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Promoting Water Recycling in the Baltic Sea Region

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The WaterMan project
Final draft of the regional water recycling strategy for Berlin & Brandenburg



Pia Schumann, Elisa Rose, Ulf Miehe

KWB - Berlin Centre of Competence for Water

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1. Scope and focus area
2. Local Background
3. Stakeholder analysis
4. Survey
5. Mapping of documents
6. Best practices
7. Water reuse activities in Berlin-Brandenburg
8. Core measures & activites
9. Process



1. Model Strategy: Scope & focus area

Water sources & uses

Municipal Wastewater (Greywater)

Industrial & commercial use
Agricultural & urban irrigation

Focus area

Berlin vs. Brandenburg:

1	vs.	92 utilities
1	vs.	17 regional authorities
3.8	vs.	2.6 million people

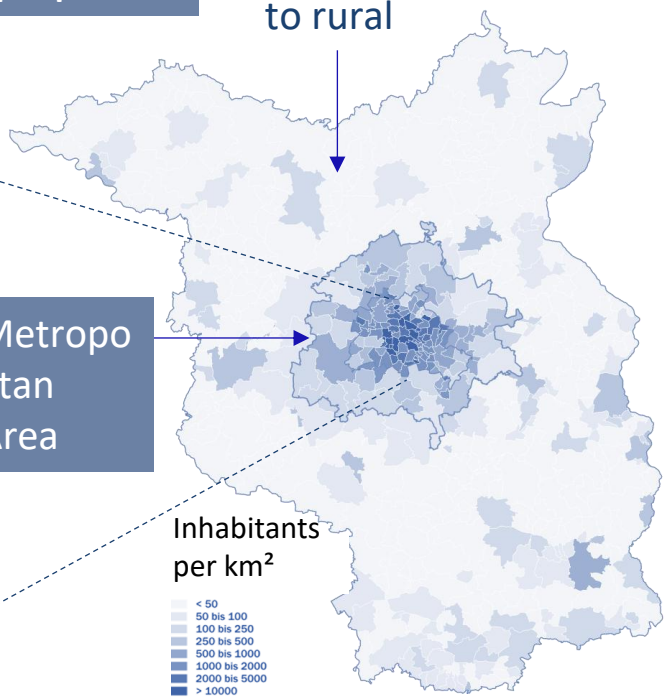


Berlin water utilities (BWB)

Berlin

Metropolitan Area

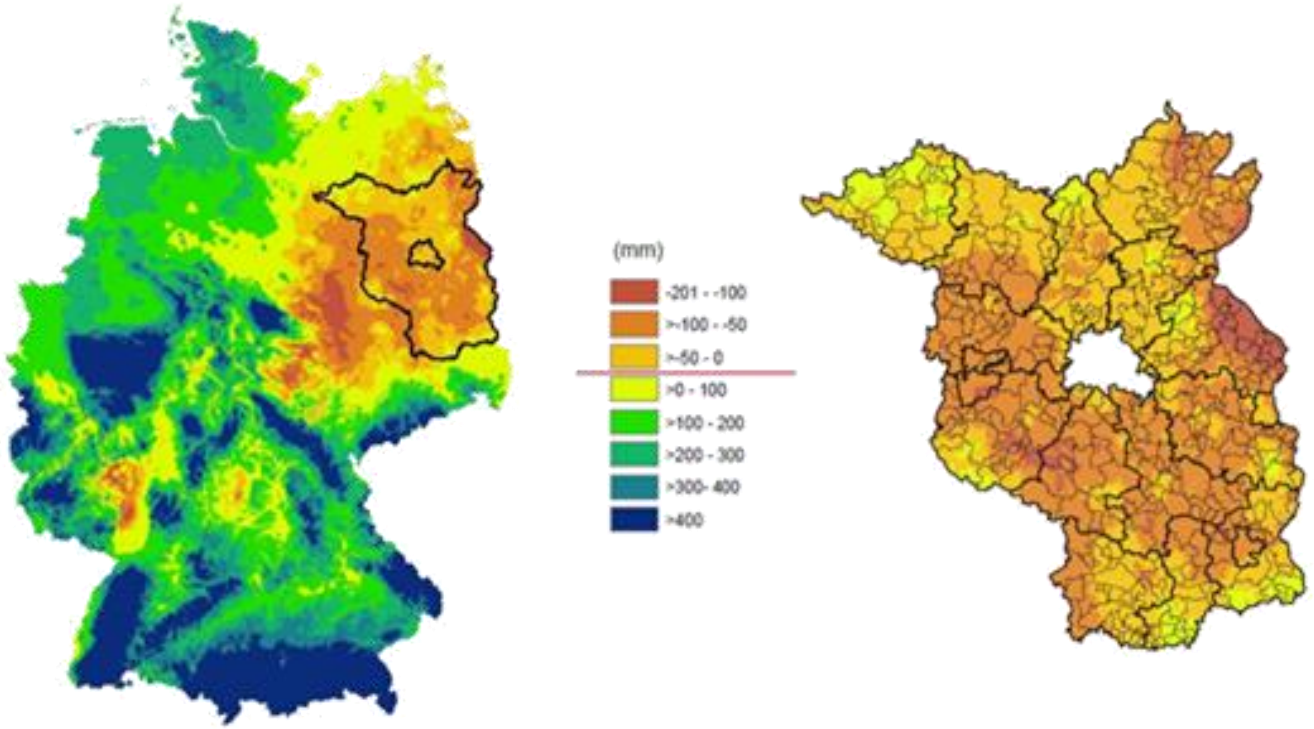
Peri urban to rural



Alexrk2, https://commons.wikimedia.org/wiki/File:Metropolregion_Berlin-Brandenburg_Einwohnerdichte.svg, change in color

2. Local background

- one of the driest regions in Germany
- annual mean rainfall of 580 mm
- extreme droughts in recent summers
- negative annual climatic water balance of -52 mm
- mean temperature of 9.7°C (1.4 °C in winter, 18.4°C in summer).



Annual climatic water balance of Germany (left) and the state of Brandenburg (right) over the period from 1991 to 2021. Colors indicate the local water balances, calculated from precipitation minus potential evapotranspiration. Based on data from the German Climate Data Center (CDC 2023).

Dittmann et al., 2024; doi: 10.2166/wrd.2024.081

2. Local background

Future challenges of water supply in the Berlin Brandenburg Metropolitan Region

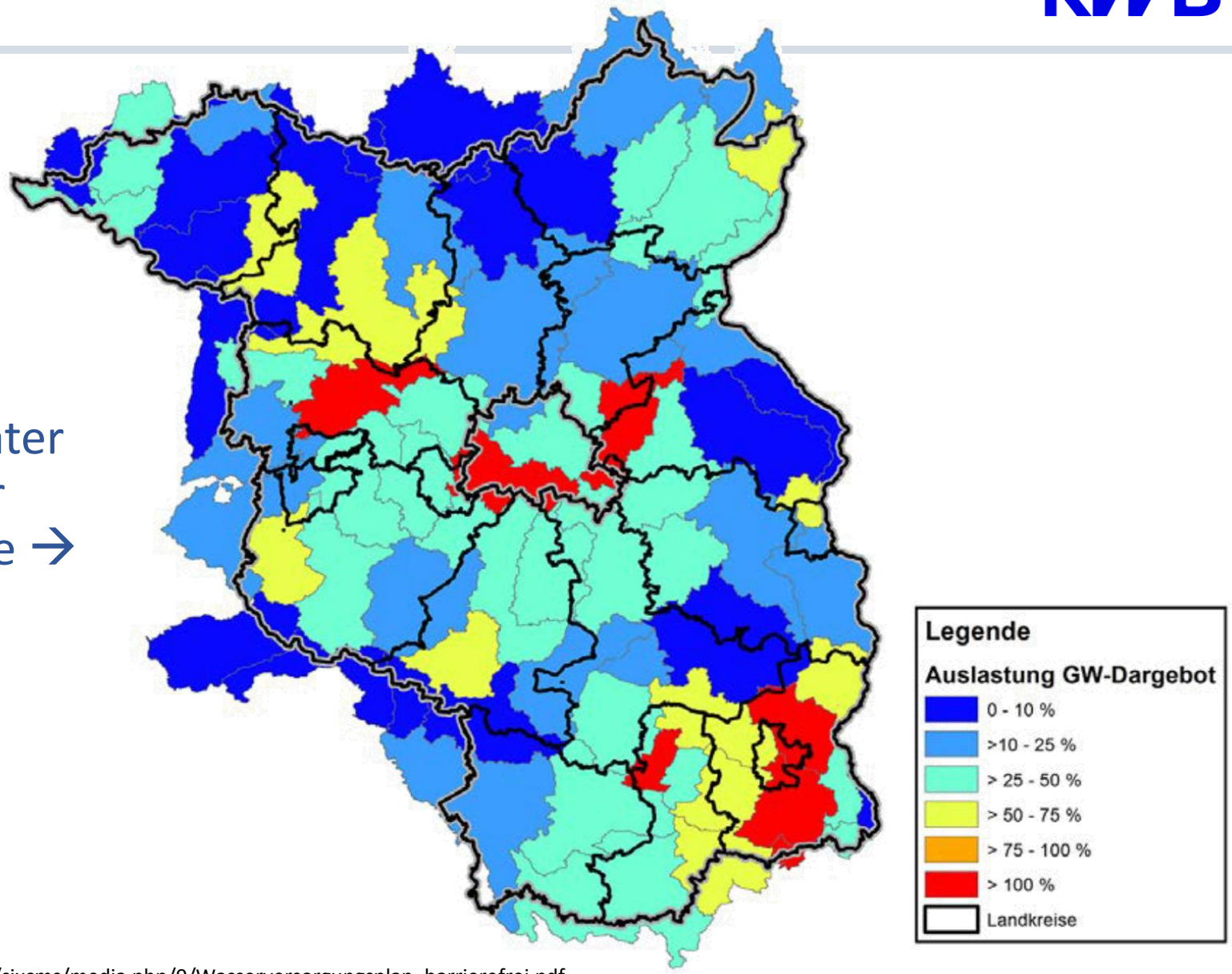
- Population Growth: Rising demand due to increasing population
- Climate Change: Reduced water availability (e.g., the dry five-year period 2018–2022)
- Decline in Spree River Flow: End of lignite mining and related mine drainage inflows
- Decline in Havel River Flow: Lower precipitation levels



2. Local background

Groundwater utilisation:

- Target: Utilisation < 30%
- High share in the metropolitan region has reached ist groundwater use target capacity → no further substainable abstraction possible → other options to be found



MLUK 2022: Wasserversorgungsplanung Brandenburg, https://lfu.brandenburg.de/sixcms/media.php/9/Wasserversorgungsplan_barrierefrei.pdf

2. Local background: Current and future water demands

	Berlin	Brandenburg part of the metropolitan region
Area (km²)	891 [6]	2888 [5]
Status quo (years 2020–2022)		
Inhabitants (Mio. inhabitants)	3.78 [3]	1.02 [5]
Raw water demand (Mio. m³)	219 [1]	54 [1]
inhabitants supplied by BWB (%)	100 [2]	7 (85,000 inhabitants, 5.7 Mio. m³) [2]
Future scenario(s)		
Inhabitants (Mio. inhabitants)	3.96 (2040) [3] 4.2 (2050) [1]	1.14 (2030) [4] 1.2 (2050) [1]
Raw water demand (Mio. m³)	248 (2050)[1]	77 (2050)[1]

1 ITM (2020), 2 BWB (o.J.), 3 SenWEB (2022), 4 Amt für Statistik B-BB (2021) (mittlere Entwicklungsvariante), 5 Amt für Statistik B-BB (2023), 6 Amt für Statistik B-BB (2024))



2. Local background

- Forecast for 2050: +49 million m³/a
  - Berlin: 28 million m³/a,
  - Metropolitan region in Brandenburg: 21 million m³/a
- Additional demand not evenly distributed across the metropolitan region
- Climate change issue: longer dry periods would reduce the available supply
- Assumption according to the Berlin Water Master Plan: loss of up to 55 million m³/a in Berlin (with 50% less groundwater recharge), requiring substitution
- Forecast: 50–100 million m³/a, additional and substitution demand



ITM 2020: Initiative Trinkwasserversorgung Metropolregion Berlin–Brandenburg. (2020). Masterplan Wasserversorgung Metropolregion Berlin–Brandenburg: Bestandsaufnahme und Ableitung von Erfordernissen für die Trinkwasserversorgung in der Metropolregion. Created by Wasserversorgungsunternehmen der Metropolregion. https://www.ag-wasser.de/initiative-itm

2. Local background: Measures in discussion

- Pipelines from
  - the Baltic Sea to Berlin (desalinated water)
  - reservoirs in the Central Uplands
- Local and regional interventions
  - Increased groundwater abstraction
  - Enhanced groundwater recharge (e.g., reuse, bank filtration)
  - Intensified water circulation (WWTP effluent discharge upstream)
  - Municipal wastewater reuse near WWTPs
  - Reduced water demand
  - Blue-green infrastructure for local infiltration
  - Remediation of contaminated sites



ITM 2020: Initiative Trinkwasserversorgung Metropolregion Berlin–Brandenburg. (2020). Masterplan Wasserversorgung Metropolregion Berlin–Brandenburg: Bestandsaufnahme und Ableitung von Erfordernissen für die Trinkwasserversorgung in der Metropolregion. Created by Wasserversorgungsunternehmen der Metropolregion. https://www.ag-wasser.de/initiative-itm

Kommunale Abwasserbeseitigung im Land Brandenburg – Lagebericht 2025. MLEUV

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  - Increased groundwater abstraction
  - Enhanced groundwater recharge (e.g., reuse, bank filtration)
  - Intensified water circulation (WWTP effluent discharge upstream)
  - **Municipal wastewater reuse near WWTP**
  - Reduced water demand
  - Blue-green infrastructure for local infiltration
  - Remediation of contaminated sites

→ Local measures are highly promising due to simpler implementation and fewer stakeholders



ITM 2020

2. Local background: Irrigation potential in Brandenburg

- Water irrigated demand for agriculture in Brandenburg was calculated to be 23.1 Mio m³ in 2019 (average 72.2 mm)
- about 56.6 Mio m³ total wastewater is generated in the growing season from April to October

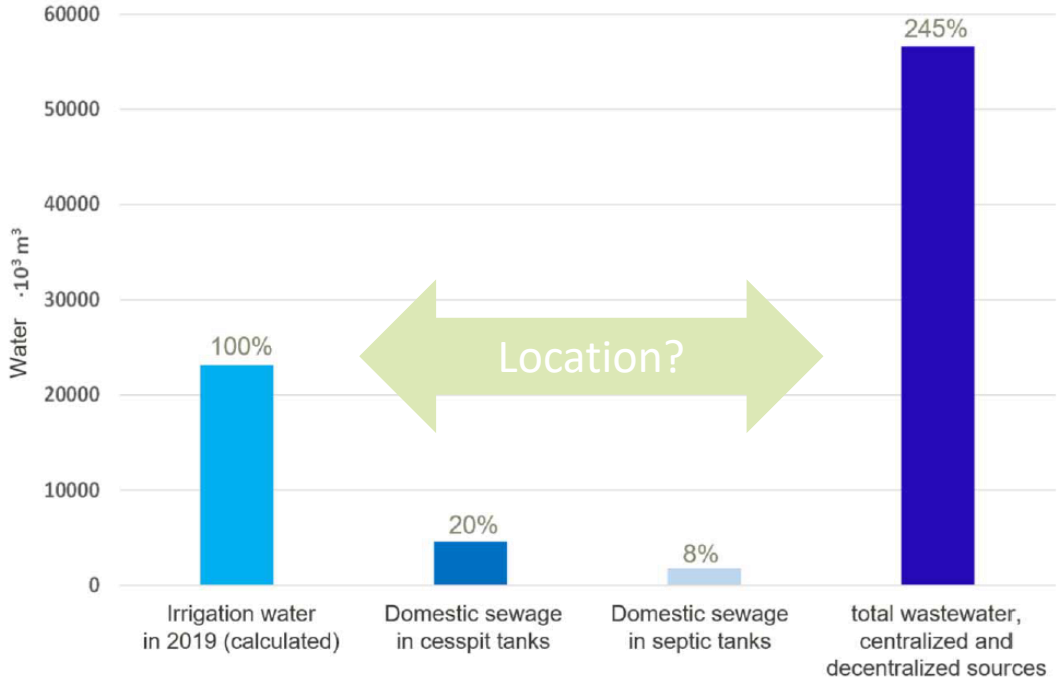
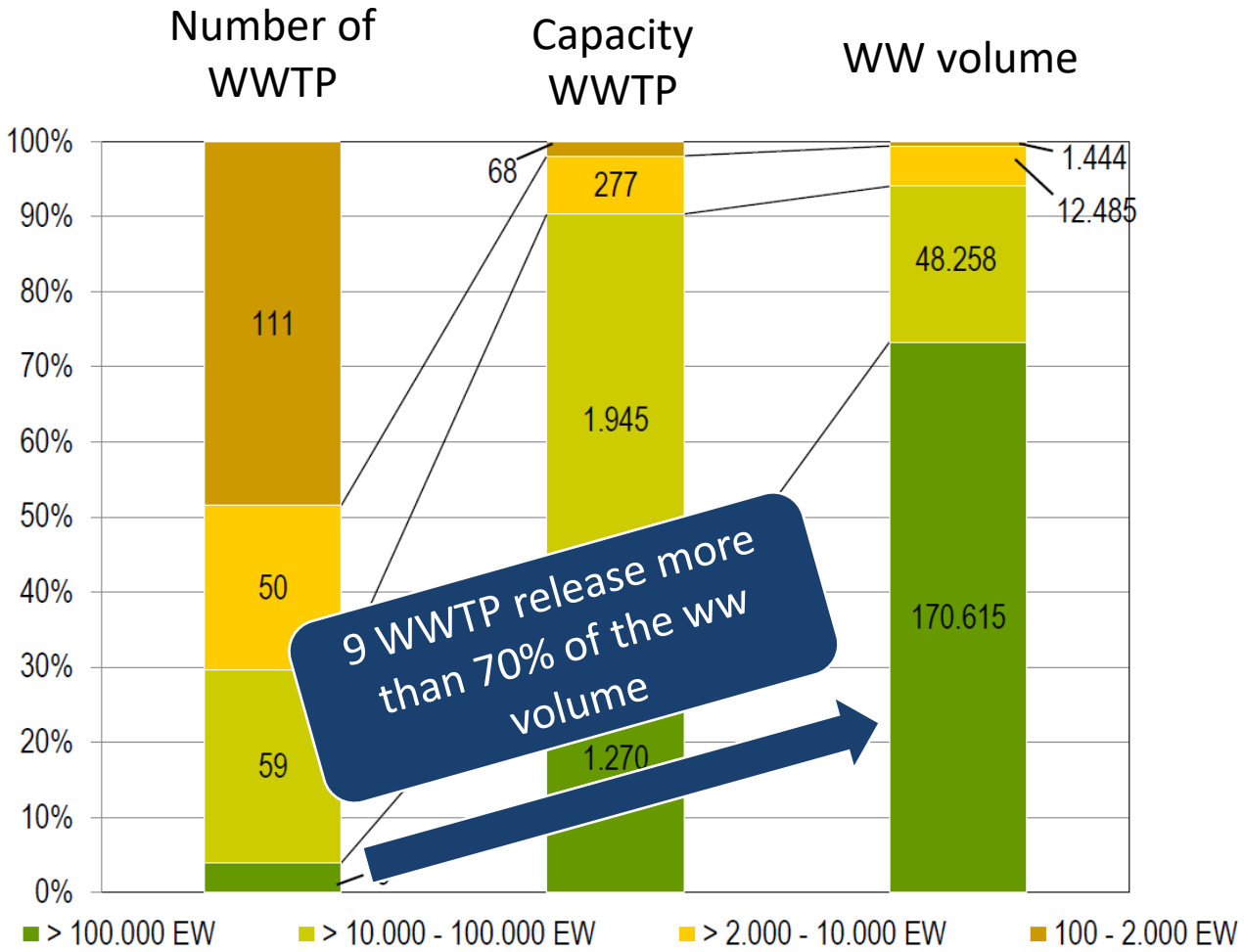


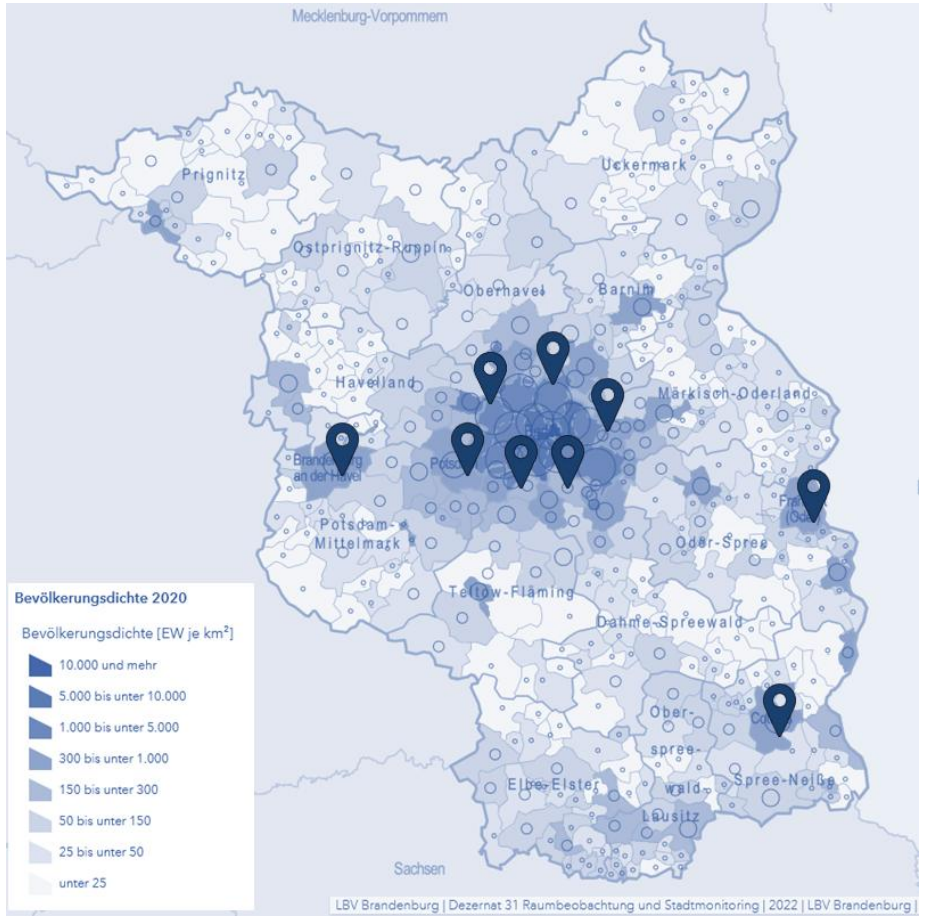
Figure 4 | Water balance during the growing season (April–October). Accounted for substitution potential for irrigation water used in 2019 with decentralized sewage sources and total wastewater in Brandenburg, Germany.

Dittmann et al., 2024; doi: 10.2166/wrd.2024.081

2. Local background: Wastewater volumes & spatial distribution



Kommunale Abwasserbeseitigung im Land Brandenburg – Lagebericht 2025, MLEUV

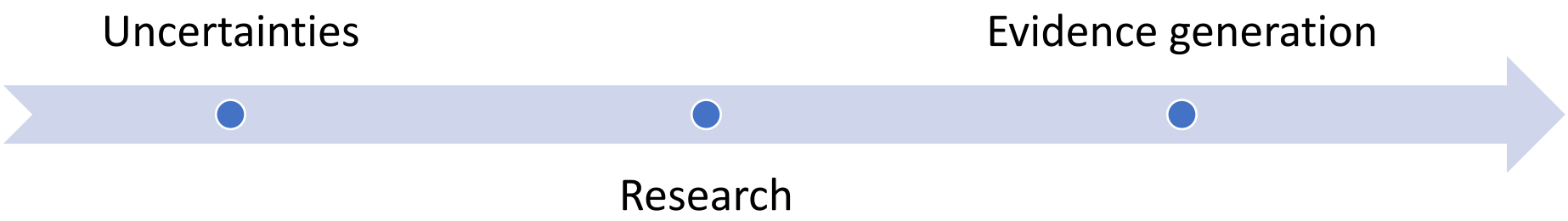


LBV Brandenburg | Dezernat 31 Raumbeobachtung und Stadtmonitoring | 2022; https://raumanalyse.brandenburg.de/rm-be-bb/?page=Bev%C3%B6lkerungsdichte-2020&views=2.3.4-Lokalisierung%2CLegende

2. Local background: Status quo of water reuse adoption in Berlin-Brandenburg

- Despite its potential, water reuse is not yet widely adopted due to unresolved uncertainties and governance gaps.
- High level of uncertainty: Open questions regarding regulation, health risks, economics, and public acceptance
- Role of research: These uncertainties are currently addressed primarily through research and pilot projects

Focus on applied research as a prerequisite for scaling water reuse



3. Stakeholders

Local decision makers

- Facilitate safe & sustainable water management
- Ensure resource protection

- **Senatsverwaltung Berlin für Mobilität, Verkehr, Klimaschutz & Umwelt (SenMVKU)**
- Ministerium für Landwirtschaft, Umwelt & Klimaschutz Brandenburg (MLUK)
- Landesamt für Umwelt (LfU)
- Gesundheitsämter (Public health authority)
- Pflanzenschutzamt Berlin (Plant protection authority)
- Senatsverwaltung für Justiz und Verbraucherschutz
- Local politicians & political parties

Water utilities

- Ensure safe, sustainable (& economic) water suppply & disposal

Berliner Wasserbetriebe

- Berlin: **Berlin Water Utility**
- Brandenburg: Organized on a local level in water and wastewater associations

Associated organi-zations

- Support interests of target group
- Mapping of regional water reuse activities

- German Environment Agency
- Chambers of Commerce & Industry Berlin & Brandenburg
- Landeswasserverbandstag Brandenburg e.V.
- Universitys: e.g. Technical University of Berlin
- **Berlin Partner**
- Julius Kühn Institute
- Standardization bodies: DIN ISO, DWA, VDI, DVGW
- Brandenburgische Wasserakademie
- Fachverband Bewässerungslandbau Mitteldeutschland e.V.

BERLIN PARTNER für Wirtschaft und Technologie

Potential end-users

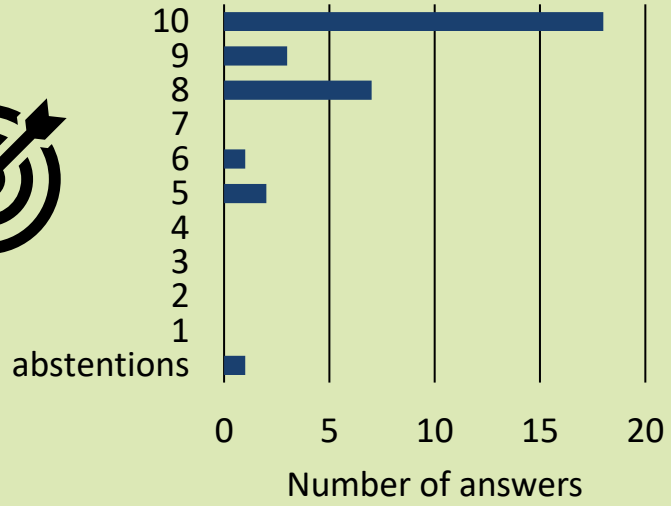
- Ensure economic & safe water supply

- Industry & businesses
- Public companies: e.g. municipal disposal company (BSR)
- Districts and municipalities

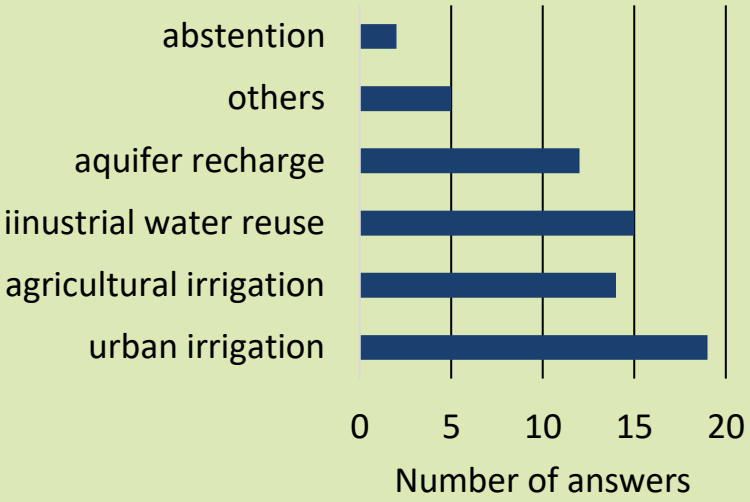
4. Survey

- Survey excerpt from local stakeholder event, Potsdam, November 2024 (n=32)
- More than 80% of participants work in Berlin and/or Brandenburg

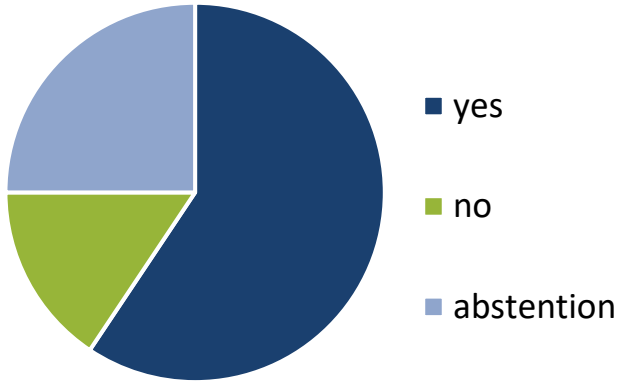
How interesting is water reuse for your work and region?



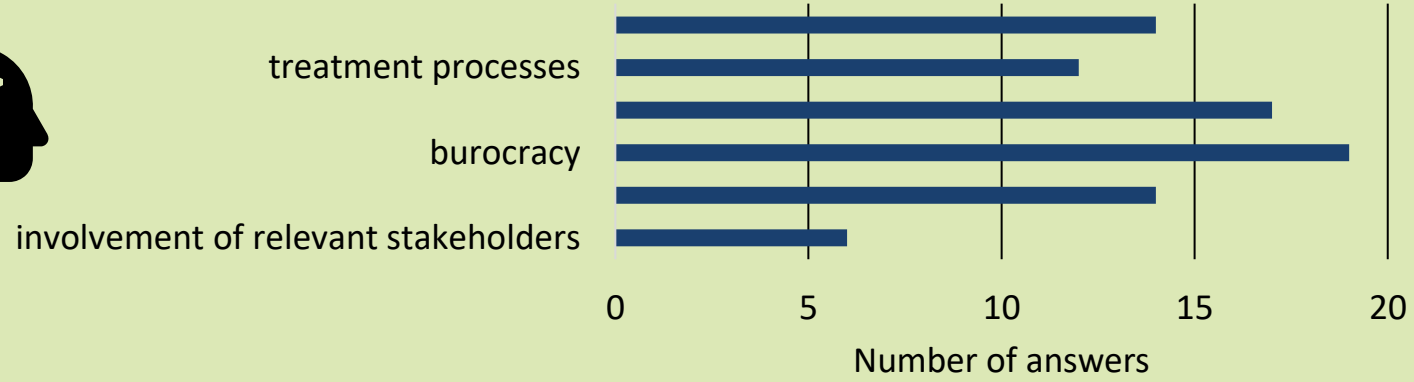
Which type of water reuse is most interesting for your region?



Are you considering implementing water reuse?



What are the main challenges for you in the context of water reuse



5. Mapping of documents



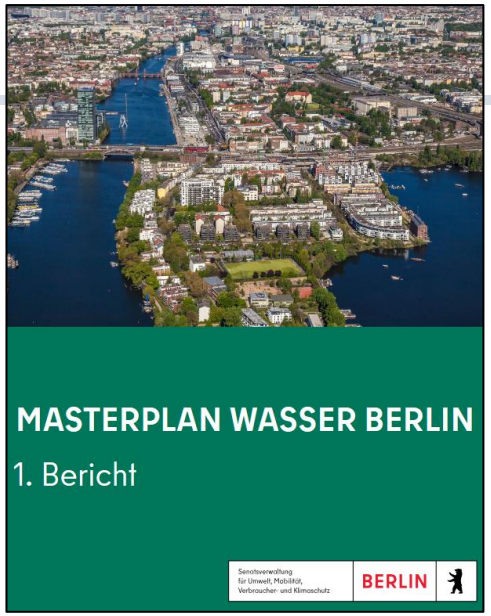
Berlin Master Plan Water

Micropollutant Strategy

Cross-State Water Management

National Water Strategy

1



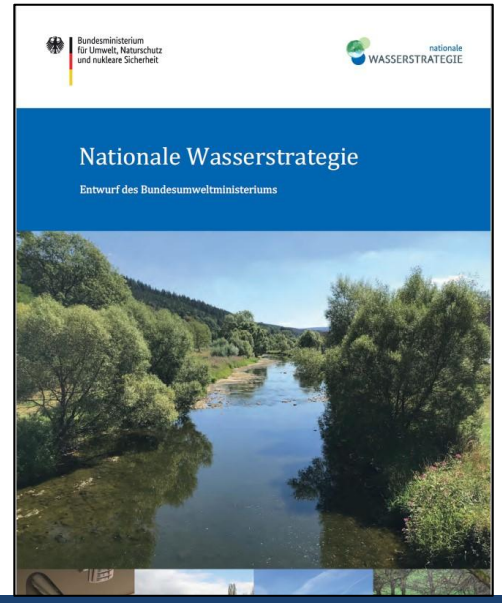
2



3



4



6. Best practices

Upcoming: Nordenham (Germany)

- Cooperation of OOWV and KRONOS TITAN to reuse treated municipal wastewater from 2026, reducing drinking water demand by up to 500,000 m³/year



Treated Municipal Wastewater Reuse in Terneuzen (The Netherlands)[1]

- A cooperation between chemical industry (Dow Terneuzen) & the local water company
- Water Source: Secondary effluent from the WWTP Scheldestromen
- Further Treatment by: Evides
- Treatment: Reverse Osmosis
- Reuse Application: Cooling tower process

Camp De Tarragona Water Reclamation Plant (Spain)[2]

- Water source: Secondary Effluent from Tarragona and Vilaseca-Salou wastewater treatment plants
- Treatment capacity: Average of 19,000 m³/d (Phase I)
- Further extension: 29,000 m³/d (Phase II) and 55,000 m3/d (Phase III)
- Reuse Application: cooling water for Tarragona Chemical Complex & boiler feed water at cogeneration power plant

Reuse of treated wastewater in Katowice (Poland)[3]

- Effluent flow 1,500,000 m³/y
- advanced treatment: microfiltration
- Reuse application: cooling tower

[1]https://corporate.dow.com/content/dam/corp/documents/science-sustainability/066-00202-01-industrial-water-reuse-case-study.pdf, [2]Sanz et al., 2015, doi: 10.2166/ws.2014.114, [3]Ramm et al., 2024, https://doi.org/10.1016/j.jenvman.2024.120890

7. Water reuse activties in Berlin-Brandenburg

- WaterMan – Feasbility study in Ruhleben and Stahnsdorf
- Pu2R – Decentralized water reuse for agricultural irrigation
- Flexitility – Water reuse for agricultural irrigation
- TrinkWave Transfer – Full-scale sequential groundwater recharge
- IWIQ – Real world piloting of greywater recycling
- BWB: Treated wastewater is used to restore nature: in Hobrechtsfelde (Berlin), ~4,900 m³/day of effluent from Schönerlinde WWTP rehydrates former fields into a biodiverse green area

8. Core measures & activities: The KWB perspective

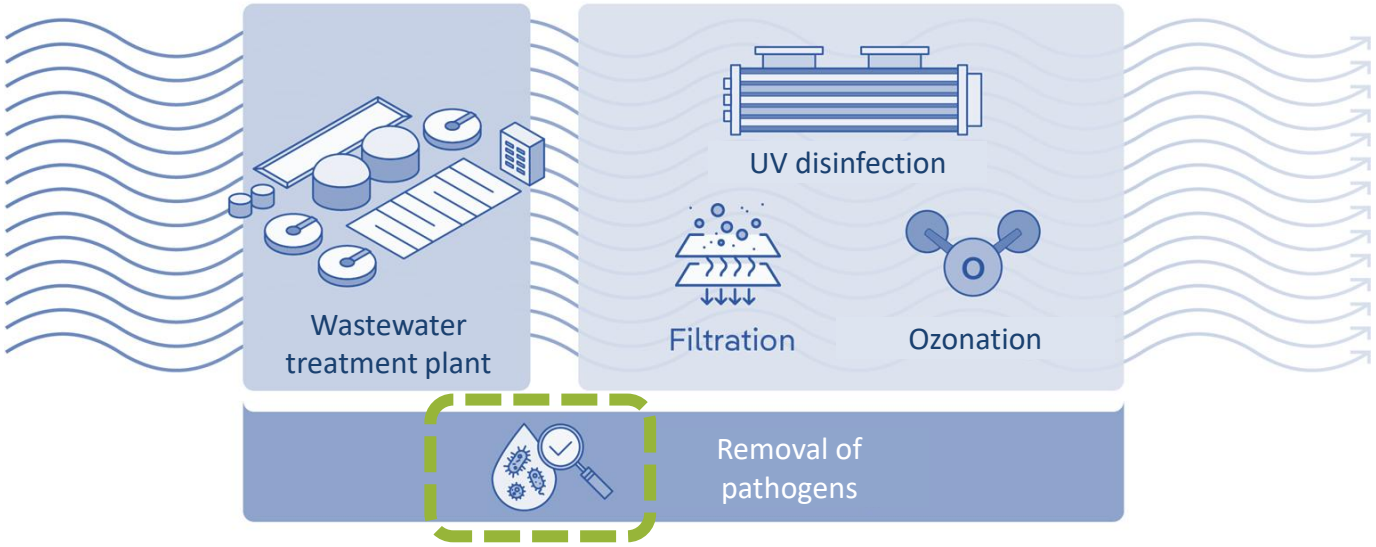
Engaging stakeholders	Identifying knowledge gaps from relevant actors	Guiding decision-making and implementation
Informing policy, practice, and the public	Building capacity internally and with partners	Creating networks to connect actors
Identifying needs & potentials (e.g. greywater recycling project)	Developing solutions	Advancing research to generate knowledge

8. Core measures & activities

- Knowledge generation
- Capacity building and training
- Stakeholder engagement and co-creation
- Policy support and evidence based guidance
- Communication and public outreach
- Research projects (national and international)

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Water reuse

8. Core measures & activities

Knowledge generation	Capacity building and training	Stakeholder engagement and co-creation	Policy support and evidence based guidance	Communication and public outreach	Research projects (national and international)

- LCA workshop
- QMRA Workshop & Tool Update
- Workshop on water reuse, treatment technologies, risk assessment and managenent
- WaterMan Excursion
- Infographics

8. Core measures & activities

Knowledge generation	Capacity building and training	Stakeholder engagement and co-creation	Policy support and evidence based guidance	Communication and public outreach	Research projects (national and international)



Stahnsdorf

8. Core measures & activities

- Knowledge generation
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- Policy support and evidence based guidance
- Communication and public outreach
- Research projects (national and international)





8. Core measures & activities

Knowledge generation

Capacity building and training

Stakeholder engagement and co-

Policy support and evidence based

Communication and public outreach

Research projects (national and international)

Direct communication



Special: Regenwasser

Pia Schumann; Elisa Rose

Regenwasser als alternative Wasserressource im Ostseeraum

Im EU-Projekt WaterMan drehen sich alle Aktivitäten um die Wasserwiederverwendung als ein neues Element des Wassermanagements. Erste Anwendungsbeispiele aus Schweden, Lettland, Litauen und Polen zeigen, wie Regenwasser hilft, Trinkwasserressourcen zu schonen.

Bild 1 Beispiel Vastervik (Schweden): Ein Regenrückhaltebecken auf Gamleby wird aus einem 80 ha großen Einzugsgebiet gespeist und dient der Bewässerung städtischer Flächen.

tigt werden sollten. Gegebenenfalls sollte eine Behandlung eingeplant werden, um eine sichere Wiederverwendung zu gewährleisten.

Synergien im Ostseeraum

Das EU-geförderte Interreg-Projekt WaterMan demonstriert im Ostseeraum, wie solche Synergien entstehen. Die Kombination aus Klimaanpassung, Bildungsinitiativen und innovativem Wassermanagement eröffnet dabei neue Perspektiven für eine klimaresiliente Wasserwirtschaft. Im Unterschied zu den üblichen deutschen Standards wird hier der Begriff Wasserwiederverwendung breiter gefasst: Neben ge-



Wasserbewusste Stadt

Elisa Rose; Pia Schumann

Wasserwiederverwendung in der Hauptstadtregion als Strategie

Wie kann die Wasserwiederverwendung in Städten effizient umgesetzt werden? Das Projekt WaterMan widmet sich dieser Frage und fördert den lokalen Kapazitätsaufbau im Ostseeraum. Am Beispiel Berlin-Brandenburg werden die Potenziale der Wiederverwendung von aufbereitetem Abwasser untersucht.

Die Metropolregion Berlin-Brandenburg, in der knapp 6,4 Mio. Menschen leben, steht vor großen Herausforderungen hinsichtlich einer sicheren und klimaresilienten Wasserversorgung. Die Region ist geprägt durch weit unter dem Bundesdurchschnitt liegende Niederschläge (< 600 mm/a), Sandböden mit geringer Wasserkapazität, zunehmende Hitzewellen und wachsenden Wasserbedarf aufgrund des Klimawandels. Die Oberflächengewässer und Grundwasserspiegel sinken langfristig, auch wenn es

8. Core measures & activities

- Knowledge generation
- Capacity building and training
- Stakeholder engagement and co-creation
- Policy support and evidence based guidance
- Communication and public outreach
- Research projects (national and international)

IWIQ
RECREATE
SOLUCIR
SCALA
Poseidia
Emerg0

8. Core measures & activities: Building trust for scaling water reuse through local action and collaboration

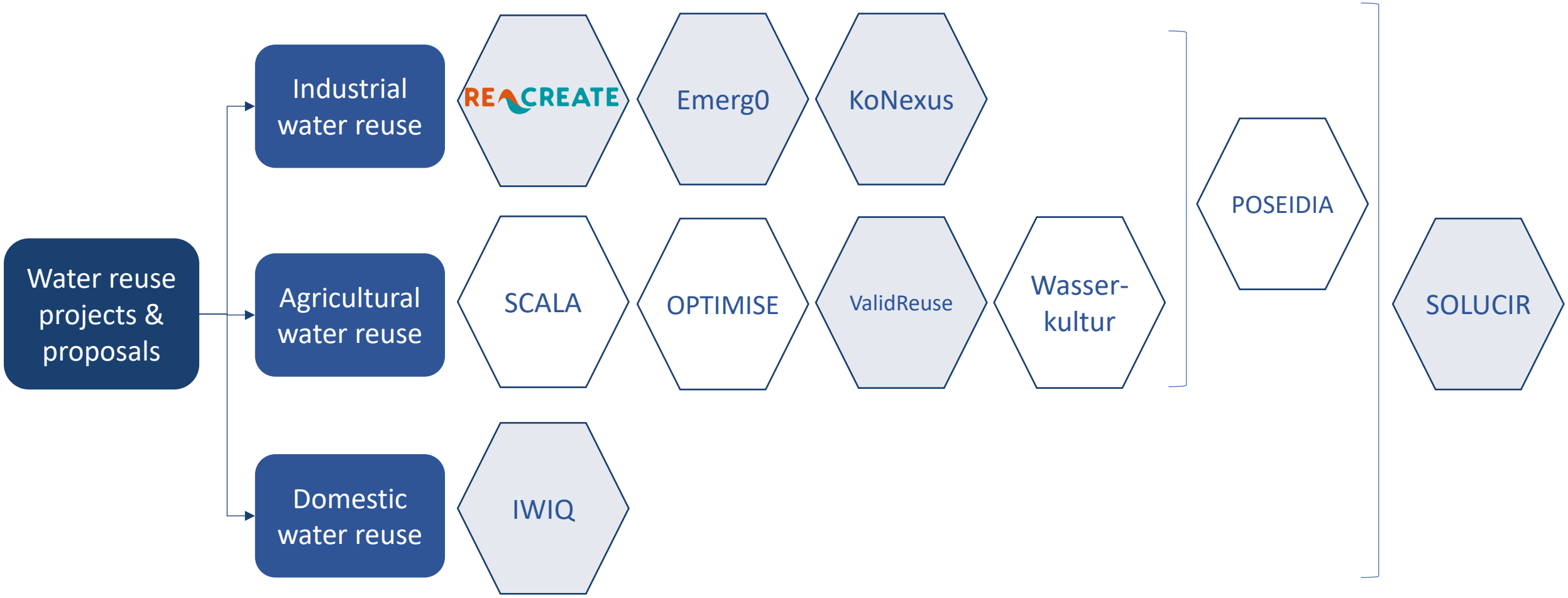
- **Lighthouse projects** at local level: Demonstration projects create continuity in water reuse
- Key enabling factors: **Trust, time, and transparency**, achieved through long-term, visible projects
- **Support through collaboration**: WaterMan supports project development through exchange



Governance challenge:

- The joint regional water strategy of Berlin & Brandenburg has been discontinued since early 2025
- No ongoing dialogue to contribute to is currently available

8. Core measures & activities: KWB projects and proposals



9. Process

- Strategy developed by KWB’s Water Treatment and Reuse team
- Continuous input from BWB, regulatory authorities (UBA, Berlin Senate, Brandenburg water authorities) and other stakeholders shaped focus and priorities

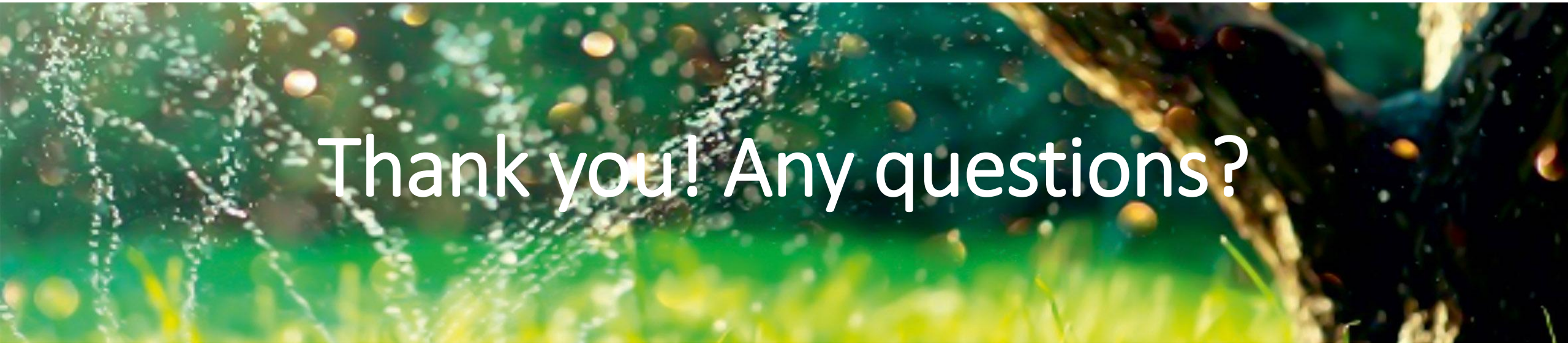


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Thank you! Any questions?