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Water recycling as cornerstone of Kalmar's local water supply strategy

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Local & regional model strategies for water reuse

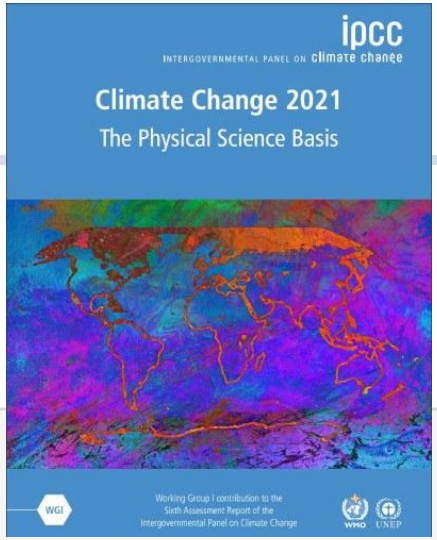
- Local conditions vary
- Pilots aim to demonstrate adaptation of solutions
- Tailored strategies can promote water reuse

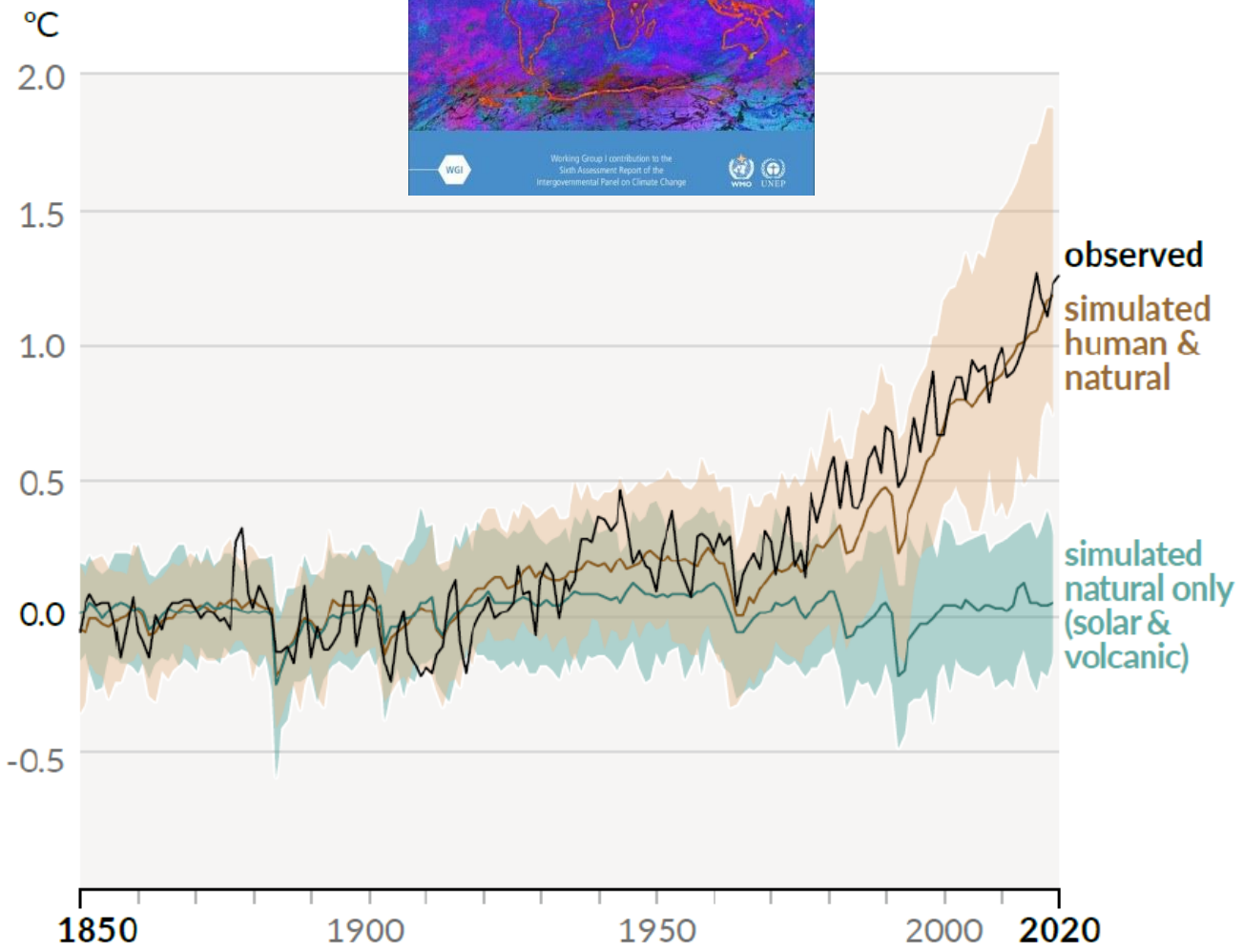
Action is needed!

- Changing climate:
  - Higher mean temperatures
  - Altered percipitation patterns

➢Kalmar region – highly sensitive to droughts due to geographic location

Kalmar





Water supply plan

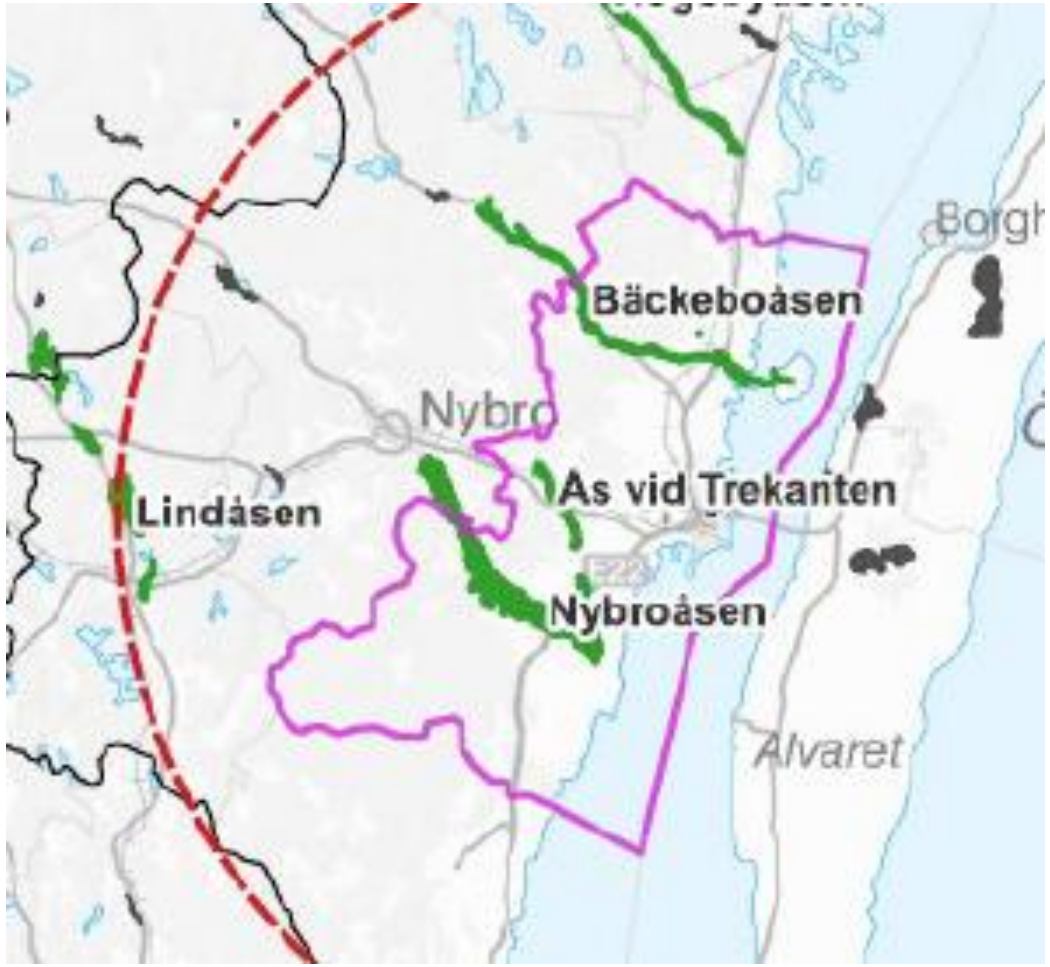
- A water supply plan is a document that outlines how a municipality´s drinking water supply will be secured on the short and long term

Main purpose

- Ensure access to clean and safe drinking water för residents and businesses
- Protect and manage water resources effectively
- Guarantee resilience during disruptions (climate changes, drought, contamination, outages, extraordinary events etcetera)
- Challenges as climate change, population growth and technological disruptions and other threats to the water supply.

Background and identification of water resources

- Kalmar municipality is located in a dry region
- No large groundwater reservoirs in the vicinity
- Groundwater and artificial soil filtration of surface water are the basis for the municipality's drinking water production
- Surface and groundwater resources within a 100 km radius of Kalmar (not Öland) have been analyzed:
  - ➢ **Prioritization of water resources**
  - ➢ **Small groundwater resorvoirs**



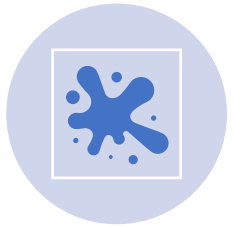
Water resource analysis shows there won't be enough water in the future

- Today 5.6 million cubic meters of drinking water for 66,000 inhabitants (92% are connected to the municipal drinking water supply)
- In 2050 about 7.7 million cubic meters of drinking water for 95,000 inhabitants
- The municipality´s water supply is based on groundwater and artificial infiltration of surface water (streams and rivers)
- The water supply system needs to be expanded, and new areas need to be considered for groundwater extraction and surface water infiltration
- Supplementary surface water resources are required to cover dry years and population growth

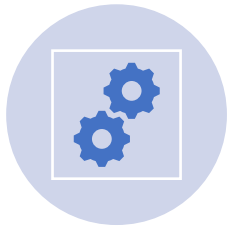
An action plan with 13 measures within these categories

- water needs
- water protection
- water use
- individual water supply and agriculture

Expansion of existing facilities according to water decree



Several water abstraction areas



Develop operations through improved monitoring and control

Increased capacity of infiltration plants

Investigate the conditions for a desalination plant

Monitor and regulate other future water supply interests in existing water systems

Reduce leakage of drinking water from the water supply network.

Information campaigns aimed at water users to reduce water consumption.

Develop conditions for the use of technical water/recycled wastewater from the KSV (Wastewater treatment plant)

Promote the construction of wetlands, irrigation dams and other water retention measures.

453 / 5 000
Indirect reuse, the recycled water is returned to the water source to be refilled, thereby naturally purifying the water.

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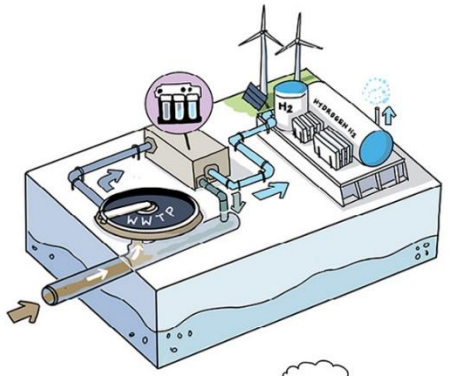
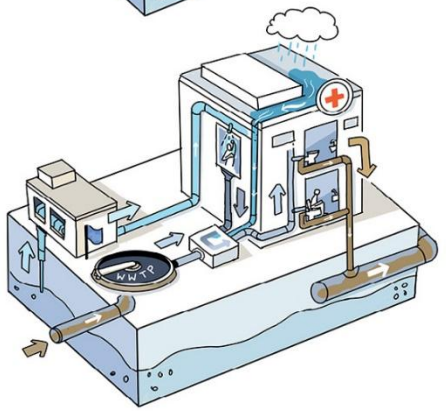
Reused water as a drinking water resource



Indirect reuse of wastewater

The recycled water is returned to the water source to be refilled, thereby achieving natural purification of the water (artificial infiltration)

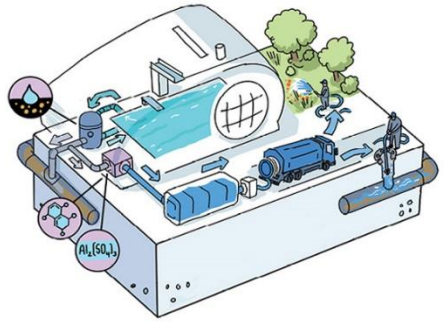


Direct reuse of wastewater

Recycled water is purified and fed into the drinking water system directly after purification, becoming

a) a sub-stream together with raw water from a water source and then taken into a waterworks for purification into drinking water

b) taken directly into the waterworks as raw water and purified into drinking water



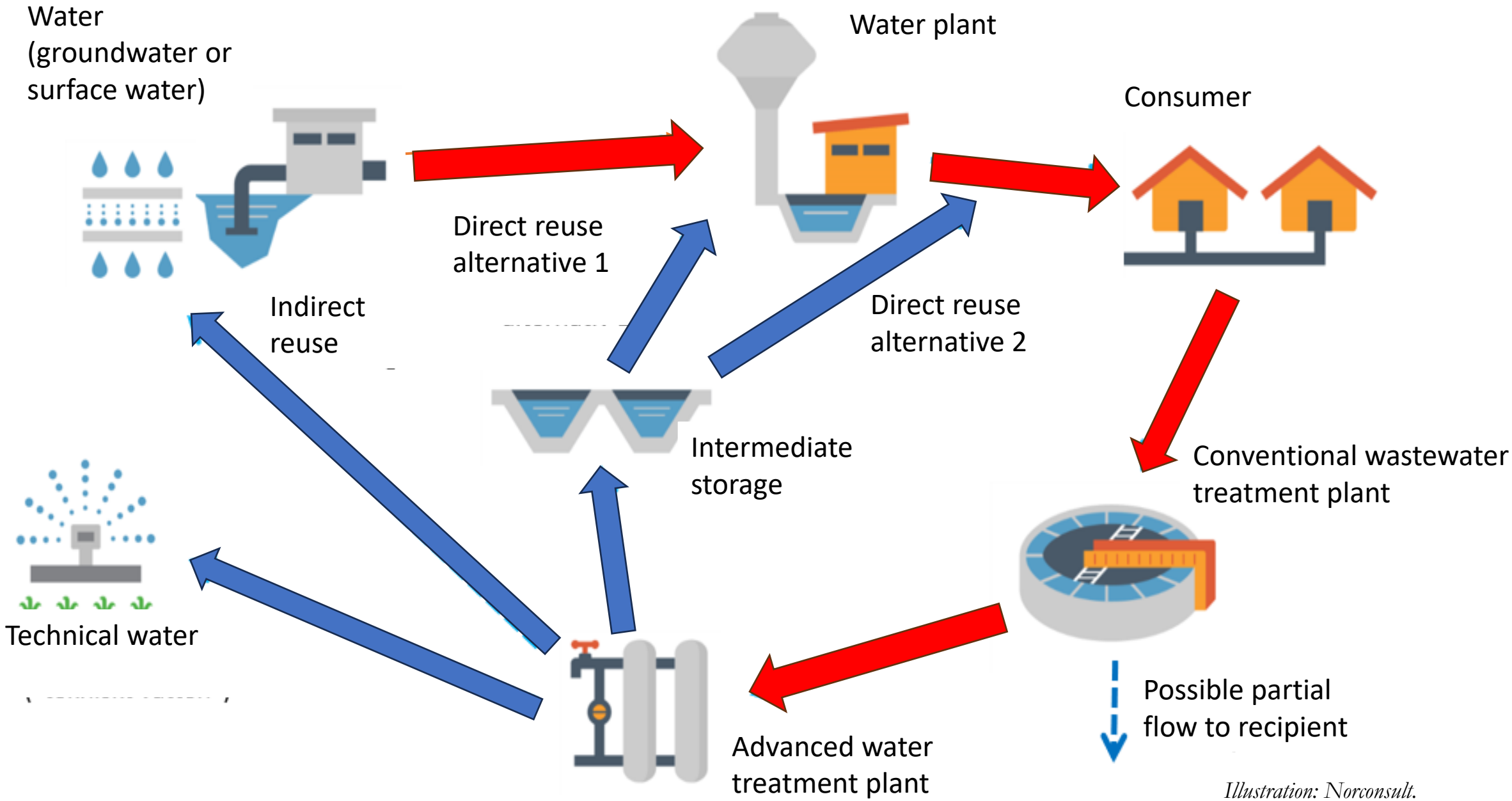


Illustration: Norconsult.

Recycled purified wastewater as technical water

Direct reuse of treated wastewater for drinking water production is possible but a complex and relatively unproven technology

Indirect reuse of treated wastewater for drinking water production is possible by recycled water is added to at groundwater source, as a lake, river and will be mixed with natural raw water and thereafter infiltrated and purified in a water plant.

Today, there is **a lack of experience** with the **process steps, in combination** with each other, to prepare drinking water from treated wastewater

It is recommended to carry out **pilot tests** to **gather operational experience** and build **public confidence**

High operational reliability and require a lot of energy and chemical consumption in relation to drinking water production from groundwater and surface water, resulting in **a higher production cost**.

A challenge with **technical water** is that there is no Swedish **legislation** for water other than drinking water and bathing water. There is a legislation on irrigation of agricultural land with reused water.

The raw water quality depends on what connected households and businesses **add to the water**. Wastewater contains high levels of bacteria, viruses, parasites and parasitic worms, as well as chemicals. It makes it **complex to purify.**

Replace the use of **drinking** water with technical water that does not meet drinking water quality but can be used for other things such as irrigation, flushing toilets, process water, cooling water, car washes, etc.

Lack of a pipeline network for technical water restricts distribution to users. A water kiosk will be located at the Kalmarsundsverket (KSV)

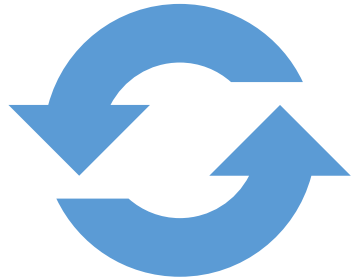
To secure the water supply, water recycling needs to be implemented in Kalmar

Problem: Under the assumption that population will continue to increase - the current water resources will not be enough in the future.

Solution: Diversify water sources and increase water reuse.

Opportunities:

- **Municipal wastewater:** The construction of a new (circular) utility plant that will purify the municipal wastewater to class A (EU regulation 2020/741) provides a great opportunity for water reuse.



- **Stormwater retention:** Harvesting and utilization of rainwater are key measures to consider in all land development projects and gives the benefit to use rainwater from retention ponds to irrigate sport fields for instance.

Distribution of Water Usage in Kalmar

User	Percent	Volume (m^3)
Private users	70%	3.9 million
Industry	20%	1.1 million
Public use	10%	0.56 million

Kalmar municipality has an annual consumption around 180,000 m^3, which accounts for around 32% of the total public usage.

Irrigation (~25% of municipal use):

- sport fields 34, 000 m^3
- green areas, parks, plants and trees: 9000 m^3

Water retention ponds for irrigation

Distribution of Water Usage in Kalmar

User	Percent	Volume (m^3)
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Private users are the main consumers of drinking water

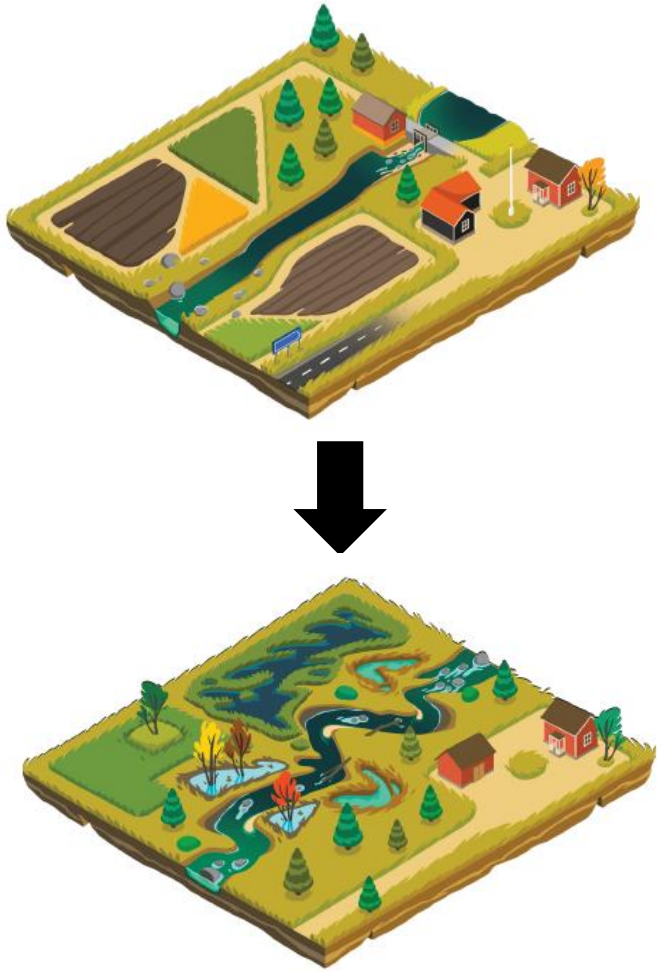
- We use 140 l/person/day
- 3.9 million m^3 → 5.4 million m^3 in 2050
- If we reduce our individual consumption with 15%:

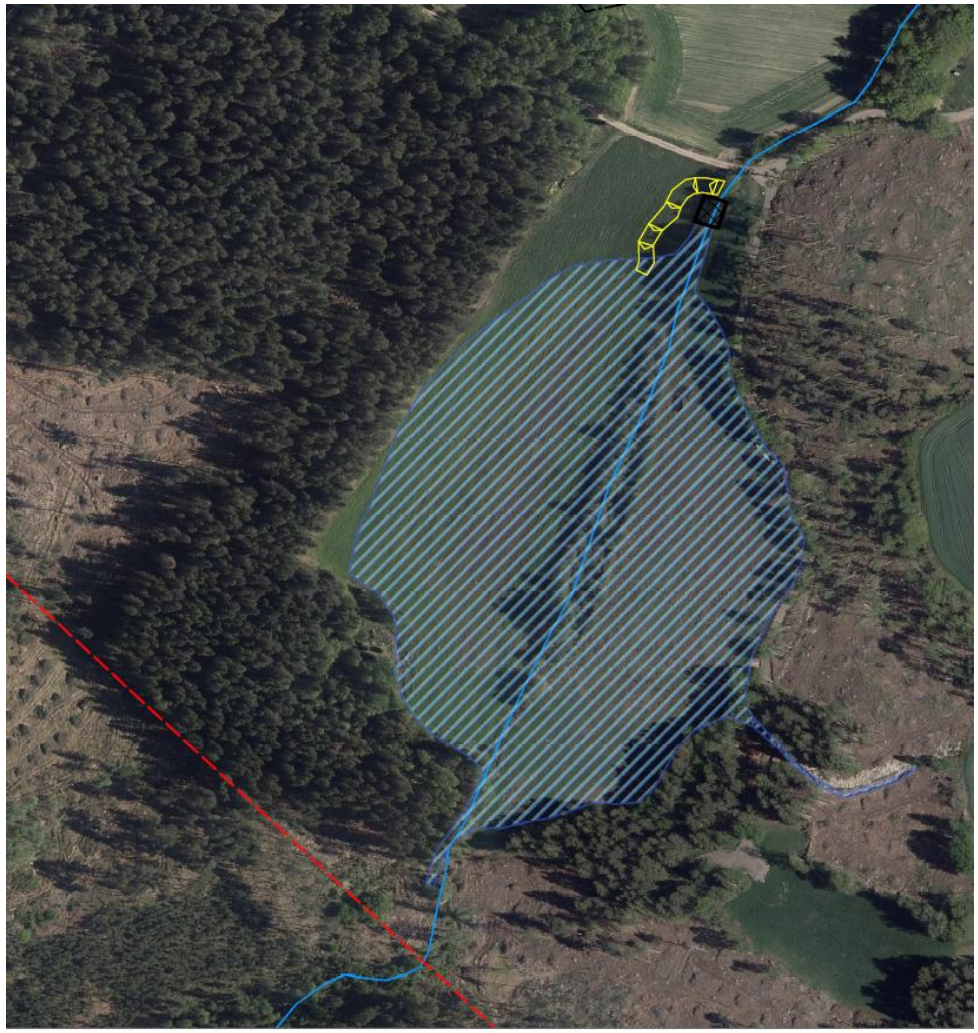
  140 l/person/day → 120 l/person/day = 4.5 million m^3 in 2050

Save drinking water by reducing conusmption

Water Retention – Restoring Landscape Ability to Retain Water

- wetlands
- irrigation ponds
- restoring the natural water course





These measures can be designed for various purposes, and where appropriate, the retained water can be reused for irrigation – either on agricultural land or in urban environments.

Prevent by reducing leakage and consumption!

Reduce leakage from the water supply network.

Information campaigns to reduce water consumption and increase awareness.

Develop conditions for water reuse.

Promote water retention measures.

Prepare by developing conditions for water reuse and infiltration!

Awareness and Acceptance: Who needs to be informed?

- Presentations of project at relevant forums
- Public survey
- Study visits to pilot project

Awareness and Acceptance: Who needs to be informed?

- **Local workshop on water reuse**
- Presentations of project at relevant forums
- Public survey
- Study visits to pilot project

Participation in the WaterMan project

- Peer reviews from project partners → positive impact on the strategic work and the pilot project.

- A working show case gives opportunities to dialogue and outreach through study visits.

How do we scale up? Remaining challenges

On a local level, the following actions are essential to support sustainable water use:

- **Recognizing water as a strategic priority** within municipal planning and decision-making.
- **Appointing a water coordinator** to ensure continuity, coordination, and integration across departments and projects.

How do we scale up? Remaining challenges

To enable broader water reuse several key developments are needed:

- Clear national guidelines that interpret EU Regulation 2020/741 for non-agricultural applications.
- Defined water quality standards for different reuse purposes.
- Support for municipalities to conduct risk assessments and implement monitoring systems.
- Investment in infrastructure.

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Thank you for your attention!

Kalmar 25 November 2025