

CRITICAL REFLECTIONS ON IMPROVING THE OVERALL WATER QUALITY BY EFFICIENTLY MANAGING STORMWATER

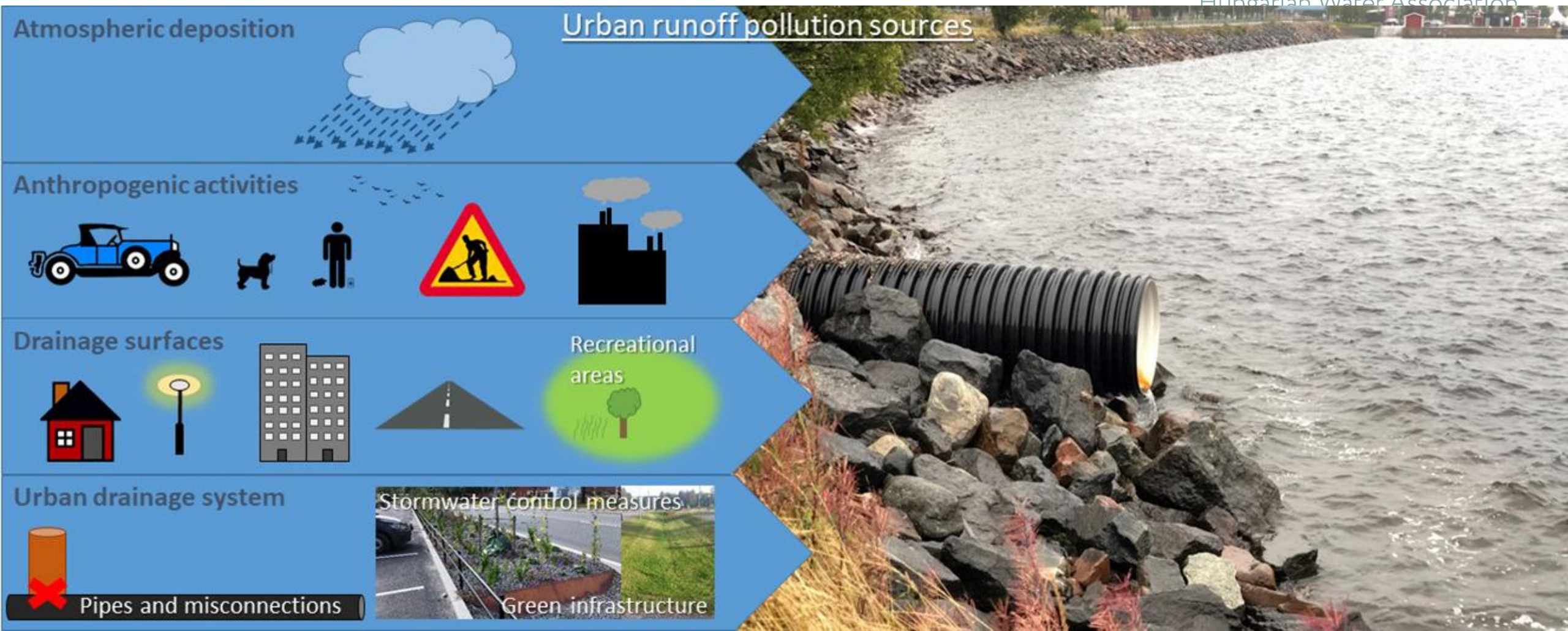
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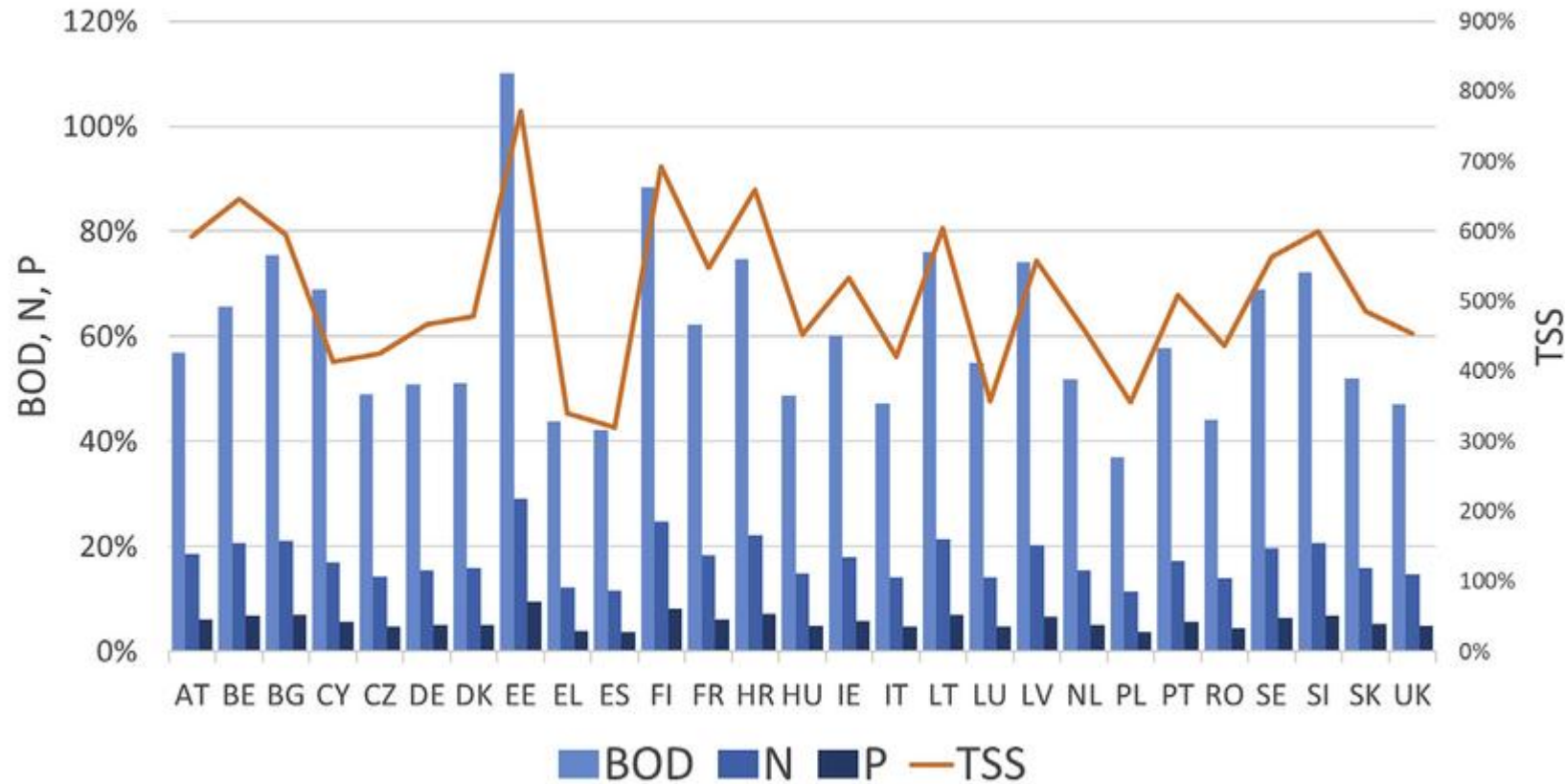
CONTENT OF THE PRESENTATION

- About municipal wastewater-related pollutions – stormwater runoff
- Taxonomy – ESG requirements
- Multiple climate challenges: prevention and adaptation
- Financial and regulatory deficiencies
- **New approach** – stormwater and urban cooling
- Stormwater management: energy needs and contributions to CO2 emissions
- **New approach** – CO2-based ROI
- Takeaways

URBAN RUNOFF POLLUTION SOURCES



ESTIMATED LOADS FROM URBAN RUNOFF

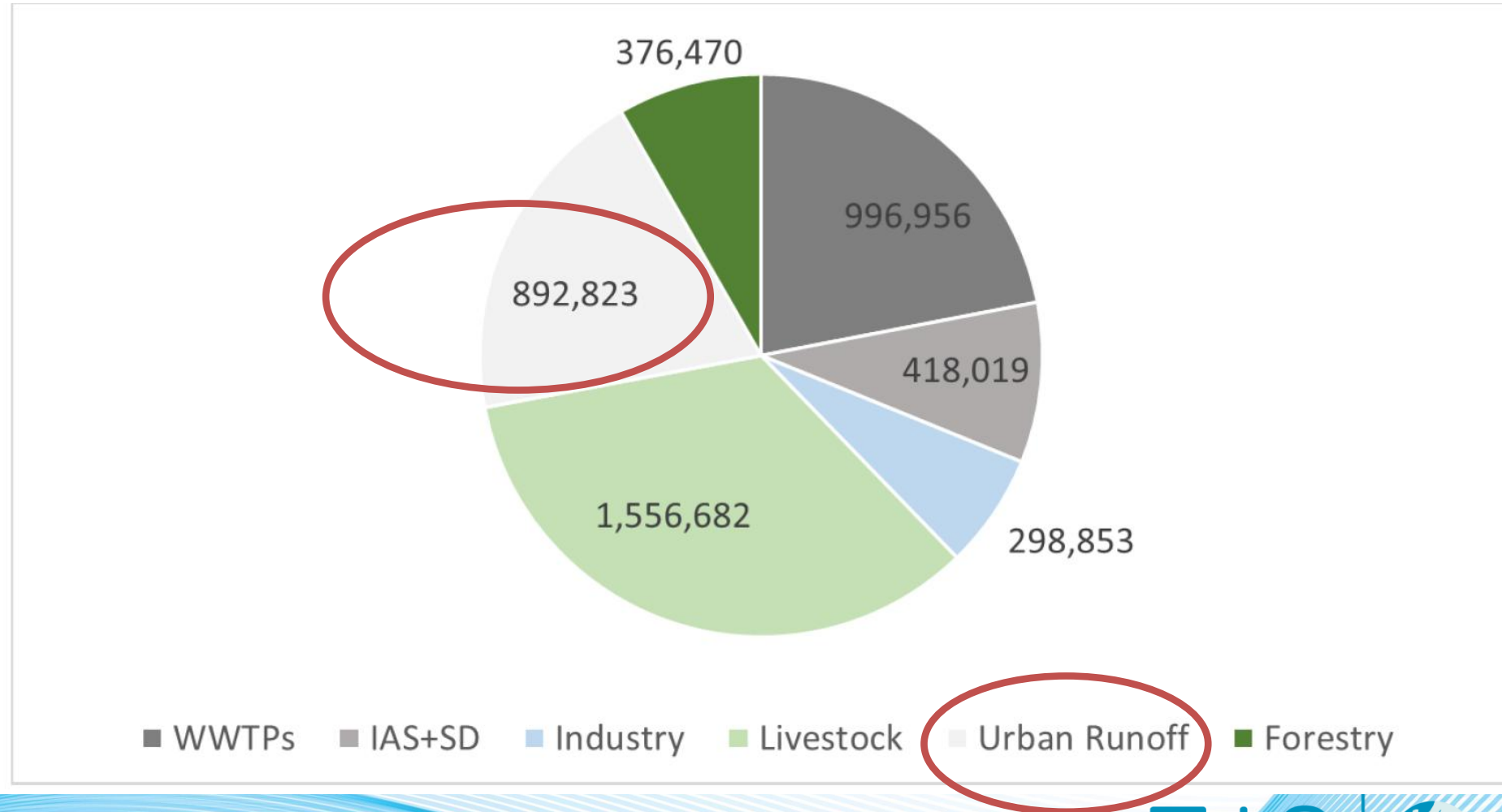


Estimated loads from urban runoff as a percentage of loads generated by treatment of urban wastewater by European standards.

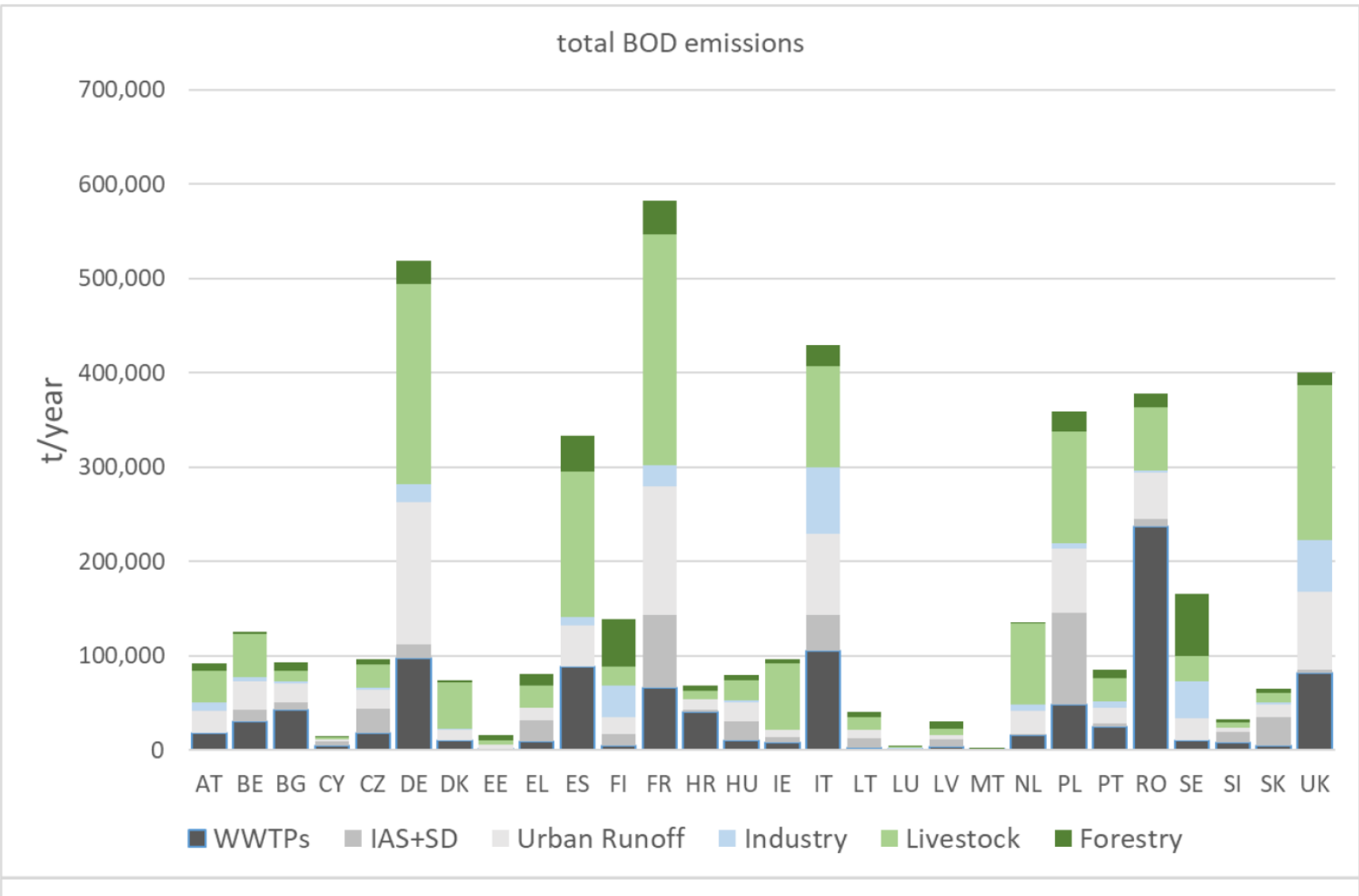
as % of wastewater loads

POLLUTION LOAD – BOD FROM WWTP <> STORMWATER

loads of BOD to EU water bodies by source (tonnes per year): EU28 totals



POLLUTION LOAD – BOD FROM WWTP <> STORMWATER



loads of BOD to EU water bodies by source (tonnes per year): by country

POLLUTION LOAD MICROPLASTICS – HEAVY METAL

that's why pre-treatment of
stormwater is so important:

Source of microplastic	quantity (ton/year) 2019
paint	230 000 - 863 000 (av. 482 000)
tyres	360 000 - 540 000 (av. 450 000)
pellet	52 140 - 184 290
textile	1 649 - 61 078
geotextile	6 000 - 19 750
detergent capsules	4 140 - 5 980
total for the selected 6 product groups	654 929 - 1 674 098 (90-93% total emission)
Total plastic	729 087 - 1 808 198

NEW UWWDT TO IMPROVE URBAN WASTEWATER TREATMENT AND REUSE

Three **important sources of remaining load of pollution from** urban wastewater that could be avoided were identified:

- **stormwater overflows**
- **polluted discharges of urban runoff,**
- potentially mal-functioning individual systems

stormwater overflows and urban runoff, represent a sizeable remaining source of pollution discharged into the environment



NEW UWWDT TO IMPROVE URBAN WASTEWATER TREATMENT AND REUSE

- reduce the **pollution from stormwater overflows**
- avoid the entry of **unpolluted rain waters** into **collecting systems or temporary storage, including natural water retention, and appropriate treatment** of these heavy loaded first rains
- limit the pollution from stormwater overflows to no more than 2 % of the annual collected urban wastewater load calculated in dry weather flow condition
- **Microplastics and relevant micropollutants** should be monitored, where relevant, in sewer overflow discharges and in discharges of urban runoff from separate systems with a representative sampling programme allowing for concentration estimation in view of water quality modelling

WATER IN THE EU GREEN DEAL (WATER: ONE OF 6 OBJECTIVES)

Taxonomy Regulation: the climate and environmental objectives

The water is one of the 2+4 climate and environmental objectives
1 of 6...



Climate change mitigation



Climate change adaptation



Sustainable and protection of water and marine resources;



Transition to a circular economy

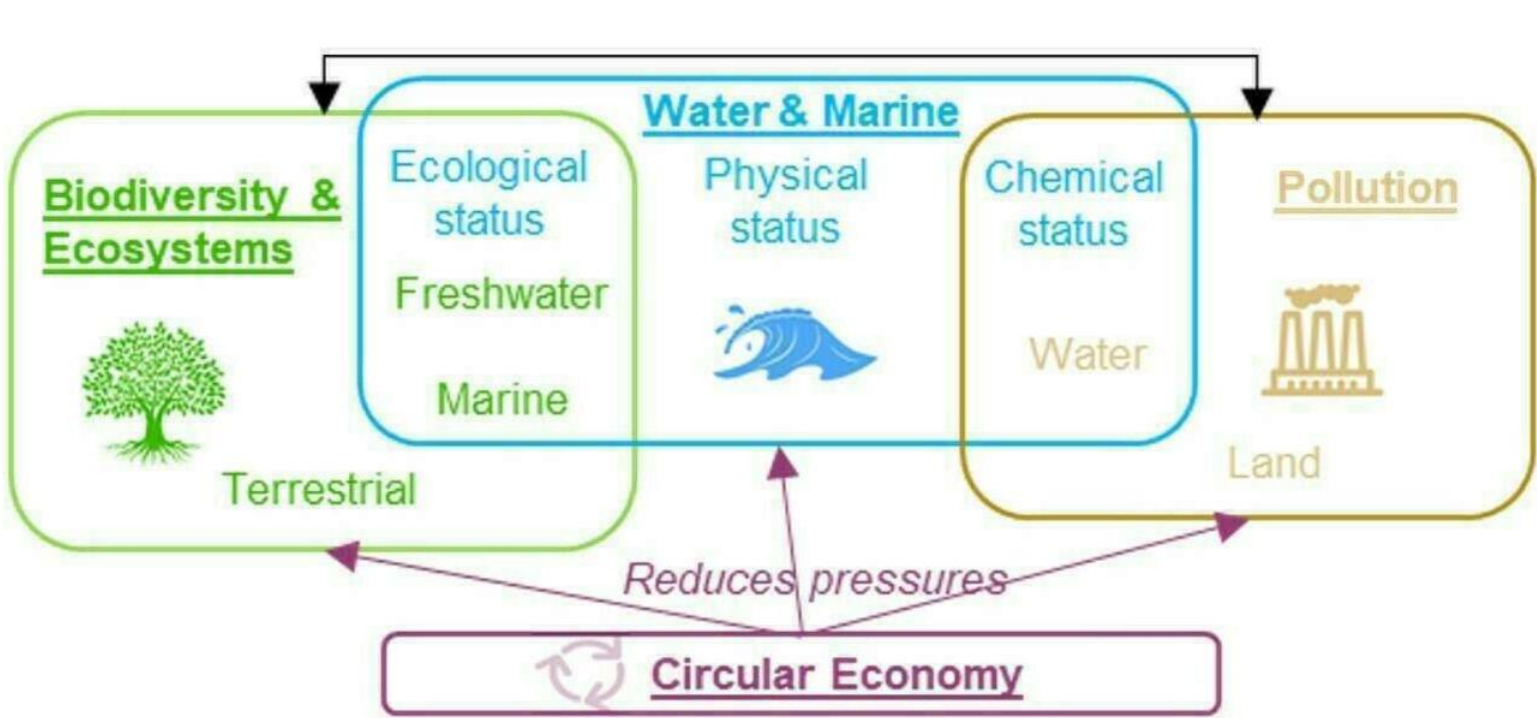


Pollution prevention and control;



Protection and restoration of biodiversity and ecosystems.

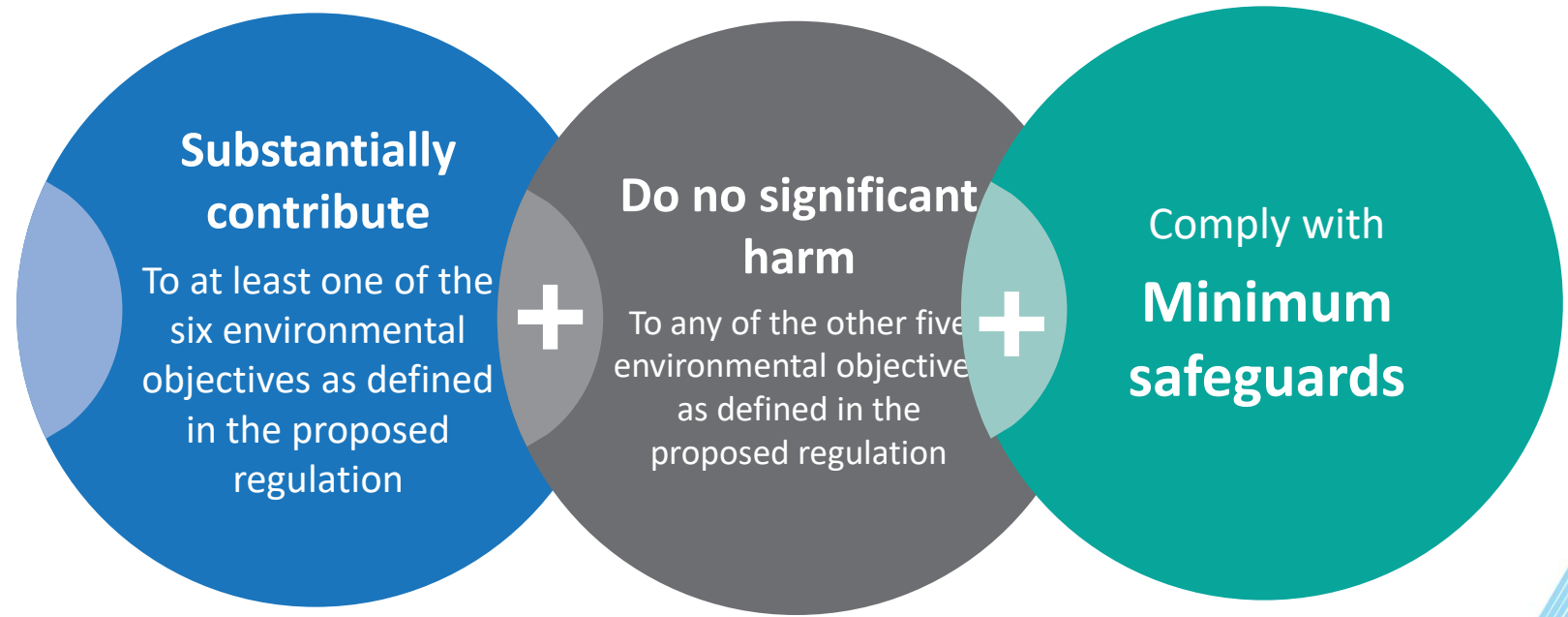
WATER AND THE OTHER ENVIRONMENTAL OBJECTIVES



The water in everything ...

THE 3 BASIC CONDITIONS FOR AN ACTIVITY TO BE CONSIDERED TAXONOMY - ALIGNED

- Science-based
- Leverage existing work
- Dynamic
- CAPEX & OPEX
- Easy to use



Minimum Safeguards = UN Guiding Principles and OECD Guidelines

WATER MANAGEMENT RELATED ACTIVITIES

As listed in the Full list of Technical Screening Criteria August 2021 993p.

○ 11. Water supply	902
○ 11.1 Water supply	902
○ 11.2 Desalination	907
○ 12. Sewerage	918
○ 12.1 Urban Wastewater Treatment	918
○ 12.2 Phosphorus recovery from wastewater	922
○ 12.3 Production of alternative water resources	927
○ 12.4 Sustainable urban drainage systems (SUDs)932



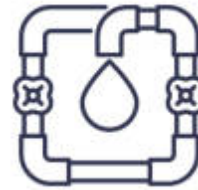
FINANCIAL AND REGULATORY DEFICIENCIES



Missing
discharge fees



Low resource values (costs)
for freshwater utilisation



Infrastructure costs are not
included into services



Large-scale implementation and
private participation is not
achievable, due to low ROI

NEW ASPECTS OF WATER CLIMATE NEXUS

CLIMATE CHANGE – STORMWATER NEXUS

- Climate change effects on water management
 - Flood, stormwater overloads, extreme precipitation events, drought, etc. = harmful effects
- Pollution control
 - 50% of pollutions related to municipal discharge comes from rain events
- Stormwater as alternative water resources = supports adaptation
 - the local (decentralised - best on the spot) **retention, reuse or infiltration**

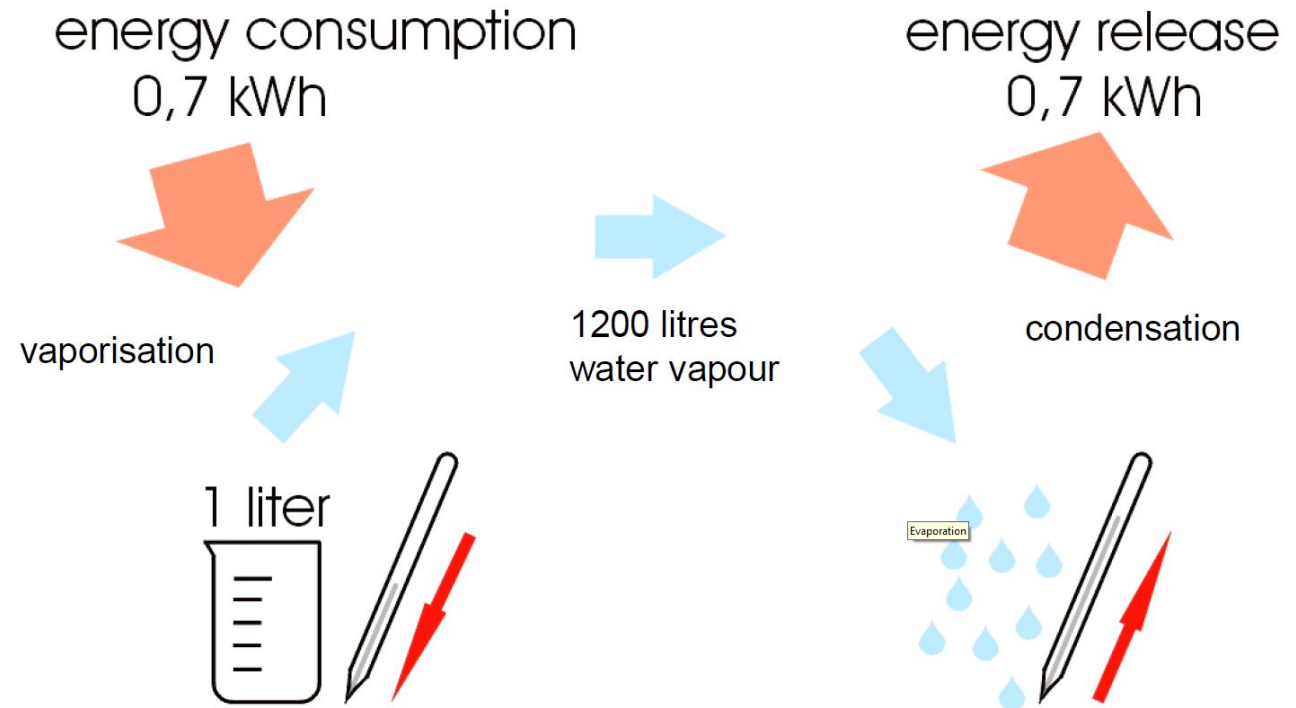
There is something we have not taken into account yet!

- **Cooling effect that results in CO2 emission reduction >> CC Mitigation**

NEW APPROACH – URBAN COOLING EFFECT

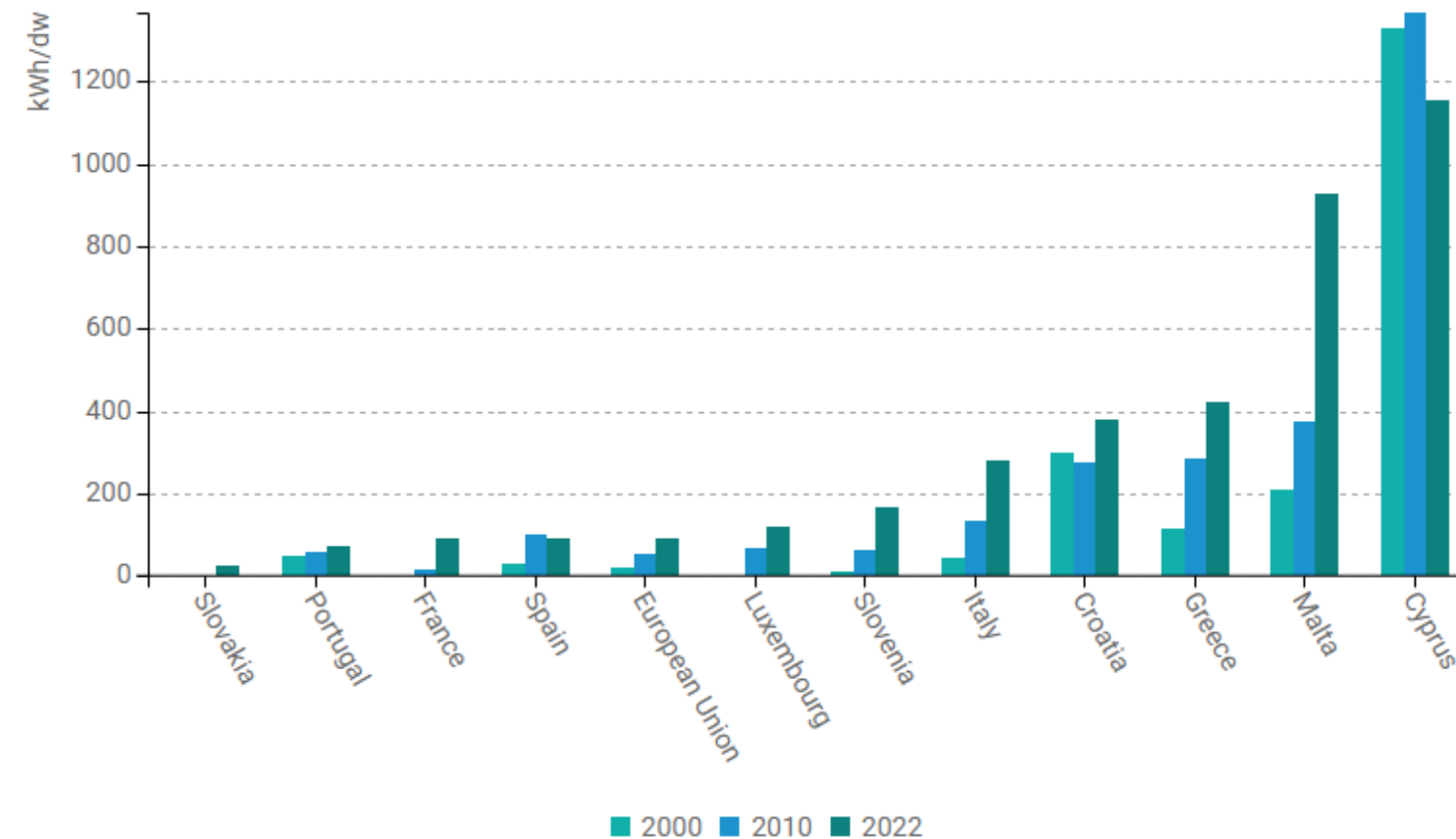
LATENT HEAT of evaporation – principle of perfect air conditioning: cooling (vaporisation) and warming (condensation)

1 litre of stored and evaporated water saves the same amount of energy as a 700-watt air conditioner consumes in one hour.



18 grams of water vapour has volume 22400 ml (Avogadro Law)

Consumption per dwelling for air conditioning



In 2022, air conditioning represented only 2.5% of the household electricity consumption in the EU

average per-dwelling consumption: increasing from 21 kWh/household in 2000 to 93 kWh/household in 2022, driven by the growing use of air conditioning appliances

This end-use is significant in Cyprus, Malta, Greece, Croatia and Italy (from 8% to 25% of household electricity consumption).

Infiltration, storage-related investments – if we take the CO2 footprint into account:

ROI within one year!!



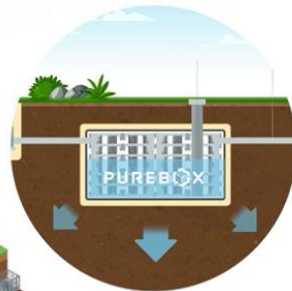
STORMWATER UNDER CONTROL

RETENTION & INFILTRATION



RAINWATER STORAGE

reduces flood risks and provides a reusable water source



INFILTRATION SYSTEMS

restores groundwater, reduces runoff, and supports a balanced water cycle

Moreover:
carbon footprint reduction= sold on the CO2 market

MESSAGE TO TAKE

- Due to bad water resource governance
 - to low water resource costs and
 - missing discharge tariffs, stormwater has no value.
- **financial gap - low ROI** for private (corporate and citizens) investments due to:
 - undervalued public infrastructure and
 - **bad water resource governance**
- **ESG + Taxonomy**, and awareness rising are **second best** and insufficient solutions
- **Room for hope:**
 - tightening requirements
 - **NEW APPROACHES:** urban cooling and CO2 footprint

Thank you for your attention!

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