




 **Considering Horizon 2020 structures** 



- Industrial Leadership - Key enabling technologies
→ water quality – water quantity – water energy nexus
 - ICT
 - Nanotechnologies
 - Advanced Materials
 - Biotechnology
 - Advanced Manufacturing and Processing
- Actions needed to address societal challenges
→ non technical/societal perspectives
 - Sustainable and competitive bio-based industries
 - Reducing energy consumption and carbon footprint through smart and sustainable use
 - Unlock the potential of efficient and renewable heating-cooling systems
 - New Knowledge and technologies
 - Climate action, resource efficiency and raw materials
 - Promote the sustainable supply and use of raw materials, covering exploration, extraction, processing, recycling and recovery
 - Strengthen eco-innovative technologies, processes, services and products and boost their market uptake

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 **Key enabling technologies – water quantity** 



- ICT
 - Systems and tools to control water quantity
 - Online monitoring to support recycling, reuse and water loop closure
- Nanotechnologies
 - Enable the use of alternative resources: e.g. brackish water, water symbiosis
 - Improve internal water recycling and reuse
- Advanced Materials
 - Materials to enable the new design of processes: Processes using less water - Sustainable use of water in process.
 - Coatings/ sealants that repair and renew water distribution systems to reduce water loss; new materials for pipes.
- Biotechnology
 - New design of processes: Processes using less water - Sustainable use of water in process. → Industrial Biotechnology
- Advanced Manufacturing and Processing
 - New design of processes: Processes using less water - Sustainable use of water in process. → Chemistry and related process industries

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 **Key enabling technologies – water quality** 



- Nanotechnologies
 - Enable the use of alternative resources: symbiotic water use
 - Internal recycling and reuse, focusing on Sustainable/Advanced reuse and water loop closure
 - Fit for purpose innovative treatment and process solutions (e.g. catalysts, membranes)
 - Sustainable treatment of brines
 - Waste streams valorisation: valuables recovery, selective separation of pollutants
- Advanced Materials
 - In-process optimisation in material and product usage, maintenance, etc.
 - Fit for purpose innovative treatment and process solutions (e.g. catalysts, membranes)
 - Sustainable treatment of brines
 - Product design of chemical and biotech solutions/products for WT and WWT
 - Waste streams valorisation: valuables recovery, selective separation of pollutants
 - Materials to ensure sustainable WWT during (e.g. self cleaning functions).

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 **Key enabling technologies – water quality** 



- Biotechnology
 - Design of the industrial processes towards sustainable Water and Waste Water Treatment → Industrial Biotechnology
 - In-process optimisation in material and product usage, maintenance, etc (e.g. fouling)
 - Development and efficient use of technologies for WT and WWT
 - Waste streams valorisation: valuables recovery, selective separation of pollutants
- Advanced Manufacturing and Processing
 - New design of processes: Processes using less water - Sustainable use of water in process. (e.g. re-acton & process design)
 - Towards more innovative treatment and process solutions. (e.g. concentrate treatment)
 - Sustainable treatment of brines (e.g. energy, fouling)
 - Development and efficient use of technologies for WT and WWT
 - Chemistry and related process industries

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 **Key enabling technologies – water energy nexus** 

1. Nanotechnologies
 - Reduce scaling corrosion (e.g. for heat exchange)
 - Lower energy levels of process reactions
2. Advanced Materials
 - Materials for energy efficient water treatment technologies (e.g. membranes)
 - Scaling corrosion resistant materials
 - Materials for low pressure processes
3. Biotechnology
 - Reduce bio-fouling
 - Improve energy recovery in anaerobic treatment
4. Advanced Manufacturing and Processing
 - Energetic conversion/valorisation of by-products / compounds within wastewater (e.g. energy recovery from salt gradients)


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 **Societal challenges** 

1. Sustainable and competitive bio-based industries
 - New design of processes: Processes using less water - Sustainable use of water in process.
 - In-process optimisation of materials and production processes, maintenance, ... (e.g. for water and energy efficient production of bio-based platform chemicals)
2. Reducing energy consumption and carbon footprint through smart and sustainable use

Unlock the potential of efficient and renewable heating-cooling systems

 - Sustainable cooling & heating
 - Efficient heat exchange / thermal storage
3. New Knowledge and technologies
 - Sustainable cooling & heating
 - Realize water qualities "fit-for-use"
 - Water treatment technologies (e.g. alternative membrane technologies)

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 **Societal challenges** 

4. Climate action, resource efficiency and raw materials
 - Internal recycling and reuse, focusing on sustainable water loop closure.

Promote the sustainable supply and use of raw materials, covering exploration, extraction, processing, recycling and recovery

 - Alternative water sources
 - Symbiotic water use
 - Treatment of highly loaded liquid streams
 - Wastewater valorisation

Strengthen eco-innovative technologies, processes, services and products and boost their market uptake

 - Energy efficient treatment technologies
 - Wastewater valorisation
 - Proof of technology performance

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