

# Kalmar kommun

Klas Eriksson, Department of parks

Coordinating UV pilot project

Kalmar municipality: ca 72 000 inhabitants

City of Kalmar ca 40 000 inhabitants

Agriculture, forestry, lighter industry, service, tourism

Long coast to Baltic sea (Kalmarsund)

# Kalmar



# REUSE OF SEWER WATER FOR IRRIGATION

WATERMAN PARTNER MEETING IN LATVIA 1 – 3 APRIL 2025



Kalmar kommun

PILOT PROJECT -  
DISINFECTION WITH  
MOBILE UV-PLANT  
Kalmar municipality



**Interreg**  
Baltic Sea Region



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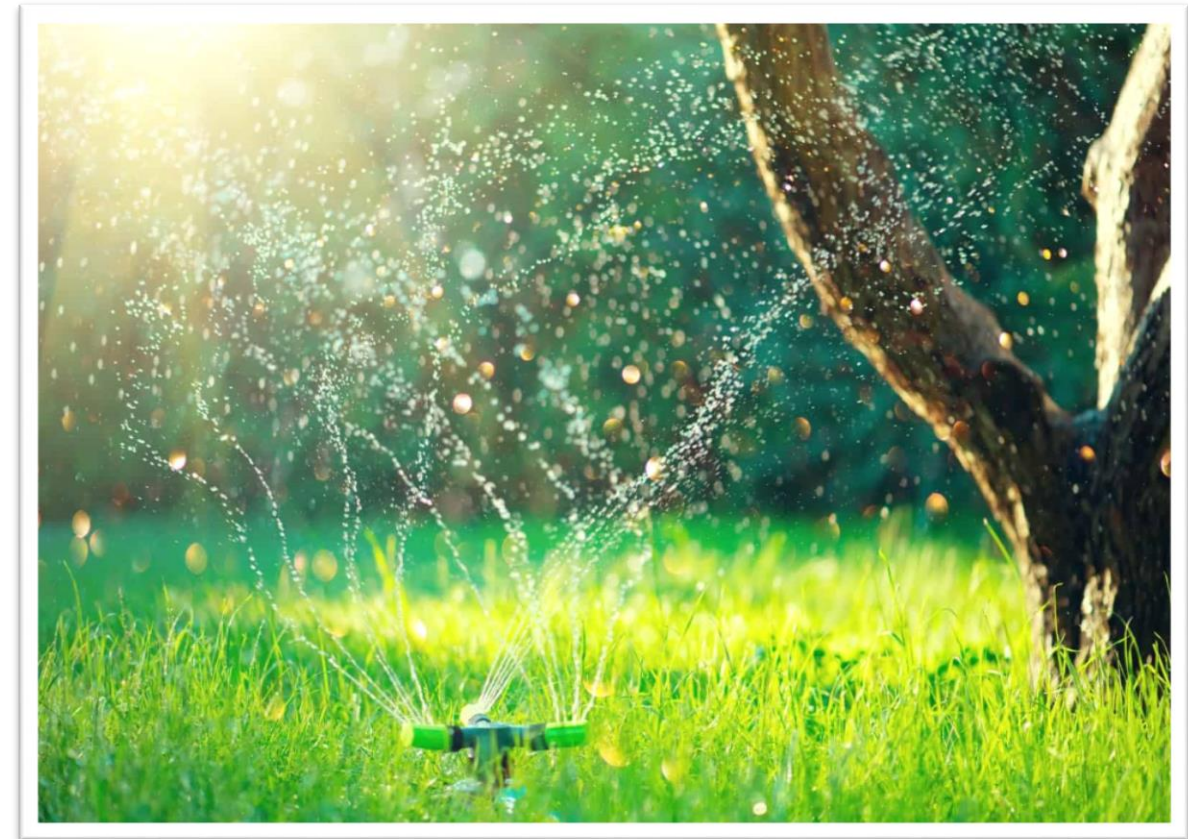


SUSTAINABLE WATERS

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# Project objective

- 1. “Save water by reusing treated wastewater for irrigation.*
- 2. Prepare for a future with less water supply.*
- 3. Show possible technical solutions ”*



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# Irrigation practice

- Irrigate trees and plants
- Establishing phase – 3 years
- 2 500 m<sup>3</sup>/year
- **Before UV-pilot:** Stormwater
- Simple and cheap but limited capacity and resilience.
- **After UV-pilot:** recycled wastewater



# Distribution of water

- Tractor and tanktrailer
- Application with hose reel
- Watering bags to improve efficiency
- Moisture meters at root level to save water and improve establishing



## Present and future situation – water supply for irrigation

- Already experienced several droughts
- Drought situation expected to become worse
- Demand for water increases but supply decreases
- Water becomes more expensive (+ 35 % in 4 years).
- Political decision not to use drinkingwater
- Need for reliable water supply also in drought situations
- Stormwater not a reliable source in severe droughts
- Stormwater can sometimes contain harmful substances

# Reliable water supply

- Stormwater: Risk of mismatch between demand and supply, unwanted substances.
- Desalination: Reliable source but, expensive, energy demand is high, complex technique.
- Sewer water: Reliable source but contains harmful substances that must be handled.





# Treated sewerwater as water source

- Sewer water “never” dries out
- Risk of negative attitude among our staff and the general public
- Health risks - bacteria and virus
- Risks can be managed - disinfection
- Salinity might be a problem



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# Disinfection with UV-light

## Pros:

- Well proven technique
- Kills most virus and bacteria
- No need to add chemicals
- Easy to handle
- Relatively low cost
- On /off operation saves energy

## Cons:

- Particles cause problems

# Control of production and quality

- Controlprogram according to EU 2020/741
- Sample once/week – laboratory analyses of E-coli
- On-line turbidity monitoring (water colour)
- Education of staff
- Manual on how to handle risks, accidents etc.
- Aim for class B-water quality (E-coli) < 100 cfu/100 ml (Flow 650 l/min)
- **Result in operation: Class A-water E-coli < 10 cfu/100 ml (Flow 650 l/min)**

# Small scale test

Test with small scale equipment and water from Kalmar WWTP

Filter + UV-light:

E-coli

From  $> 2420$  MPN/ 100 ml

To  $< 10$  MPN/ 100 ml



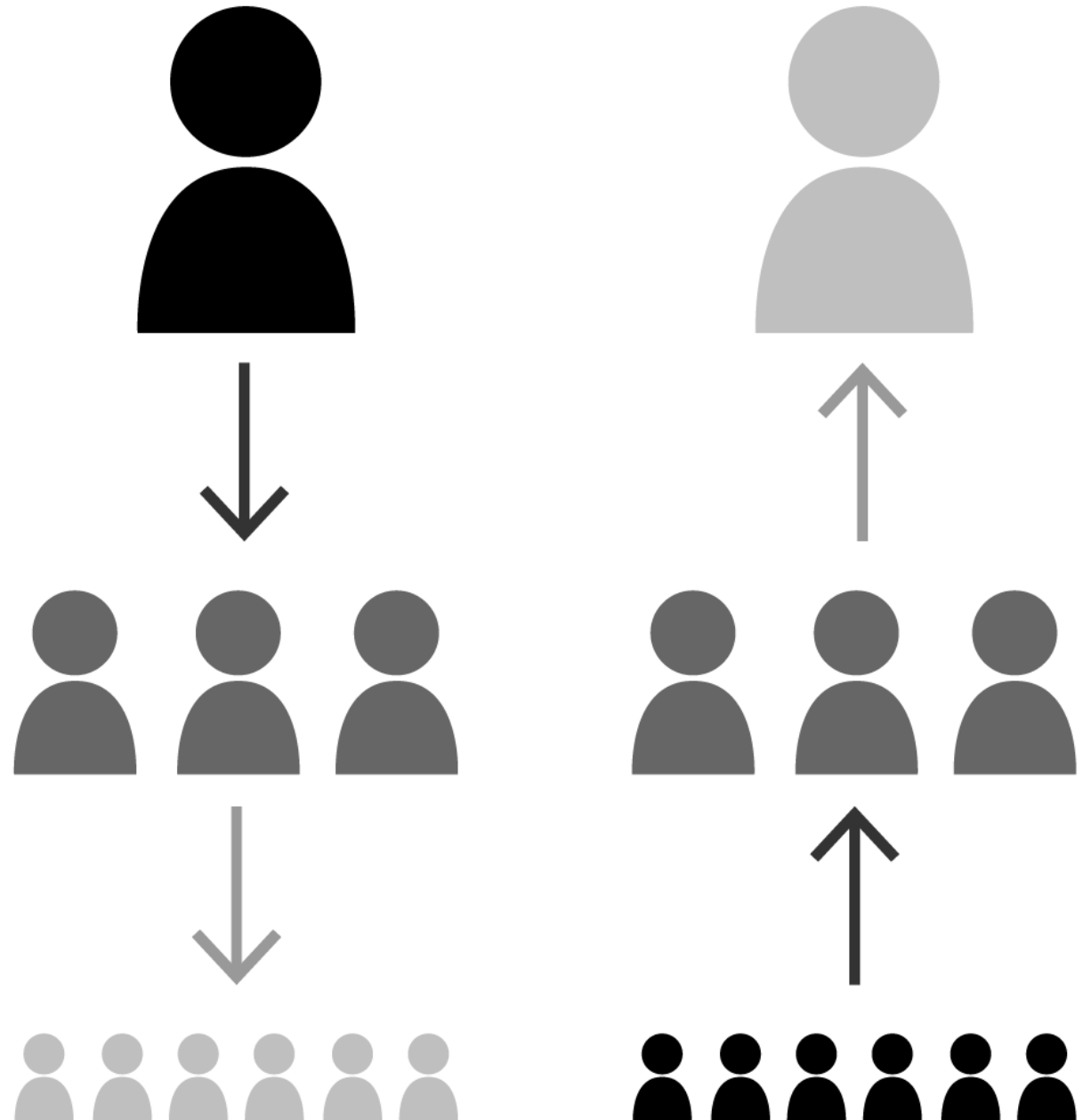
# Legal issues

- EU 2020/741 most relevant directive for our production and use
- Some uncertainty how to apply the directive with Swedish law
- Product or waste?
- Waste = less administration, faster approval process, cheaper
- Application describes why, how and when we want to recycle wastewater
- Regulatory authorities argue around legal issues in permit, point out uncertainties but gives green light.
- Conditions in the permit is a copy of our application

# Communication Staff, partners, public

Previous experience:

- Be transparent with:
- Why, how, when
- Be open with risks and how to manage/minimize them
- Involve staff early



# Plan for communication

1. Inform, involve and educate staff
2. Parallell dialouge with partner - Kalmar Vatten AB  
(public water/sewer company)
3. Listen to questions and worries – involve experts and people with experience to explain
4. Inform media and general public

## What have we done this far?

- Meetings with staff – discussed problems and solutions
- Information about project on Website, Social media
- Local papers, radio, TV
- Sign/message on productionsite and tanktrailer
- Staff resource for information – answer questions on site
- Open house for staff and stakeholders with plant in operation

# Economy

- Low volume, 3 500 m<sup>3</sup>/year, affects cost per m<sup>3</sup>
- Investment UV-plant 150 000 EUR, total 200 000 EUR 10 year payoff time
- Production cost: 5,60 EUR/m<sup>3</sup>
- Financing from EU 80 %, Swedish government, City of Kalmar 20 %
- Cost of water: 0,60 EUR/ m<sup>3</sup> (Drinkingwater 2,8 EUR/m<sup>3</sup> 2024)
- Higher volume (other areas of use) = lower cost
- Longer technical lifetime = lower cost
- Investment for the future



## Concerns we had before start and how it turned out

- Technical problems with on/off operation? **Not yet**
- Will regrowth of bacteria be a problem? **Analysis shows no growth in pipes, equipment or tanktrailer this far (2024)**
- Extra work cleaning disinfection plant and tanktrailer? **No need**
- Will watering bags plug up? **No signs of plugging after 1:st season**
- How will general public react? **Few reactions from citizens this far, the ones we have had are positive**



## Expectations on the UV-light pilot project – Achieved this far, 1:st season

- Provide a lasting supply of water also in extreme weather - Yes
- Save other water resources - Yes
- Reliable technique with low need for maintenance – Too early to say
- Low energy consumption – 1 500 kWh = ca 0,4 kWh/m<sup>3</sup> (Includes testrun)
- Deliver class B-water as a minimum – Delivers class A-water
- Contribute to a positive attitude for reuse of wastewater - Yes
- Hope to be seen as a good example of circular economy – work in progress

# Plans for 2025

- Install online turbidity meter - Done.
- Validation of plant to meet class A-requirements: Ongoing
- Discussions with other parts of the municipality in order to increase use of reused wastewater. Agreement to use an additional 2 000 m<sup>3</sup>/ year. Legal permission approved.
- PR- information aimed at general public: What we do, why we do it and how. Survey in parks during the summer.

# Results from watersamples 2024 season

Typical level of E-Coli **before** filter and UV-disinfection: > 20 000 / 100 ml

Typical level of E-Coli **after** filter and UV-disinfection: < 10 / 100 ml

Flowrate 650 l/min (ca 40 m<sup>3</sup>/h)

# Questions?

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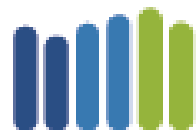
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# Automatic cleaning inside tank, remote control powerreel for easy hose handling



# Mobile UV-disinfection plant built in std ISO-container





