

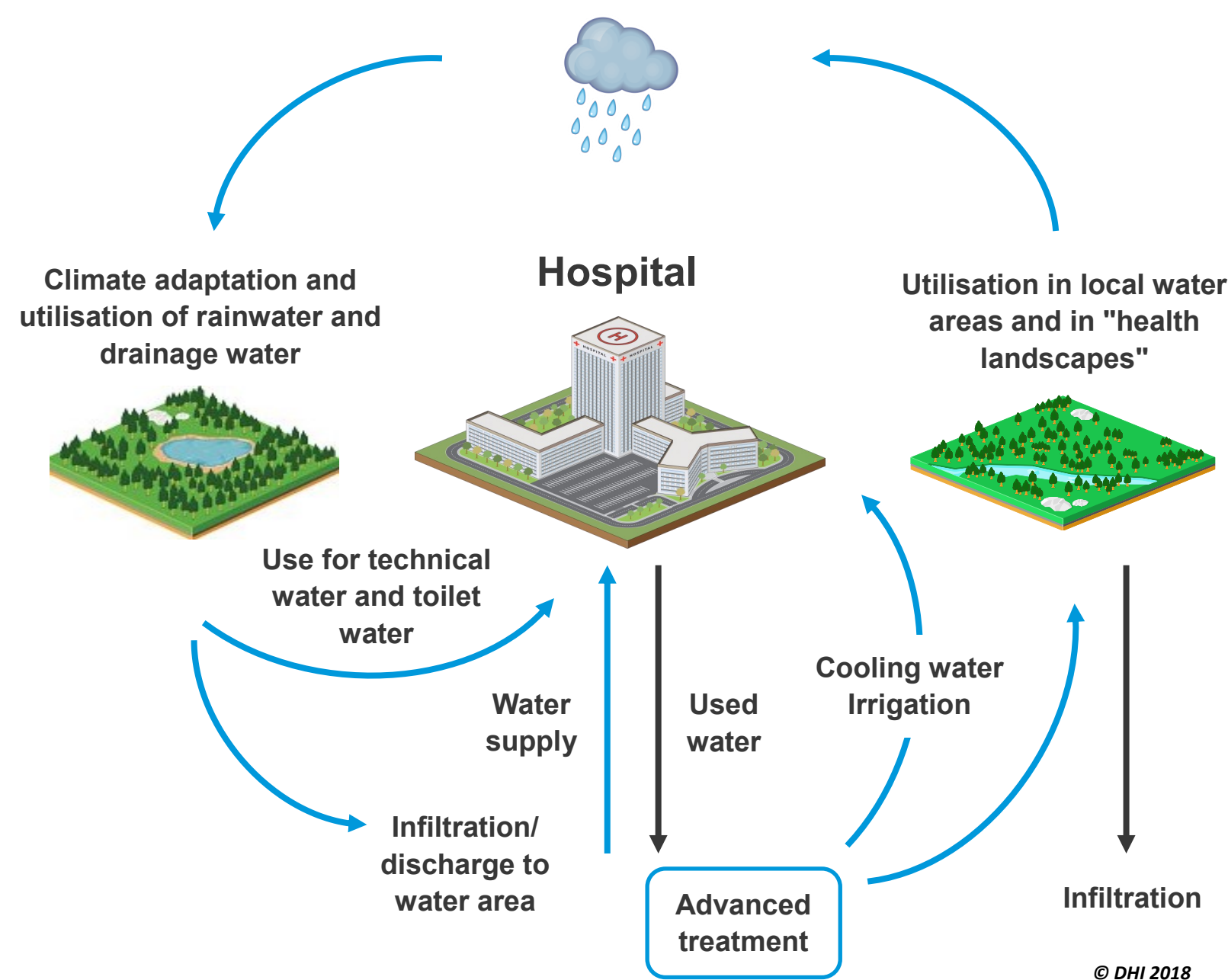
DANISH MANAGEMENT OF HOSPITAL WASTEWATER

From pollution problem to new water resources

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Management of hospital wastewater in Denmark

Denmark has a unique authority regulation of hospital wastewater. Hospitals are characterized as industries discharging hazardous pharmaceuticals and pathogens and are therefore regulated as such. The Danish municipalities regulate the hospitals, and a municipal guideline specifies how the hospitals are to be prioritized and regulated. The municipalities use the guideline to rate the hospitals from small to large point sources. Only the large point sources are facing requirements for wastewater treatment. The map below shows the larger hospitals under construction and renovation in Denmark.



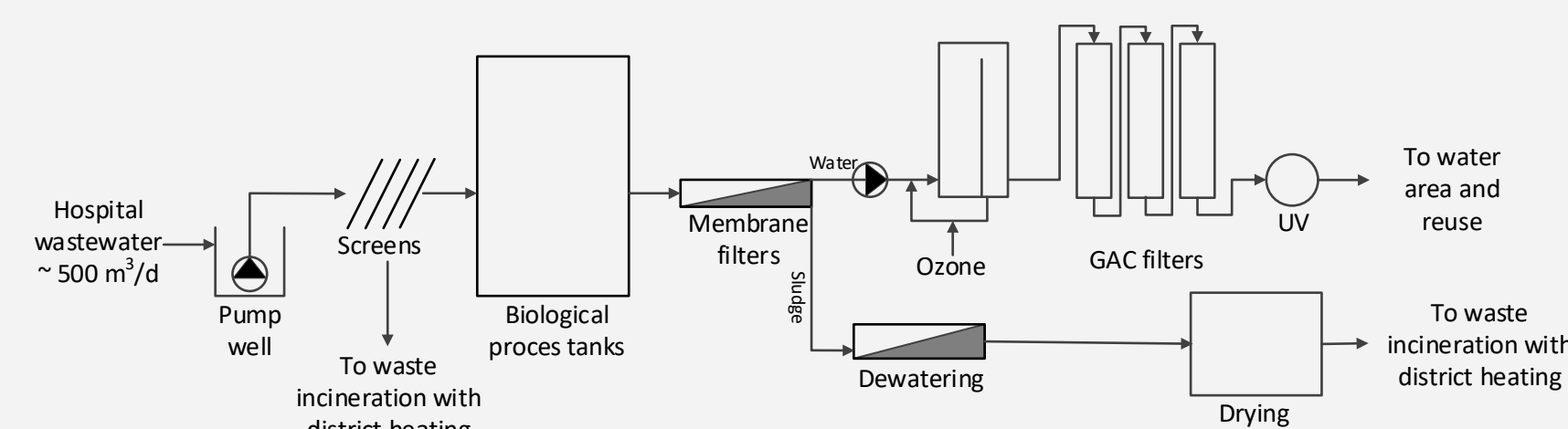
From pollution problem to new water resources

DHI helps the large Danish hospitals to find holistic water solutions. The large hospitals are met by requirements to treat the hospital wastewater in order to remove hazardous pharmaceuticals and antimicrobial resistant bacteria. By handling these requirements as new opportunities the hospitals can turn the pollution problem into new water resources that can be reused and utilized at the hospital and in the local area. Advanced treatment technology is used to upgrade the wastewater to new water resources. The recommended strategy for handling the wastewater and rainwater in an integrated water cycle solution is illustrated to the left.

Full scale advanced treatment since 2014

Advanced treatment technology

A full-scale advanced treatment plant has been in operation since 2014 at Herlev Hospital, a 900-bed hospital situated in Copenhagen. The treatment plant treats all wastewater from the hospital. The hospital is under expansion from 170.000 m³/y today to 200.000 m³/y in 2020. The process train is illustrated below. The Herlev Hospital plant is viewed as Best Available Technique for treatment of hospital wastewater by Danish local authorities.



Costs

Investment cost for a similar treatment plant is 4 million EUR. Operation and maintenance costs are 1.3 EUR/m³. The pay-back period can be roughly calculated to 10-13 years based on the savings of the local sewage tax (3 EUR/m³).

Next steps for treatment plant implementation

Aalborg University Hospital

Beds: 580 beds
Region: The North Denmark Region
Time schedule: 2019
Water area: Marine area (The Limfjord)



New Odense University Hospital

Beds: 700 beds
Region: The South Denmark Region
Time schedule: 2020
Water area: "Health lakes" and Local stream (Odense Stream)



New Herlev Hospital

Beds: Expansion to 950 beds
Region: The Capital Region of Denmark
Time schedule: Since 2014 (Expansion in 2019)
Water area: Local stream (Kagså)



New Rigshospitalet

Beds: Expansion to 1.300 beds
Region: The Capital Region of Denmark
Time schedule: 2023
Water area: Local lake (Inner Cph lakes)

