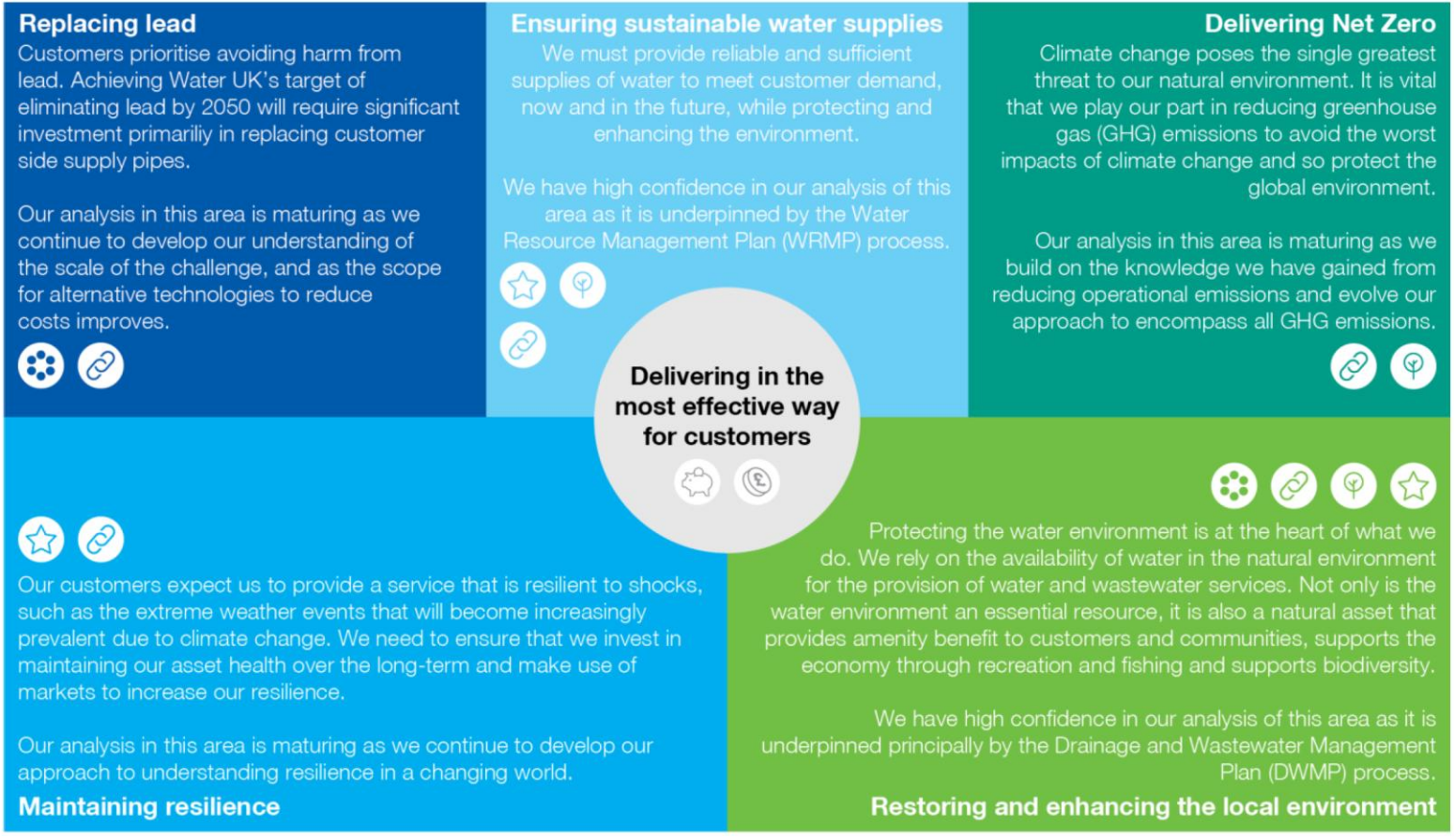
Efficiency and prudent investment

- Leading levels of efficiency – be the most efficient company in the sector in the round by 2030 and maintain that position.
- Leading in innovation – have an innovation pipeline of at least £100m (including Ofwat innovation fund competition) by 2030 and maintain it.

Caring for our communities

- Support our local economies – maintain spending at least 60p in every £ with suppliers in our region.
- Give time back to the community – at least 50% of our employees to spend time volunteering every year.

RESEARCH AND INNOVATION PRIORITIES
ENABLING LONG-TERM INVESTMENT



PRIORITY PERFORMANCE COMMITMENTS – UNDERPERFORMING AREAS

Compliance Risk Index (CRI): a measure of overall drinking water quality, designed to illustrate the risk arising from treated water compliance failures, aligned with the current risk-based approach to regulation of water supplies used by the Drinking Water Inspectorate (DWI). Non-compliance can result from deficiencies in water treatment, storage and distribution, so innovation is needed across all these areas.

Per Capita Consumption: a measure of household water consumption in litres per person per day (l/person/d). The Performance Commitment is based on the percentage reduction of three-year average PCC from the 2019-20 baseline. This measure is largely dependent on changing customer behaviour, using a range of ‘soft’ and ‘hard’ interventions.

Business demand: a measure of non-household water consumption, for which NWG has committed to a 9% reduction, excluding growth, by 2038. Scale and financial imperative provide addition opportunities to household water efficiency interventions.

PRIORITY PERFORMANCE COMMITMENTS – UNDERPERFORMING AREAS

Unplanned outage: a measure of the health of our water abstraction and treatment assets. It is designed to make sure water companies appropriately maintain and improve asset health and demonstrate their commitment to asset stewardship responsibilities. Asset health assessment, modelling and forecasts are key as is anticipating changing demands on our assets e.g. due to climate change or catchment land use.

Pollution events: the total pollution incidents (Categories 1 to 3) from sewerage assets as normalised per 10,000km of sewer. NWG has seen a rise in Cat. 3 (least serious) pollution numbers in the last couple of years, mainly associated with pollution events from sewage pumping stations during chronic (e.g. Storm Arwen) and acute (e.g. brown-outs) power outages. Increasing overall wastewater system resilience is key to reducing pollution, as is ensuring visibility of current system health and performance.

Bathing water quality: a single average 'score' for each company based on classification (Excellent, Good, Sufficient and Poor) of all eligible designated coastal and inland bathing waters. As for pollutions, improvement likely to depend on overall system resilience and collaboration with catchment stakeholder to jointly address problem bathing waters.

NWG RESEARCH AND INNOVATION PRIORITIES
PRIORITY PERFORMANCE COMMITMENTS – HIGH PERFORMING AREAS

Leakage: a measure of water lost, defined as the sum of distribution system leakage, including service reservoir losses and trunk main leakage plus customer supply pipe leakage. Research focuses on four aspects: prevention, awareness, location, and mending (PALM). Remote and terrestrial sensing (e.g. acoustic, vibration, temperature), hydraulic modelling, and materials science are key areas for research.

Interruptions to supply: calculated as the average length of interruption per customer across the whole customer base. Our target is currently around 4 minutes. Extreme weather is the main threat, with both freeze/ thaw and drought conditions driving high levels of mains bursts. Infrastructure interdependency is also key, as failures in energy, communications and transport networks can impact response times.

Internal flooding: calculated as the number of internal sewer flooding incidents, due to both overloaded sewers (hydraulic flooding) and other causes (e.g. blockages), normalised per 10,000 sewer connections. It includes sewer flooding due to severe weather events. Research focuses on early detection and prevention of potential issues (e.g. tree roots and wipes) through technical and behavioural interventions.

Storm overflows: the average number of spills for each storm overflow across the wastewater system. Closely linked to pollution and internal flooding, reducing blockages and increasing overall wastewater system resilience is key, as is ensuring visibility of current system health and performance. Catchment and nature-based solutions are also in scope to drive up performance in this area.

NWG RESEARCH AND INNOVATION PRIORITIES
CHALLENGES

- **Energy:** one of our major operational costs, despite using 100% renewable energy and increasing our energy efficiency significantly – using less and generating more renewable energy is always better.
- **People:** we need to dramatically increase the scale of our activities to deliver the increased investment planned over the next 25 years – growing our workforce and supply chain, upskilling and increasing productivity are key.
- **Chemicals:** consumption is increasing due to population growth and tighter treatment standards. We need to reduce overall chemical use and increase the sustainability, circularity and security of supply of chemicals we do use.
- **Storm overflows:** eliminating harm from storm overflows is a major areas of investment. Innovative solutions are needed to reduce costs and deliver benefits faster. E.g., diverting, reducing and attenuating flows, flow and quality monitoring, active network control, nature-based interventions.

NWG RESEARCH AND INNOVATION PRIORITIES
CHALLENGES

- **Asset health: w**e need to improve our understanding of the health of our assets, ensure maintenance and replacement work is timely, targeted, effective, efficient and non-disruptive.
- **Nutrient neutrality:** excess phosphorous and nitrogen in the natural environment causes major ecological harm. Research is needed to enable more efficient nutrient removal and recovery at our works and though flexible permitting and partnership working that enables more effective management of nutrients at a catchment level.
- **Process emissions:** one of the most significant and currently most difficult areas of greenhouse gas emissions to eliminate. Innovations in the types of treatment processes we use, how we operate those processes, and in the capture and removal of fugitive emissions are needed.

NWG RESEARCH AND INNOVATION PRIORITIES
OPPORTUNITIES

- **Systems thinking and partnership working:** from research to innovation to adoption and impact, underpinned by aligned long-term planning. By adopting a cross-sectoral systems thinking approach we can deliver more for less across society and environment.
- **Nature-based solutions:** while we already use nature-based solutions such as reed beds to improve water quality and reduce flood risk, research is needed to develop and evaluate nature-based solutions for a wider range of problems. Innovation in the way that actions are coordinated across catchments and in how schemes are funded may enable greater use of nature-based solutions.
- **Artificial intelligence:** the maturing and mainstreaming of AI could support service improvements and efficiency across our business. We are already using AI to enable more effective customer service. Innovation is needed to leverage the benefits of AI whilst protecting people and the environment: delivering greater insights from our data, managing our network more actively, and reducing chemical and energy usage.
- **Open data:** by opening access to our data, citizen scientists and others can use it to unlock value for our customers and the regions we serve. Innovation is needed to enable secure and equitable data sharing and to support new business models to create new insights and value.

NWG RESEARCH AND INNOVATION PRIORITIES
OPPORTUNITIES

- **Robotics:** there is a huge potential for robotics to enable rapid and automated intervention while minimising disruption to services, intervention costs and risk to human health, especially in hazardous environments. Further development is needed to improve the technical and economic viability of robotics to enable them to be widely adopted in the water sector.
- **Smart networks:** eliminating environmental pollution and flooding from sewers remains one of our biggest challenges. We are looking to develop enhanced monitoring and remote management / edge intelligence to enable us to make greater use of our existing assets to reduce the impact of sewer overflows and surcharges.
- **Metering:** innovations in meter design are needed to reduce the environmental impact of meters and deliver better resolution, extended battery life, edge intelligence, greater sensing capability. Novel metering data analysis is needed to create customer and operational insight, including identifying leaks and high or unusual usage patterns where we could help customers reduce their water consumption.
- **Material technologies: t**o achieve net zero we will need to innovate in materials and construction techniques, sustainable, circular, low-cost, enabling novel construction methods and cost-effective interventions on legacy assets.