INNOVATING FOR A GREENER FUTURE:

European water service priorities
Innovating for a greener future: European water service priorities

Our world is changing rapidly and so are water services. Innovation is key to guaranteeing the affordability of safe, sustainable and resilient water services for the decades to come. Water service providers are well aware of the challenges and have identified a number of technological and non-technological areas requiring particular innovation efforts with a view to meeting the goals of the European Green Deal.

The research needs are compiled in this document and should help policy makers in designing research and innovation programmes in a way that responds to the real needs of drinking water and waste water operators.

Innovation has multiple facets

Over the past decades, water services have improved significantly in terms of quality and accessibility. Today, 95% of European citizens have access to high quality drinking water while 86% of them are connected to waste water services. Our sector has substantially increased the levels of health and environmental protection while reducing energy demand and embracing circular economy principles. Innovation has been a key enabling factor in this process.

Innovation is therefore a crucial tool to help the water sector meet the challenges of the United Nation’s Sustainable Development Goals, adapt to climate change, become more efficient and comply with legislation at all levels.

For the water sector, innovation must not be limited to technological developments. In reality, innovation comprises other aspects including governance, communication, public policy and partnerships. Although EurEau had approached the topic from a more...
technological perspective for a number of years, we see today that water utilities in nearly all Member States continue to face problems in accessing and implementing innovative solutions. It seems that this is not primarily caused by the lack of technological developments or solutions available but rather by the policy side which regulates the capacity of water utilities to invest (time and money) in innovation. The fact that utilities in a number of countries find it difficult to even maintain the infrastructure in place demonstrates how difficult it is for them to invest money and time in innovation. Additionally, implementing innovative solutions needs to be accompanied with human resource management to adapt to the chosen solutions.

A stronger focus is needed on innovative public policy (regulation, economics), governance and partnerships to avoid legislative rules that set detailed and definitive requirements, leaving little room for innovation to meet demands outside regulatory compliance.

Significant amounts of mainly European but also national public funds are invested in the early stages of the innovation cycle, i.e. into research. This opportunity can easily be lost if the research results do not reach the European water sector at an economically viable scale, or do not respond to their real-life needs. Innovation is therefore much more than an appendix to research. It is an integral part of the whole cycle and should be treated as such.

Graph 1: Drivers for innovation in the water sector

EurEau 10 challenges

- Protecting water as a vulnerable resource
- Building an effective strategy to minimise the presence of micropollutants in the environment
- Increasing the public understanding of the water sector.
- Responding to the growing impact of climate change on water
- Giving water its value in the circular economy
- Increasing the resource efficiency in the water sector
- Fostering sustainable economic growth and creating jobs
- Setting the right price for water services
- Managing long term assets in a fast changing environment
- Reinforcing the resilience of water services to security risks

Drivers

- Regulatory compliance
- Water scarcity
- "the right things to do"
- Future-proof investment needs
- Company strategy and level of service to customers & citizens
- Image
- Process constrains
- Economics
- Security demand

Types of innovation

- Technological
- Non-technological
- Communication
- Governance
- HR management
- Business models
- Finance
Barriers to innovation must be overcome

A number of barriers may slow down innovation in the water sector. They include

- inflexible and prescriptive legislation;
- missing LCA data showing that new solutions do not only address one particular issue, but provide wider sustainability benefits;
- a lack of knowledge on innovative solutions;
- a lack of innovative financing solutions;
- technological solutions not adapted to the needs of water service providers;
- A lack of public support.

Through its 32 national member associations, EurEau boosts a unique network of water operators from across Europe. We are willing and able to ensure a better information flow between regulators, public support providers and water operators. This document forms an important part of the effort. Moreover, we can also use our network to better inform water operators of promising innovation cases.

Innovation priorities for EurEau members

EurEau members reported over 350 proposals for innovation. In order to present them all, we regroup them by topics and group the one tackling the same ideas. However we obtain a quite substantial number of needs. With the figures below we hope to visualise and help the reader to jump on the topics of interest for him. These figures represent either the research needs for drinking water, waste water or horizontal matters. Within a figure, we highlighted the most cited topics as follows:

- 5 times and more in green
- between 2 and 4 times in orange
- single proposals in black.

The figures are displayed in a list version for a more detailed analyses of the proposals.
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- Develop robust new approaches to optimise the level of asset service for both sewers and WWTP.
- Develop new approaches (modeling, monitoring...) for failure detection and rehabilitation of sewer networks.
- Develop new digital techniques for inspection, rehabilitation and separation of sewers.
- Demonstration project to show the efficiency and impact of the separation of networks (grey/black water).
- Develop easy technical solutions minimising energy demand for managing CSOs in real time.
- Develop new treatment systems for the treatment of storm water.
- Develop new green infrastructure (materials, devices and design concepts) focused on cost effectiveness, flexibility and adaptability to different environmental situations.
- Develop monitoring to ensure long-term evaluation of SUDS.
- Develop techniques for underground storage, permeable surfaces and green roofs.
- Investigate new approaches for climate resilient urban water management (long-term and early warning system for flood security).
- Demonstration project to show the efficiency and impact of the separation of networks (grey/black water).
- Step-up the technology to mainstream fertiliser production from sewage sludge.
- Develop technologies to maximise energy production from sewage sludge.
- Investigate the optimisation of co-digestion between sewage sludge and animal manure.
- Investigate the possibility to reduce the volume of sludge through new organisms strains.
- Develop new ways to remove pollutants of emerging concern from sewage sludge.
- Develop new technologies to recover chemicals from sewage sludge.
- Investigate the impact of the use of sewage sludge in agriculture.
- Develop new approaches to management of sewage sludge through recovery.
- Explore new approaches to nutrient recovery from sewage sludge.
- Develop new approaches for the use of sludge.
- Investigate the optimisation of co-digestion between sewage sludge and animal manure.

Circular economy
- Investigate how to make SUDS the standard.
- Investigate new approaches for climate resilient urban water management (long-term and early warning system for flood security).
- Develop new treatment systems for the treatment of storm water.
- Develop new approaches to optimise WWTP treatment for water reuse.
- Develop new approaches and treatments for pollutants of emerging concern in WW.
- Develop new technical solutions for reaching low nutrient concentrations with low energy and chemical consumption.
- Develop new strategies and techniques to reduce h2o emissions.
- Investigate new biological processes including bioaugmentation to overcome current issues (sludge production, specific contaminants).
- Develop new treatments for odour control from WWTP.
- Develop new approaches of integrated waste water management (treatment, monitoring and control) for small WWTP.
- Develop new approaches to optimise the use of current assets.
- Develop low cost approaches to waste water management (apex and capes).
- Develop new approaches to reach sustainable WWTP.
- Develop new approaches to optimise WWTP through integrated modelling.
- Analyse balance between centralised and decentralised treatment systems at catchment scale.
- Investigate the impacts of pollutants of emerging concern an the water cycle, including impact on water services and the ways to mitigate them.
- Develop new methods for monitoring pollutants of emerging concern both in clean water and in waste water.
- Develop new approaches to waste water services to reduce energy consumption and maximise energy recovery.
- Develop new cost effective methods to analyse microplastics in waste water and sludge.
- Develop new approaches for health and hazard management for employees of the waste water sector.
- Develop concepts for sustainable waste water management: from control at source to resource recovery.

Analytical methods
- Develop new cost effective methods to analyse microplastics in waste water and sludge.

Health and safety
- Develop new approaches for health and hazard management for employees of the waste water sector.

Other topics
- Other topics: from control at source to resource recovery.

Other topics
- Other topics: from control at source to resource recovery.
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Horizontal Matters - 1

- Demonstrate technologies for microplastic removal in rivers
- Promote the implementation of new treatment technologies within water services infrastructure
- Develop and test new ways of communicating with customers
- Implement medium scale pilots to demonstrate the feasibility and interest of separating waste water lines
- Develop methodologies to protect I/T/OT infrastructure of water services
- Develop methodologies and techniques to protect water infrastructure
- Develop sensors and methodologies for the monitoring of all aspects of the water cycle (quality, quantity, different resources and different hydraulic conditions)
- Develop new digital tools and services for water services to improve communication with customers
- Develop new methodologies to better use smart meters and optimise water transport and distribution networks
- Develop standards that allow multi-vendor digital solutions to be interoperable
- Develop a robust digital environment for sanitation management
- Develop modular and interoperable solutions to optimise every aspect of the water cycle
- Promote the use of Big Data and AI in every aspect of water management
- Develop universal and flexible digital solutions for water services able to operate in various conditions and environments
- Develop a digital environment and data treatment capabilities to optimise water treatment, water distribution and wastewater collect and treatment
- Develop new methodologies to use big data to optimise WTP control
- Develop new tools to capture external factors and input water resource management
- Develop the use of drones in water infrastructure management
- Develop integrated methodologies to monitor water quality and quantity from source to sea
- Develop methodology to sort valuable data in sensors available data to improve water infrastructure management
- Develop a digital environment and data treatment capabilities to optimise water treatment, water distribution and wastewater collect and treatment
- Develop IoT and RTC approaches into the everyday business of water services
- Develop new methodologies to use big data to optimise the control of WTP
- Developing algorithms and software tools to model, forecast and simulate water acquisition and control systems

- Demonstration platform & living labs: operational experience for research and innovation projects
- Security of the water sector
- Sustainable business models of the future
- Data protection
- Asset protection
- Sensors
- Communication
- Asset management
- Resource management
- Data management
- Transactional coordination

- Optimisation of water services
- Asset management
- Technical solutions
- Develop new approaches to water services in order to foster sustainability
- Explore new governance models to improve water services according to strategies at catchment level
- Develop communication tools to transfer knowledge from problem owners to decision makers
- Investigate the sustainability of water transfer over long distance
- Develop new approaches to water services in order to foster sustainability (inter service cooperation)
- Analyse the impact of climate change on water demand for different uses
- Develop new approaches combining data mining and real time communication for water asset management
- Investigate the life cycle approach to water infrastructure
- Explore new approaches to ensure reliability of the infrastructure
- Explore new approaches to ensure the reliability of existing infrastructure
- Develop new technical solutions for monitoring and diagnosis of existing infrastructures
- Develop software to integrate new sensors data for asset management

- Operation
- Resource recovery
- Explore the use of thermal energy from waste water streams
- Develop new ways of promoting innovations to decision makers aside from regulatory obligations
- Develop new approaches to promote and implement innovative solutions in the water sector
- Investigate new business models for water services that combine better efficiency, better or new services and reduced cost
- Investigate the effect of new ways of handling waste water (separate collection for different quality)
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Horizontal Matters - 2

Maximising energy efficiency

Analytical methods

Pollutants of emerging concern and AMR – Environmental impact and user responsibilities

Climate change adaptation and mitigation

Human Resources Management

Communication

Sustainability

Consumers

Security

Join forces

Synergies

Treatments

Other topics

Other topics

Technology

Recruitment strategies

Investigate drivers and bottlenecks to employ qualified workers in the water sector

Develop new models for incorporation of HR into asset management

Technology

Investigate how technologies can be used to improve HR intelligence

Education and competencies

Develop high-level and transversal profiles for data management in the water sector

Explore new ways of keeping practical experience in water treatment and management inside water services

Explore driving forces that make the public engage in sustainability and transfer it to the water sector

Develop new communication methods to boost information and feedback from water services customers (bottom-up)

Develop new ways to manage crises communication through new technologies

Develop new approaches to communication fostering interservices cooperation

Effect on assets

Develop new approaches to make existing assets resilient towards climate change

Develop models and tools to design resilient assets

Resource management

Investigate the effect of climate change on the quantity and quality of water resources

Develop new approaches to make cities resilient towards climate change (2)

Emerging issues related to climate change

Investigate the effect of climate change on the quantity and quality of water resources

Impact and pathways

Investigate the impact and risks of contaminants of emerging concern and derive sound monitoring requirements

Investigate mitochondrial resistance to water resources

Asset assessment

Develop new methodologies to map the main sources of contaminants of emerging concern

Develop new methodologies to analyse consumption patterns of contaminants of emerging concern

Develop new green substances to replace substances of emerging concerns

Develop new approaches for a holistic assessment of chemicals in the environment

Develop new technologies to remove pollutants of emerging concern

Technology

Develop new tools for energy consumption assessment and diagnosis to optimise energy consumption from water infrastructure

Develop new approaches for energy recovery from water infrastructure

Develop new approaches to reuse of chemicals in water processes

Develop common approaches with various industries to optimise the use and reuse of materials and chemical in water services

Develop new sensors for rapid screening of chemical substances, rapid bacteriological analyses, or on-line monitoring of contaminants of emerging concern

Develop sensors for taste and odour control in DW

Explore the use of different technologies (like LiDAR) for flow measurements

Develop cost-effective and reliable analytical methods for resin and resin plastics in different matrix (mass and particle count)

Develop cost-effective and reliable analytical method for polar compounds

Develop cost-effective and reliable biosensor

Develop new microbial analytical methods

Develop cost-effective and reliable analytical method for PACs, POMA, PM2.5 & pesticides aligned to legislation with suitable LOQ & LODs

Develop full automated robotic labs

Laboratory working tools

Recruitment strategies

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Develop new technologies to remove pollutants of emerging concern

Technology

Develop new tools for energy consumption assessment and diagnosis to optimise energy consumption from water infrastructure

Develop new approaches for energy generation from sewage sludge

Develop new approaches for energy generation from water mains

Develop new approaches to energy efficiency and carbon footprint reduction

Develop new approaches for energy generation from water infrastructure

Develop new uses for biopolymers with a view to replacing current synthetic polymers

Develop common approaches with various industries to optimise the use and reuse of materials and chemical in water services

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Summary Table of the most frequently proposed ideas

In the following table we regrouped the topics proposed more than once (green and orange) and associated them first with the EurEau challenges they answer and second, the European Commission Green Deal objective they contribute to. Both of these are presented according to the numbered list below. The entire list of proposed topics can be obtained upon request from EurEau.

List of EurEau’s 10 challenges:
1. Protecting water as a vulnerable resource
2. Building an effective strategy to minimise the presence of micropollutants in the environment
3. Increasing the public understanding of the water sector
4. Responding to the growing impact of climate change on water
5. Giving water its value in the circular economy
6. Increasing the resource efficiency in the water sector
7. Fostering sustainable economic growth and creating jobs
8. Setting the right price for water services
9. Managing long term assets in a fast changing environment
10. Reinforcing the resilience of water services to security risks

Major themes of the Green Deal related to EurEau challenges
1. Increasing the EU’s climate ambition for 2030 and 2050
2. Supplying clean affordable and secure energy
3. Mobilising industry for clean and circular economy
4. Preserving and restoring ecosystems and biodiversity
5. A zero pollution ambition for a toxic-free environment.
<table>
<thead>
<tr>
<th>Theme</th>
<th>Sub-theme</th>
<th>Major research topic (green and orange)</th>
<th>Corresponding EurEau Challenge</th>
<th>Corresponding Green Deal objective</th>
</tr>
</thead>
<tbody>
<tr>
<td>DW - Demand Management</td>
<td>Consumption</td>
<td>Develop new approaches to control demand (Water-fit-for-purpose or more efficient distribution systems)</td>
<td>6</td>
<td>4</td>
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<td></td>
<td></td>
<td>Develop new approaches to foster engagement of citizens (information and involvement) for better protection of DW resources (quality and quantity)</td>
<td>3, 4</td>
<td>4, 5</td>
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<tr>
<td>Optimising supply systems</td>
<td></td>
<td>Develop new strategies based on smart metering to optimise distribution networks (consumption patterns, pumping strategies, leakage or contamination detection...)</td>
<td>7, 9, 10</td>
<td>3, 5</td>
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<tr>
<td></td>
<td></td>
<td>Develop new standardised and compatible sensors to monitor new threats on-line</td>
<td>7, 9, 10</td>
<td>3, 5</td>
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<tr>
<td>Maintenance of supply systems</td>
<td></td>
<td>Develop new ways of managing leakages in DW networks</td>
<td>6, 7, 9</td>
<td>3</td>
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<td></td>
<td></td>
<td>Develop new rehabilitation techniques (no-dig)</td>
<td>6, 7, 9</td>
<td>1, 3</td>
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<tr>
<td>DW – Protection of DW resources</td>
<td>Water resource planning in a changing climate</td>
<td>Identify, predict and protect water resources available (quantity and quality) for DW under CC scenarios</td>
<td>1, 4</td>
<td>1, 3, 4</td>
</tr>
<tr>
<td></td>
<td>Pollution: Control at source measures</td>
<td>Investigate multistakeholder approaches for implementation of control at source measures in the protection of groundwater resources</td>
<td>1, 2</td>
<td>4, 5</td>
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<td></td>
<td>Protect/Monitor catchment areas</td>
<td>Develop new surveillance technologies for DW resources protection (drones or others)</td>
<td>1, 7</td>
<td>4, 5</td>
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<td></td>
<td></td>
<td>Deploy new sensor nets to monitor quantity and quality of groundwater for its protection</td>
<td>1, 7</td>
<td>4, 5</td>
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<tr>
<td><strong>DW – DW treatment technologies</strong></td>
<td><strong>Develop new, fast, online quality analysis early warning systems</strong></td>
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<tr>
<td>General: Water Treatment Plant Level</td>
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<tr>
<td>Treatment Processes</td>
<td><strong>Develop new process and product controls for small decentralised drinking water treatment systems</strong></td>
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<td></td>
<td><strong>Develop new technological processes and strategies for removing organic micropollutants</strong></td>
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<td></td>
<td><strong>Develop treatment processes and strategies to secure water quality (minimise by-product formation and others)</strong></td>
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<td></td>
<td><strong>Develop low chemical treatment technologies for DW</strong></td>
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<tr>
<td>Materials</td>
<td><strong>Develop new filtration material (membranes) to avoid the use of chemicals and minimise waste</strong></td>
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<tr>
<td><strong>DW – Other topics</strong></td>
<td><strong>Develop new products from or uses of Water Treatment Works sludge</strong></td>
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<tr>
<td>Circular Economy</td>
<td><strong>Develop new technologies and strategies to optimise energy use in DW networks</strong></td>
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<tr>
<td><strong>WW – Sustainable WWT technologies</strong></td>
<td><strong>Investigating the resource factory concept - towards zero emission WWTP</strong></td>
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<tr>
<td>Circular Economy</td>
<td><strong>Develop new approaches to optimise WW treatment for water reuse</strong></td>
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<tr>
<td>WW Reuse</td>
<td><strong>Develop new approaches and treatments for pollutants of emerging concern in WW</strong></td>
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<tr>
<td>Treatment processes incl. substances of emerging concern</td>
<td><strong>Develop new technical solutions for reaching low nutrient concentrations with low energy and chemical consumption</strong></td>
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<td></td>
<td><strong>Develop new strategies and techniques to reduce N2O emissions</strong></td>
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<tr>
<td>WW – Sustainable sludge management</td>
<td>Investigate new biological processes including bioaugmentation to overcome current issues (sludge production, specific contaminants...)</td>
<td>7, 9</td>
<td>5</td>
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<tr>
<td>General: WWTP level</td>
<td>Develop new approaches of integrated waste water management (treatment, monitoring and control) for small WWTP</td>
<td>1, 3, 7, 9, 10</td>
<td>4, 5</td>
<td></td>
</tr>
<tr>
<td>Pollution: control at source measures</td>
<td>Investigate the impacts of pollutants of emerging concern on the water cycle, including impact on water services and the ways to mitigate them</td>
<td>1, 2, 5, 9</td>
<td>5</td>
<td></td>
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<tr>
<td>Energy efficiency</td>
<td>Develop new approaches to waste water services to reduce energy consumption and maximise energy recovery</td>
<td>5, 6, 7, 8</td>
<td>1, 2, 3</td>
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<tr>
<td>WW – Sustainable sludge management</td>
<td>P-recovery</td>
<td>Step-up the technology to mainstream fertiliser production from sewage sludge</td>
<td>5, 7</td>
<td>3</td>
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<tr>
<td>Energy recovery</td>
<td>Develop technologies to maximise energy production from sewage sludge</td>
<td>5, 7, 9</td>
<td>2, 3</td>
<td></td>
</tr>
<tr>
<td>Pollutant removal</td>
<td>Develop new ways to remove pollutants of emerging concerns from sewage sludge</td>
<td>1, 2, 5</td>
<td>3, 5</td>
<td></td>
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<tr>
<td></td>
<td>Develop new technologies to recover chemicals from sewage sludge</td>
<td>5, 7</td>
<td>3, 5</td>
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<tr>
<td>Sludge to land application</td>
<td>Develop new ways to use sludge on land</td>
<td>5</td>
<td>1, 3, 5</td>
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<td></td>
<td>Investigate the impact of the use of sewage sludge in agriculture</td>
<td>4, 5</td>
<td>1, 3, 5</td>
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<tr>
<td>New outlets for sludge and recovered nutrients</td>
<td>Develop new approaches to management of sewage sludge through recovery</td>
<td>5</td>
<td>1, 3, 5</td>
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</tr>
</tbody>
</table>
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<table>
<thead>
<tr>
<th>WW – Sustainable urban drainage</th>
<th>Waste Water Network</th>
<th>Develop robust new approaches to optimise the level of asset service for both sewers and WWTP</th>
<th>3, 4, 6, 9</th>
<th>1</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Develop new approaches (modelling, monitoring...) for failure detection and rehabilitation of sewer networks</td>
<td>4, 7, 9</td>
<td>1, 4, 5</td>
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<td></td>
<td></td>
<td>Develop new no-dig techniques for inspection, rehabilitation and separation of sewers</td>
<td>4, 6, 7, 9</td>
<td>1, 5</td>
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<tr>
<td>SUDS &amp; NBS</td>
<td>Investigate how to make SUDS the standard</td>
<td>4, 6, 9</td>
<td>1, 4, 5</td>
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<td></td>
<td>Develop new treatment systems for the treatment of storm water</td>
<td>4, 9</td>
<td>1, 4, 5</td>
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<tr>
<td>Urban water management in a changing climate</td>
<td>Investigate new approaches for climate resilient urban water management (long-term and early warning system for flood security)</td>
<td>4, 6, 9</td>
<td>1</td>
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</tr>
<tr>
<td>WW – Other topics</td>
<td>Health and safety</td>
<td>Develop new approaches for health and hazard management for employees of the waste water sector</td>
<td>7</td>
<td>5</td>
</tr>
<tr>
<td>HM1 – Sustainable business models of the future</td>
<td>Management</td>
<td>Develop new ways of promoting innovations to decision makers aside from regulatory obligations</td>
<td>3, 5, 7</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>Resource recovery</td>
<td>Explore the use of thermal energy from waste water streams</td>
<td>5, 6, 9</td>
<td>2, 3</td>
</tr>
<tr>
<td>HM1 – Asset management</td>
<td>Asset management</td>
<td>Develop new approaches combining data mining and real time communication for water asset management</td>
<td>9</td>
<td>5</td>
</tr>
<tr>
<td>HM1 – Digitalisation of the water sector</td>
<td>Sensors</td>
<td>Develop new approaches combining data mining and real time communication for water asset management</td>
<td>9</td>
<td>5</td>
</tr>
<tr>
<td></td>
<td>Communication</td>
<td>Develop new digital tools and services for water services to improve communication with customers</td>
<td>3, 8</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Data management</td>
<td>Develop methodology to sort valuable data in already available data to improve water infrastructure</td>
<td>9, 10</td>
<td>5</td>
</tr>
</tbody>
</table>
### May 2020 – Innovating for a greener future: European water service priorities

<p>| HM1 – Security of the water sector | Data protection | Develop methodologies to protect IT/OT infrastructure of water services | 7, 9, 10 | 5 |
| HM1 – Security of the water sector | Asset protection | Develop methodologies and techniques to protect water infrastructure | 4, 7, 9, 10 | 1, 5 |
| HM1 – Demonstration platform &amp; living labs | Asset management | Promote the implementation of new treatment technologies within water services infrastructure | 9 | 5 |
| HM2 – Human Resources Management | Technology | Investigate the inclusion of new technologies to facilitate working conditions in water assets | 7, 9 | 5 |
| HM2 – Human Resources Management | Education and competences | Develop high level and transgenerational profiles for data management in the water sector | 7 |
| HM2 – Human Resources Management | Education and competences | Explore centralised education for the water sector at EU Level | 7 |
| HM2 – Communication | Sustainability | Explore driving forces that make the public engage in sustainability and transfer it to the water sector | 4, 7, 9 | 1, 5 |
| HM2 – Communication | Consumers | Develop new communication methods to treat information and feedback from water services customers (bottom-up) | 3, 8 |
| HM2 – Climate change adaptation and mitigation | Technology | Develop technical solutions to reduce the CO2-footprint of water services | 4, 7, 9 | 1, 5 |
| HM2 – Climate change adaptation and mitigation | Effect on assets | Develop new approaches to make existing assets resilient towards climate change | 4, 7, 8, 9 | 1, 5 |
| HM2 – Climate change adaptation and mitigation | Resource | Develop new approaches to integrate water resource protection in the adaption to climate change effect | 1, 4 | 1, 5 |</p>
<table>
<thead>
<tr>
<th>Management</th>
<th>Investigate the effect of climate change on the quantity AND quality of water resources</th>
<th>1, 4</th>
<th>1, 5</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Develop new approaches to make cities resilient towards climate change</td>
<td>4</td>
<td>1</td>
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<tr>
<td>HM2 – Pollutants of emerging concern and AMR</td>
<td>Impact and pathways</td>
<td>Investigate the impact and risks of contaminants of emerging concern and derive sound monitoring requirements</td>
<td>1</td>
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<td>Investigate microbial resistance in water resources</td>
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<td>Asset assessment</td>
<td>Develop holistic approaches on the impact of extra treatments at WWTP level</td>
<td>9</td>
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<td></td>
<td>Control at source</td>
<td>Explore new approaches to reduce the use of substances of emerging concern</td>
<td>1, 2</td>
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<tr>
<td></td>
<td>Technology</td>
<td>Develop new technologies to remove pollutants of emerging concern</td>
<td>1, 2, 7</td>
</tr>
<tr>
<td>HM2 – Analytical methods</td>
<td>Sensors</td>
<td>Develop new sensors for rapid screening of chemical substances, rapid bacteriological analyses, on-line monitoring of contaminants of emerging concern</td>
<td>2, 10</td>
</tr>
<tr>
<td></td>
<td>Standards development</td>
<td>Develop cost-effective and reliable analytical methods for micro and nano plastics in different matrix (mass and particle count)</td>
<td>1, 2, 7, 8</td>
</tr>
<tr>
<td>HM2 – Maximising energy efficiency</td>
<td>Treatment</td>
<td>Develop new technologies for energy generation from sewage sludge</td>
<td>4, 5, 7, 8</td>
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<td></td>
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<td>Develop new approaches for thermal energy recovery from water infrastructure</td>
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</tbody>
</table>
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About EurEau

EurEau is the voice of Europe’s water sector. We represent 34 national associations of drinking water and waste water operators from 29 countries across both the private and the public sectors.

We bring national water professionals together to agree European water sector positions regarding the management of water quality, resource efficiency and access to water for Europe’s citizens and businesses.

With a direct employment of around 476,000 people, our sector makes a significant contribution to the European economy.