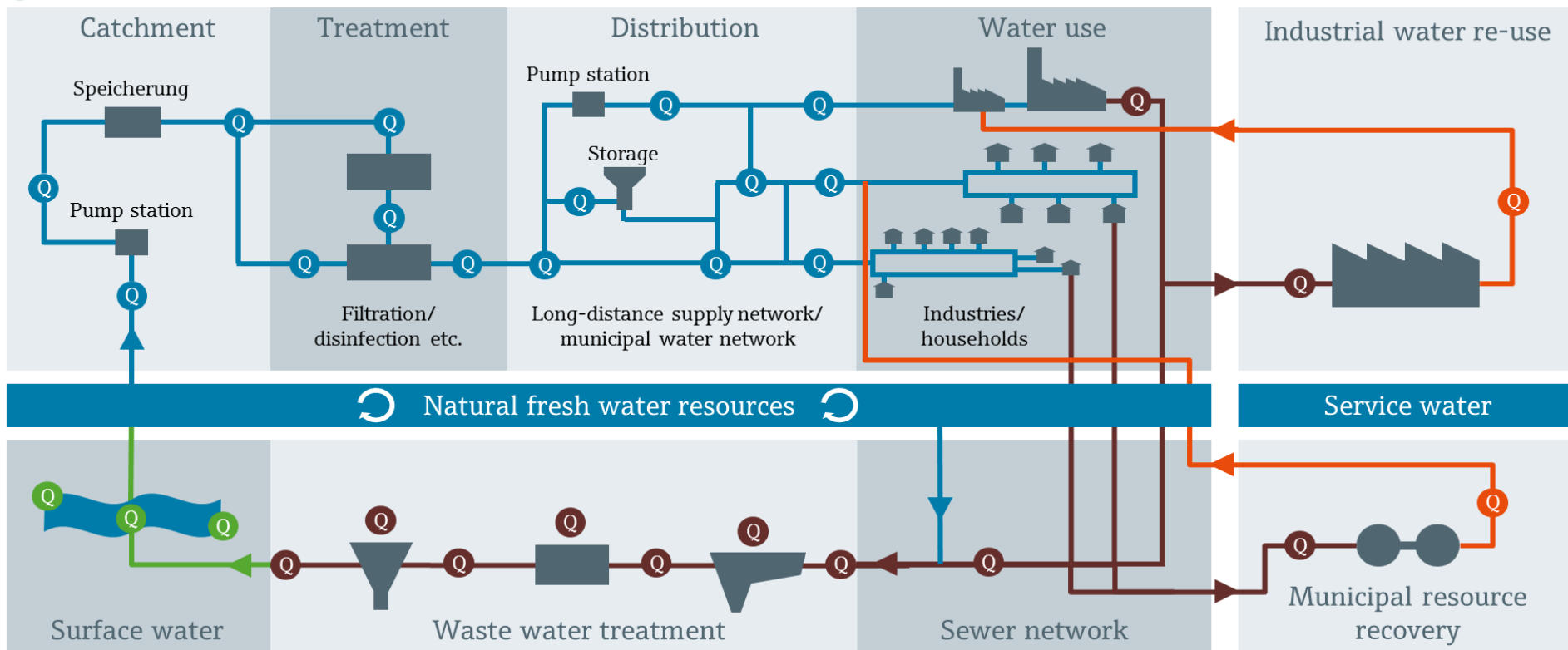


# Challenges in the digitization of water infrastructure



# Water infrastructure

Q Water quality gate



## What does the water infrastructure consist of?

	Water supply	Sanitation
Point objects	waterworks, tanks, pressure booster systems, shafts, shut-off devices and valves, house connections, metering systems	pumping stations, rainwater treatment and sewage treatment plants.
Line objects	pipes	sewers
Age / condition	<p>Point objects: mainly built later than 1980 (some earlier), mechanical and electrical components meanwhile in the first or second reinvestment cycle.</p> <p>Line objects: mixed age and material structure with components that can be up to a hundred years.</p>	
Planning horizon	>> 10 years	

## How is the water management organized?

### Water supply (D):

Approximately 6,000 companies, various forms of organization of the municipal utilities under public law through water associations to utilities under private ownership, company size varies widely from few to several thousand employees, 65% of the enterprises are organized under public law.

### Sanitation (D):

Approximately 6,900 companies, forms of public owned institutions like municipal sanitation departments up to special water associations, company size varies widely, 95% organized under public law.

## Challenges (1) general

Reinvestment requirements:

- a) In D: currently 0.4 to 1.2% of the asset value per year
- b) In USA: \$ 84 billion additional to 2020.
- c) Global: \$ 11.7 trillion in water infrastructure by 2030 to sustain economic growth (excluding climate change costs ...)

Global factors:

- a) Climate change
- b) Demography
- c) Water shortage

Digital infrastructure:

- a) Digitization levels in urban and rural areas
- b) Coverage with powerful network infrastructure

## Challenges (2) benefits and costs

### Benefits:

- a) lower operating costs
- b) optimized reinvestment in the network and maintenance
- c) higher plant performance and resource protection
- d) Higher service quality
- e) *Advanced product offering regarding water, wastewater, energy, control energy, mineral and organic products*

### Costs:

- a) Investments in measuring and control technology, possibly process technology, software, hardware, qualified staff
- b) (Probably) high initial investment (small companies?)

## Challenges (3) reliability and safety

- a) Higher complexity  
System dependency increases
- b) Safety  
Higher functional safety, reliability and robustness
- c) Security  
Increased effort required to protect data and systems



## Challenges (4) staff and management

Change of the professional field:

- a) continued education “on the job” needed
- b) Higher qualification (fit for the future)
- c) Higher job classification (payment?)
- d) Smaller crews?

Management issues:

- a) data ownership
- b) key competence of the operator
- c) financing of technology / reimbursement of costs
- d) business model of the future / attractiveness of services



## Meet the challenges with..

Principles:

- a) For the water supply and sanitation special protection requirements apply (public good).
- b) Digitization is just a means to manage the water bodies optimally, resource and cost efficient.
- c) The institutions and companies responsible for the water infrastructure and its management must be strengthened by digitization and at least maintain the value of the infrastructure.

**to be discussed....**

## Meet the challenges with or..

- a) support development and pilots with funding programs
  - Federal Ministry of Economy (BMWi)
  - state programs
- b) within the company
  - establishment of an innovation and error culture
  - techlabs (depending on the company size)
  - driver teams and digital Leadership
  - take the fears and worries of the employees seriously
- c) security by design (hardware AND software)
- d) a regulatory framework
  - safety and security
  - asset management
- e) .....



Thank you for your attention!