KOMPETENZZENTRUM
WasserBerlin

Annual Report 2017

Greetings

Kompetenzzentrum Wasser Berlin (KWB) successfully focuses on future topics like infrastructure, energy, climate and resources for their diverse range of research and innovation projects.

The interdisciplinary project »netWORKS4« is a perfect example for the forward-looking character of the KWB. It facilitates integrated planning processes for urban and infrastructure development and hence significantly contributes to Berlin becoming a Smart City. The EU-funded project »REEF-2W« examines new approaches to improve the efficiency of municipal infrastructures by linking water and waste management.

Digital transformation however, is the most important topic for the future. How can digitisation open up new perspectives and create innovative solutions in the water sector? Already more than half of the projects of Kompetenzzentrum Wasser Berlin use digital methods to solve research questions, regardless of the respective key issues.

For the removal of trace organic compounds from wastewater, an intelligent monitoring technology is currently being developed to determine the appropriate ozone dosage under a strongly fluctuating demand (»MeReZon« project). In the scope of the »SEMA-Berlin« project KWB and Berliner Wasserbetriebe have developed a model fed with data from Berliner Wasserbetriebe as well as open data from the City of Berlin to gain more accurate predictions about the rehabilitation needs for the 9,000 kilometre long sewer system in Berlin.

Finally, »FLUSSHYGIENE« should be mentioned as another digitisation-related research project. It turned out that conventional measuring methods are too slow to quickly determine the bathing water quality in watercourses after heavy rainfall. Therefore, the project has developed mathematical models which will facilitate the prediction of bathing water quality in rivers and provide an online information service for the public in the near future.

Kompetenzzentrum Wasser Berlin is already on its way into the future. May the KWB pursue this path, thereby making its contribution to the digital transformation of the water sector. For Berliner Wasserbetriebe, KWB is an indispensable part of the research landscape of Berlin.

Jörg Simon
CEO Berliner Wasserbetriebe
Board Member Berlinwasser Holding GmbH

Contents

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ZERTIFIZIERTES MANAGEMENTSYSTEM DIN EN ISO 9001 ZER-QMS

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Foreword

We look back on a successful 2017 – once again a year in which many projects were successfully executed. Our Annual Report gives you an insight into our multifaceted research, communication and networking activities. It highlights our approaches and priorities with regard to future challenges in water management.

Our activities contribute to improving the quality of life in cities. So far, we have put our main emphases on the traditional areas of urban water management such as groundwater, urban drainage, wastewater technology and surface water protection. To better cope with the dynamic development which is currently taking place in the water sector, we reorganised our work areas last year. The newly-created unit "Urban Systems" bundles all topics relating to the management of stormwater, wastewater and urban sewers. The "Process Innovation" unit addresses technical issues in the field of water and wastewater treatment. The Groundwater unit keeps to natural systems and well management.

Our projects are closely linked with topics which are relevant for the future and are particularly important for the development of Smart City Concepts: Energy efficiency, climate resilience, infrastructure, surface water protection, resources and digitisation. This way we help to integrate water as an essential component of public services into Smart City concepts.

I would like to thank all our project partners, our shareholders and especially our employees for their creative cooperation. In addition, I wish to thank the European Union, the German Federal Ministry of Education and Research, the German Federal Environmental Foundation (UBA) and the Berliner Wasserbetriebe for the research funds they provided. Furthermore, I would like to thank the Land Berlin for the support provided.

Edith Roßbach
Managing Director KWB

Newsticker

Since May 4th 2018, Edith Rossbach has been managing Kompetenzzentrum Wasser Berlin together with Regina Gnirß.

Edith Roßbach: "With Regina Gnirß we have won an experienced research manager to move forward Berlin's future topics at KWB. I am very glad about this support and look forward to the cooperation with my new colleague.

The Kompetenzzentrum Wasser Berlin

Kompetenzzentrum Wasser Berlin (KWB) is a non-profit water research centre based in Berlin, founded in 2001. Our shareholders are Berliner Wasserbetriebe and Technologiestiftung Berlin.

According to our mission statement, our major concern is to advance scientific knowledge and to push research & development activities in the water sector. To this end, we design research projects relating to all issues of the water cycle and carry them out together with our partners from academia, business enterprises and public authorities. The results contribute to keeping cities liveable also in the future. Our network activities link water professionals on the national and international level. Our PR communicates up-to-date information regarding all kinds of water topics to the interested public.

ZERTIFIZIERTES MANAGEMENTSYSTEM DIN EN ISO 9001 ZER.QMS

Shareholders

berlinwasser

Berliner Wasserbetriebe

TECHNOLOGIE STIFTUNG BERLIN

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Nicolas Zimmer
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The Year 2017 in Numbers

29 employees

55.000 external funding rate per employee

38 interns and student assistants

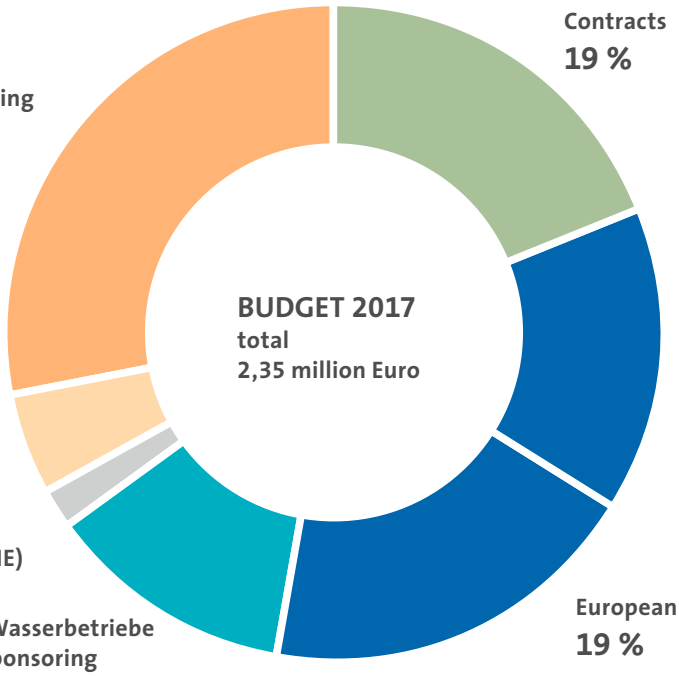
31 projects with an overall volume of 6.8 M Euro

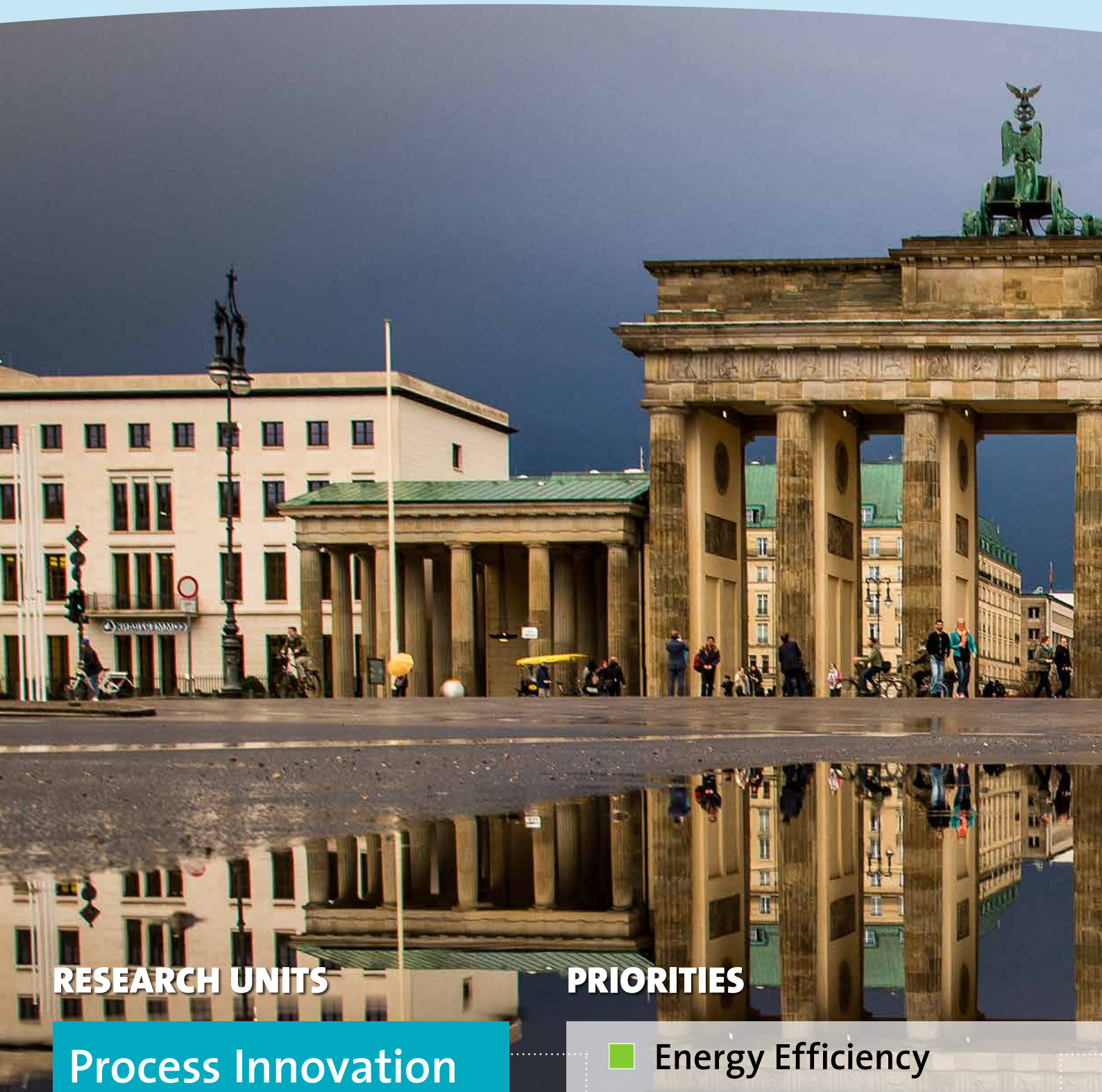
17 Participation in 17 scientific committees and professional associations

7 technical conferences with 1000 attendants

600 Berlin Long Night of the Sciences with 600 visitors

29 contributions to technical journals and conferences and monographs





RESEARCH UNITS

- Process Innovation
- Urban Systems
- Groundwater

PRIORITIES

- Energy Efficiency
- Climate Resilience
- Infrastructure
- Water Protection
- Resources
- Digitisation

Research for a Liveable City

Our research activities contribute to improving the quality of life in our cities. In 2017, a total of 31 predominantly multi-annual research projects and research contracts with a total volume of 6.6 million euros were carried out in the research units “Process Innovation”, “Urban Systems” and “Groundwater”.
Our projects are strongly based on issues related to the urban water cycle and focus to a varying degree on our research priorities Infrastructure, Energy, Digitisation, Climate, Water Protection and Resources.

TOPICS

- Improvement of the treatment performance of sewage treatment plants and wastewater reuse
- Energy and resources recovery in treatment processes
- Optimisation of sewage sludge treatment
- Life Cycle Assessment

- Sewer network operation and impact on water quality
- Rehabilitation strategies for sewers
- Urban stormwater management
- Risk assessment

- Natural water treatment processes
- Hybrid processes for groundwater replenishment
- Energy efficiency and safe operation and maintenance of wells

AquaNES

Energy Efficiency	Climate Resilience	Infrastructure	**Water Protection**	Resources	**Digitisation**

Combination of Natural and Engineered Processes for Water and Wastewater Treatment Systems

AquaNES
Demonstrating synergies in combined natural and engineered processes for water treatment systems

http://www.aquanes-h2020.eu

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Duration	06/2016 – 05/2019
Project Volume	10,7 million euro; KWB: 551,000 euro
Financing	EU Horizon2020

Partners
Kompetenzzentrum Wasser Berlin (KWB) in a consortium of 30 partners from Europe, Israel and India, coordinated by the University of Applied Sciences and Arts Northwestern Switzerland

Project Goals
Technical demonstration of combined natural and engineered processes (cNES – combined natural and engineered systems) for water and wastewater treatment; Risk assessment; Development of design guidlines for cNES; Identification of new market opportunities.

Horizon 2020
European Union Funding for Research & Innovation

Processes for water and wastewater treatment systems can be considerably improved through the systematic combination of engineered and natural components. The EU-funded project AquaNES operates 13 pilot plants in Europe, Israel and India to demonstrate the benefits of these combinations on a technical scale.

For treatment of drinking water the natural systems bank filtration and managed aquifer recharge (MAR) are combined with different engineered treatment schemes such as membrane filtration and oxidation processes. For treatment of wastewater the combination of constructed wetlands with different technical post- or pre-treatment options including ozonation and disinfection are investigated on a technical scale.

Two demonstration sites are located in Berlin. One scheme combines ozonation processes with natural post-treatment by two types of constructed wetlands for elimination of trace organic compounds and pathogens in wastewater effluent (also in comparison to technical filters). At the second site, the combination of bank filtration and nanofiltration is demonstrated at a pilot plant for removal of sulphate and trace organic compounds during drinking water production. The process data measured continuously in high temporal resolution via various online sensors are processed by a software tool developed by KWB as part of the project. This supports safe operation of the pilot systems and enables automated reporting with visualisation of crucial process parameters.

The international project consortium involves 30 partners. In Berlin, Berliner Wasserbetriebe, AKUT Umweltschutz Ingenieure and Kompetenzzentrum Wasser Berlin participate in the project. Beside its activities in Berlin, KWB coordinates a work package related to constructed wetlands and soil filters with test sites in Germany, the UK and Greece.

The plants went into operation in spring 2017. So far, the results have revealed that the combination of technical and natural methods has improved the elimination of trace substances and pathogens.

Visit of demonstration site on Antiparos Island, Greece

Demonstration of constructed wetlands installed in containers

Energy Efficiency	Climate Resilience	Infrastructure	**Water Protection**	Resources	**Digitisation**

Reducing Pharmaceutical Emissions into the Baltic Sea Region

Emissions of pharmaceutical residues into the aquatic environment from the catchment area of the Baltic Sea region are a topic of growing interest. The CWPharma project which is being funded by the European Union within the Interreg V B program (Baltic Sea region) is designed to support policy makers, administrations, and municipalities tackling this issue by providing decision-making tools and recommendations.

The project focuses on filling the gaps of knowledge identified and seeks to raise the awareness of policy-makers, regulators and permitting authorities about environmental risks, to implement emissions reduction programmes and to minimise the discharge of active pharmaceutical ingredients (API) into the Baltic Sea Region environment.

For this purpose, screening of a wide range of APIs will be performed in six river basin districts to get a more complete picture of sources, emissions and environmental concentrations of APIs. Based on pilot and large-scale trials in Kalundborg (DK), Linköping (SE), Helsinki (FI) and Berlin the most promising options for the reduction API emissions will be tested.

In total, 15 partners as well as 18 associated organisations from seven Baltic States including Belarus are involved in this project, which is coordinated by the Finnish Environment Institute (SYKE).
KWB leads Work Package 3 "Advanced Wastewater Treatment" comprising the performance of comparative studies at the pilot and full-scale plants and the evaluation of various system options in terms of their suitability for API elimination. In addition, a measurement and control concept to achieve the optimum ozone dosage will be further developed at the Berlin test site. The results will be transferred to the project consortium.

CW Pharma
Clear Water from Pharmaceuticals – Reducing pharmaceutical emissions into the Baltic Sea region

http://www.cwpharma.fi/en-US

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Duration	10/2017 – 10/2020
Project Volume	3,724,450 euro, KWB 321,100 euro
Financing	EU Interreg (Baltic Sea Region), Berliner Wasserbetriebe

Partners
Kompetenzzentrum Wasser Berlin gGmbH (Associated Partner) in a consortium with 15 partners and 18 associated organisations from 7 Baltic Sea states

Project Goals
Reduction of trace organic compound emissions into water bodies of the Baltic Sea region; Comparison of different ozonation plants and tertiary-treatment schemes by ecotoxicity tests; Performance tests relating to the control of ozonation units in a large-scale plant.

Sample drawing in Baltic sea catchments

Energy Efficiency | Climate Resilience | Infrastructure | Water Protection | Resources | **Digitisation**

Fast and Reliable Measurement and Closed-loop Control Concepts

MeReZon
Tertiary wastewater treatment with ozone

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Duration	05/2017 – 05/2019
Project Volume	217,000 Euro
Financing	German Federal Ministry of Education and Research (BMBF), Programme KMU Innovativ

Partners
TriOS Mess- und Datentechnik GmbH (coordinator); Kompetenzzentrum Wasser Berlin; Berliner Wasserbetriebe (associated partner)

Project Goals
Optimisation of the measuring technology for the regulation of ozone plants based on online UV measurements

Bundesministerium für Bildung und Forschung

Recent years have seen numerous studies and research projects to determine the extent to which trace organic contaminants (TrOCs) can be removed from municipal wastewater. It was shown that ozonation and the usage of activated carbon are technically and economically feasible measures for TrOC elimination. Currently, more and more WWTPs are getting upgraded with ozonation and/or activated carbon stages at various sites in Germany and Switzerland in order to reduce the discharged amount of TrOCs into the receiving surface waters.

However, an advanced wastewater treatment with ozone requires a fully developed strategy for controlling the ozone dose at a varying water quality in order to avoid under- and over-dosing. In practice, different control strategies have only been tested in few cases. In particular, the reliability and the required maintenance of the used online sensors posed clear challenges to the operators of ozonation systems. Therefore, an optimised stable measurement and control concept that can be implemented in systems at full scale is urgently required.

For this reason, the MeReZon project develops an innovative monitoring and control concept that enables stable, optimal, demand-based ozone dosing in WWTPs. TriOS Mess- und Datentechnik GmbH (responsible for measurement technology and project coordination), Berlin Centre of Competence for Water (responsible for developing the control concept) and Berliner Wasserbetriebe as associated partner are involved at this two-year project. The project is funded by the German Federal Ministry of Education and Research (BMBF)'s "KMU Innovativ" funding initiative for small and medium-sized enterprises.

In 2017, two online UV-VIS sensors produced by TriOS were installed in the ozone pilot plant of KWB. The aim is to gather first experiences on the reliability of the existing product in this particular water matrix und to derive recommendations for improving the cleaning strategy of the probes.

UV-VIS-Sensors installed in the ozone pilot plant

Energy Efficiency | Climate Resilience | Infrastructure | **Water Protection** | Resources | **Digitisation**

Rapid Test Procedures for the Assessment of Trace Organic Contaminants Removal from Wastewater

The planning process of technical treatment stages for the removal of unwanted organic trace contaminants (TrOC) from secondary treated wastewater can be complex and expensive, as the local boundary conditions (e.g. water matrix) always have to be considered. Using a standardised process design is therefore not always possible and comprehensive pilot tests have to be performed first in order to obtain required design parameters.

The scope of the TestTools project was to provide a set of tools for a rapid and cost efficient prediction of the efficiency of technical measures for TrOC elimination such as ozone and activated carbon, which can be used for the planning process. The so-called "TestTools" consist of suitable lab experiments and parametric modelling. KWB was responsible for the ozonation lab tests which were continued in 2017. The "TestTools" for the usage of ozone were cross-checked by pilot trials performed in Berlin and were also validated by full-scale ozonation plants in other regions of Germany. Additionally, the test scheme was applied to more than 10 WWTP secondary effluents.

Besides the influence of the varying water matrix (e.g. DOC, nitrite, etc.) on the TrOC elimination at different applied ozone doses, also possible impacts of the water temperature, pH, and the kind of ozonation transfer (adding an ozone stock solution or conduct ozone via diffusor into the water sample) were investigated. As one outcome, it could be shown that the ozonation transfer has a significant influence on the formation of bromate. The standardised test procedures for the technical design of trace organic compound removal plants using ozone and activated carbon which were developed in the project will be published in the final project report.

Quantification of soluted Ozone by using decolouration of Indigoblue

TestTools
Development and validation of rapid test schemes for the assessment of trace organic contaminants (TrOC) behaviour in technical and natural barriers in the urban water cycle

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Duration	08/2015 – 03/2018
Project Volume	775,000 euro; KWB: 238,000 euro
Financing	German Federal Ministry of Education and Research (BMBF), part KWB co-financed by Berliner Wasserbetriebe

Partners
Technische Universität Berlin (coordinator), Berliner Wasserbetriebe

Project Goals
Development and provision of rapid lab tests to assess the efficiency of natural and engineered processes for the removal of trace organic compounds from wastewater, the tools are lab tests and model calculations; KWB work package focuses on test systems for trace organic compound removal by ozonation processes.

Bundesministerium für Bildung und Forschung

Berliner Wasserbetriebe

Energy Efficiency | Climate Resilience | Infrastructure | **Water Protection** | Resources | Digitisation

Removal of Microplastic Particles from the Water Cycle

OEMP
Optimised materials and methods for microplastic particle removal from the water cycle

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Duration	4/2016 – 3/2018
Project Volume	1,442,110 euro, KWB: 70,000 euro
Financing	German Federal Ministry of Education and Research (BMBF), KWB with co-financing by Berliner Wasserbetriebe

Partners
GKD – Gebr. Kufferath AG, Technische Universität Berlin (coordination), Bundesanstalt für Materialforschung und -prüfung (BAM), German Federal Environment Agency (UBA), INVENT Umwelt- und Verfahrenstechnik AG, Kompetenzzentrum Wasser Berlin

Project Goals
Evaluation of micro plastic content from different urban water stream and the validation of technical options to reduce the micro plastic content.

Bundesministerium für Bildung und Forschung

Berliner Wasserbetriebe

The increasing use of plastic components in all areas of life entails the undesired immission of these substances into the aquatic environment. Small plastic particles (microplastic) discharged from domestic wastewater and urban spaces can get into the water cycle.

The OEMP project is dedicated to developing materials and methods which will help to retain the entry of microplastic particles (MP) emerging from diverse pathways of the urban water cycle. In addition, simple and natural systems such as soil filters are to be analysed with regard to their retention efficiency.

In 2017, two pilot plants for the reduction of microplastic from secondary effluent were operated at the wastewater treatment plant Berlin-Ruhleben. KWB focussed on the operation and samplings at the pilot plant with particular interest on particles with a size below 100 µm by using a particle counter. In both pilot plants particles >50 µm were removed by more than 80 %. In June 2017, the pilot plants were handed over to Technische Universität Berlin for further operation. In addition, the team works on a material flow analysis of microplastics to be finalised by the end of the project.

Pile cloth media filtration pilot unit at WWTP Ruhleben, Berlin

Energy Efficiency | Climate Resilience | Infrastructure | Water Protection | Resources | Digitisation

Energy from Wastewater

The organic components of municipal wastewater contain a high potential of chemical energy which remains to a large extent untapped in conventional wastewater treatment processes. In the European context, this corresponds to 87,500 GWh per year which is equivalent to the output of twelve large-scale power stations. At the same time, the energy consumption of contemporary WWTPs corresponds to the output of more than two large-scale power stations.

In fact, the KWB project Carismo has demonstrated already that with novel process schemes using existing technologies sewage treatment plants could actually become a new source of renewable energy without compromising the treatment performance. The project POWERSTEP aims at demonstrating such innovative concepts with currently available technologies. In six full-scale case studies located in five European WWTP sites various processes are being investigated. The work packages performed at WWTP Westewitz (D) and Sjölunda (SE) focus on the extraction of carbon and nitrogen from waste water. The research partner Avedore (DK) is investigating the implementation of »power-to-gas technology« through smart connection to the power grid. The case study carried out in Brunswick (D) deals with energy production from waste heat in CHP units and heat storage. The investigations of the sewage treatment plants of Kirchbichl (A) and Altenrhein (CHE) concentrate on advanced process water treatment in sewage works using membrane technology.

The results of the individual case studies will merge into integrative activities such as treatment scheme modelling and design of new treatment systems, energy and heat management and carbon footprinting.

The project is managed by KWB and involves several partners from different European countries. In 2017, all pilot plants were commissioned.

Current results of the pilot tests were presented and discussed at international expert workshops. In addition, POWERSTEP was invited to a European Parliament Committee to present the energetic, ecological and economic perspectives of the new wastewater treatment concepts. The project's final conference will be held in the scope of IFAT2018 in Munich.

POWERSTEP
Full scale demonstration of energy positive sewage treatment plant concepts towards market penetration

http://www.powerstep.eu/

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Duration	07/2015 – 06/2018
Project Volume	5,2 million euro, part KWB: 850,000 euro
Financing	Horizon 2020

Partners
Kompetenzzentrum Wasser Berlin gGmbH (coordination) in a consortium with15 partners from Germany, Netherlands, Belgium, Switzerland, Austria, Denmark and Sweden

Project Goals
Enhanced carbon extraction from waste water, innovative nitrogen removal processes, power-to-gas with smart grid approach, heat-to-power concepts and innovative process water treatment

Horizon 2020
European Union Funding
for Research & Innovation

Presentation of POWERSTEP during the MEP Water-Group Event at the European Parliament on 6 June 2017.

Energy Efficiency | Climate Resilience | Infrastructure | Water Protection | Resources | Digitisation

E-VENT
Energieeffiziente Abwasserreinigung

Reduction of Energy Demand and Greenhouse Gas Emissions from Wastewater Treatment Plants

E-VENT
Evaluation of process options for the reduction of energy consumption and greenhouse gas emissions of Berlin sewage treatment plants

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Duration	03/2017 – 04/2020
Project Volume	KWB: 885,928 euro
Financing	Berlin Programme for Sustainable Development (BENE) and Berliner Wasserbetriebe (BWB)

Partners
Kompetenzzentrum Wasser Berlin (management), Berliner Wasserbetriebe, Technische Universität Berlin

Project Goals
Analysis of new process options in the field of sewage and sewage sludge; Laboratory and pilot tests relating to granulated sludge and thermal hydrolysis; Calculation of possible process options for a selected wastewater treatment plant in Berlin; Emission analysis of the process combination installed at a wastewater treatment plant in Berlin

EUROPÄISCHE UNION
Europäischer Fonds für regionale Entwicklung

be Berlin
Senatsverwaltung für Umwelt, Verkehr und Klimaschutz

Berliner Wasserbetriebe

Berlin's wastewater treatment plants rank among the largest energy consumers within the municipal facilities. Corresponding energy efficiency measures have been implemented already, and the biogas resulting from the treatment process is used for electricity and heat production. Nevertheless, the average annual power consumption of Berlin's six WWTPs exceeds 90,000 MWh which leads to a significant contribution to the associated greenhouse gas emissions (40,000 t CO_2.eq/a).

The E-VENT project examines new process options contributing to an energy-related optimisation of Berlin's WWTPs. One of the project's major objectives is to analyse the eligible process options in view of their feasibility taking into account the specific operation conditions of the treatment plants in Berlin. The according tests are performed in close cooperation between Kompetenzzentrum Wasser Berlin and Berlin's water utility Berliner Wasserbetriebe. Alternative methods for nitrogen and carbon removal as well as methods for increasing the biogas yield in sewage sludge treatment are being tested. For the majority of the process options to be examined data from previous KWB projects are available which are to be transferred to the process conditions of large scale WWTPs.

In addition, experimental studies on laboratory and pilot scale are carried out. With regard to the granular sludge technology, it will be analysed whether and to what extent the generation of granulated biomass from Berlin wastewater water is possible at all. Furthermore, test series relating to the treatment of sewage sludge by thermo-chemical hydrolysis processes as well as thermal pressure hydrolysis are to be carried out in order to get a more reliable estimate of the process efficiency and risks associated to different compositions of sewage sludge.

In 2017, the pilots for "Thermal Hydrolyses" as well as "Granular Sludge" were planned and first laboratory tests on thermal-chemical hydrolyses were carried out.

Wastewater treatment plant Waßmannsdorf, owned by the Berliner Wasserbetriebe

Energy Efficiency | Climate Resilience | Infrastructure | Water Protection | Resources | Digitisation

Creating Synergies between Urban Wastewater and Organic Waste Management Systems

The potential of municipal waste management systems in terms of increasing energy efficiency and renewable energy production has not yet been tapped.

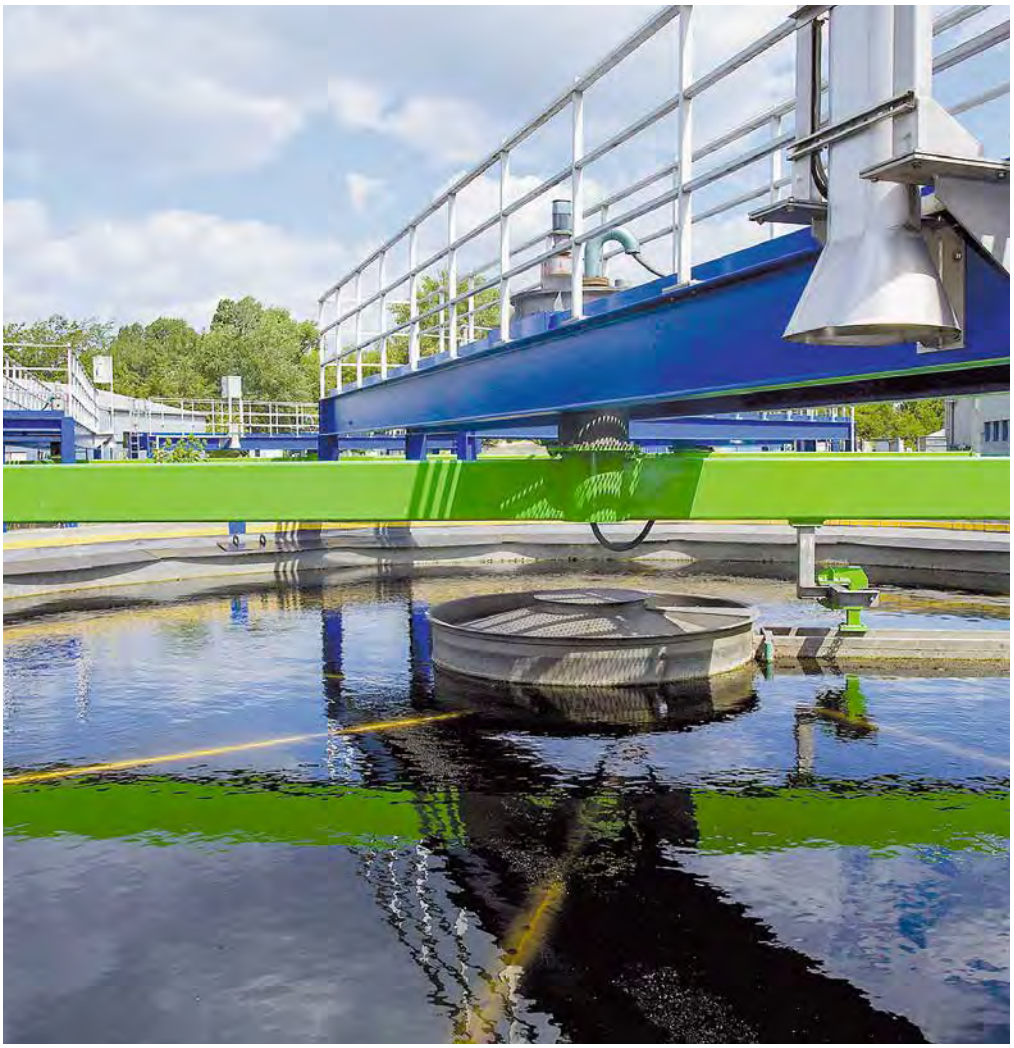
The REEF 2W project, funded by the EU Interreg Central Europe (CE) programme, is therefore designed to develop and implement solutions for public infrastructures providing for synergies between the relevant public infrastructures of the municipal solid waste chain with waste water treatment plants.

The aim is to increase energy recovery from municipal wastewater through the integration of waste management and thus to reduce greenhouse gas emissions. Five different case studies in different European wastewater treatment plants will test such combinations and present the results to the public.

The project involves eleven partners from the Central European countries Croatia, Italy, the Czech Republic, Austria and Germany. The three year joint project is coordinated by the Italian National Agency for New Technologies, Energy and Sustainable Economic Development (ENEA).

One of the five case studies is being managed by KWB. Together with Berlin's water utility Berliner Wasserbetriebe the potential of the new technologies will be analysed at the Berlin test site. The case study aims at increasing the efficient use of waste heat from cogeneration units for internal processes such as sludge pre-treatment in order to achieve higher biogas yields. Furthermore, the technical and economic conditions for the feeding of sewage gas into the gas network are examined.

Waste water treatment plant Ruhleben, Berlin



REEF 2W
Increased renewable energy and energy efficiency by integrating, combining and empowering urban wastewater and organic waste management systems

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Duration	06/2017 – 06/2020
Project Volume	2,3 million euro; KWB: 212,000 euro
Financing	EU Interreg Central Europe, Berliner Wasserbetriebe

Partners
Kompetenzzentrum Wasser Berlin (associated partner) with 11 partners from Croatia, Italy, Czech Republic, Austria and Germany

Project Goals
Detailed analysis of process combinations at wastewater treatment plants (e.g.: co-digestion, biogas treatment, sludge treatment); Development of decision support for operators regarding the use of new technologies optimising wastewater treatment plants

Energy Efficiency | Climate Resilience | Infrastructure | Water Protection | **Resources** | Digitisation

Nutrient Recovery from Biobased Waste for Fertiliser Production

NewFert
Nutrient recovery from bio-based waste for fertiliser production

http://Newfert.org

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Duration	07/2015 – 12/2018
Project Volume	Total volume: 2.41 million euro, funding EU: 1.2 million euro; Volume KWB: 250,250 euro
Financing	Horizon 2020 / Bio-based Industries

Partners
Fertiberia SA (coordination), Kompetenzzentrum Wasser Berlin, Universidad de Leon, Drage & Mate International SL, Institut national de recherche en sciences et technologies pour l'environnement et l'agriculture (IRSTEA), Proman Management GmbH

Project Goals
Production of fertilisers by usage of bio-based waste

Horizon 2020
European Union Funding
for Research & Innovation

Fertilisers play an important role as nutrient suppliers in agriculture. Their production strongly depends on primary resources, such as phosphate rock, sylvite, crude oil and natural gas. The main objective of the NewFert project which was started in 2015 is to (partly) substitute these primary resources by renewable raw materials and strengthen circular economy in fertiliser industry.

The project focuses on the development of viable and cost-effective nutrient recovery schemes for phosphate, potassium (and nitrogen) to be used for the production of a new generation of fertilisers. At the same time, existing quality standards of fertilisers are to be achieved or even improved.

The NewFert consortium is led by the Spanish fertiliser company FERTIBERIA and brings together six business and research partners from Spain, France, Germany and Austria. KWB is responsible for evaluating the whole process chain ranging from recovery to the recycling as commercial fertiliser product via Life Cycle Assessment and Life Cycle Costing.

In 2017 several promising raw materials (e.g. struvite, bone meal ashes, chicken litter ashes and olive waste ashes) were integrated into conventional fertiliser production on lab-scale. The impacts on the production process and fertilisers were examined. In cooperation with the partners KWB prepared a Life Cycle Inventory for conventional fertiliser production processes with and without integration of bio-based waste. This inventory serves as the basis for the subsequent Life Cycle Assessment and Life Cycle Costing.

Sand and bone meal before mixing to NPK-fertilizer

Energy Efficiency | Climate Resilience | Infrastructure | Water Protection | **Resources** | Digitisation

Comparative Life Cycle Assessment of Fertiliser Production Methods

Phosphorus is essential for life and an indispensable component of many fertilisers. The European and national legislation calls for the recovery of phosphorus form the wastewater stream in the medium term. Due to the lack of reliable data it has remained unanswered so far to what extent P-recovery can be considered appropriate in ecological and economic terms.

By means of the LCA methodology, the PHORWÄRTS project compares conventional fertiliser production from rock phosphate with selected methods of phosphorus recovery from the wastewater path. Since the informative value of the impact category toxicity is rather limited in LCA, the project is dedicated to perform a comparative risk assessment covering different types of fertilisers with regard to their application which is perceived as being particularly sensitive. In this context, the contamination with heavy metals and organic pollutants is spotlighted. This comparison will be completed by a cost estimate of the various production methods.

The project has been running since September 2016 and is financed by the Federal Environment Agency (UBA) in the scope of the Environmental Research Plan issued by the German Federal Ministry for the Environment. In 2017, new data relating to the different production routes of phosphorus fertilisers were collected and fed into databases. At the same time, calculation models were developed as a basis for the performance of Life Cycle Assessments and risk assessments.

The production of fertilisers from raw phosphate requires large quantities of sulphuric acid. The preliminary LCA results indicate that the source of sulphur used in the production of this sulphuric acid is critical to the size of the energy footprint of phosphate fertilisers generated from raw phosphate.

PHORWÄRTS
LCA study to compare fertiliser production from rock phosphate with P-recovery from the wastewater stream

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Duration	09/2016 – 08/2018
Project Volume	172,000 euro
Financing	German Federal Environment Agency (UBA) UFOPLAN FKZ 3716 31 330 0

Partners
Proman Management GmbH

Project Goals
Development of a new data basis for different options of fertiliser production, comparison of fossil and renewable raw materials by LCA; practical assessment of fertiliser production in ecological and economic terms.

Umwelt Bundesamt

Assortment of phosphorus recyclates

Energy Efficiency | Climate Resilience | Infrastructure | Water Protection | **Resources** | Digitisation

Nutrient Recyclates for Organic Farming

nurec4org
Nutrient recyclates for organic farming

Contact
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Duration	01/2017 – 12/2018
Project Volume	Total volume: 354,000 euro Part KWB: 178,000 euro (Funding: 133,000 euro)
Financing	Deutsche Bundesstiftung Umwelt (DBU)

Partners
Bioland Beratung GmbH; Institut für Agrar- und Stadtökologische Projekte an der Humboldt-Universität zu Berlin (IASP)

Project Goals
Establishment of acceptance for and registration of nutrient recyclates from wastewater path in organic farming

gefördert durch
DBU
Deutsche Bundesstiftung Umwelt
www.dbu.de

The aim of organic farming is to minimise the consumption of finite resources and to concentrate on "Circular Economy". Closing regional nutrient cycles is therefore one of the corner stones to ensure sustainable agriculture.

Nutrients recovered from bio-based materials and wastes offer the opportunity to promote the transformation towards sustainable agriculture and circular economy. So far, nutrient cycles are not sufficiently closed, be it in conventional or organic agriculture. This applies also to phosphates. In organic farming, the only permitted source of mineral phosphate is fossil based phosphate rock, which, besides having a doubtful fertilising effect, may also be contaminated with toxic heavy metals such as cadmium and uranium.

The nurec4org (Nutrient recyclates for organic farming) examines to what extent phosphate-containing products, which can be obtained through currently available recovery and recycling methods, will be acceptable and approved for organic farming. The aim is to introduce the scientific findings to the corresponding German and European approval bodies and to finally transfer them to the regulations for organic farming (EC/889/2008). Important stakeholders like farmers, trading companies and scientific institutions are involved in the investigations.

Within 2017 first pot trails with nutrient recyclates were performed. Additionally, the scope and the objectives for the assessment methods, which have to be applied, were defined. During a stakeholder workshop with representatives from organic food producers a catalogue was compiled featuring the acceptance criteria for the future use of nutrient recyclates in organic farming.

Workshop with stakeholders in Frankfurt/Main at 16 September 2017

Energy Efficiency | Climate Resilience | Infrastructure | Water Protection | **Resources** | Digitisation

Closing the Nutrient Loop by Enhancing Recycling Fertilisers

Nutrients in conventional fertilisers are present in a highly water-soluble form. This ensures that the nutrients are available to the plants guaranteeing high agricultural yields. However, the use efficiency, i.e. the quantity of nutrients in fertilisers that plants actually absorb, for conventional phosphate fertilisers is only about 15-40 %.

The international joint project CLOOP was designed to demonstrate that in practice mineral nutrient recyclates may have higher use efficiencies than conventional fertilisers. This is crucial to ensure the protection of surface waters and an efficient use of resources. The project focuses on testing a new generation of secondary fertilisers (NextGen fertilisers) that feature high plant availability and low water solubility at the same time.

The nutrient recyclates include struvite and other salts that can be extracted from municipal sewage treatment plants and two variations of the AshDec product that are produced from sewage sludge ash. These products will be tested under a variety of climatic conditions on agricultural land in Germany, Australia and Brazil.

Within the joint project CLOOP, KWB is responsible for the selection and procurement of secondary fertilisers from sewage treatment plants. In addition, KWB leads the work package "Evaluation and Life Cycle Assessment" in the scope of which KWB is responsible for evaluating the entire process chain from recovery to fertiliser use. Thanks to its extensive network activities, KWB is also directly involved in the exploitation and dissemination of the project results.

The Project was started in 2017. Currently, different recyclates for pot- and field-trails are being selected, processed and procured. With this project, KWB translates its phosphor recycling activities into practical application.

CLOOP
Closing the nutrient loop by development of nutrient recyclates AshDec and Struvite into next-generation fertilisers

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Duration	11/2017 – 10/2020
Project Volume	353,359 euro
Financing	German Federal Ministry of Education and Research (BMBF)

Partners
Outotec GmbH & Co KG (Koordination), Bundesanstalt für Materialforschung und -prüfung (BAM), Kompetenzzentrum Wasser Berlin, Universität Bonn, The University of Queensland (Australia), Universidade de Sao Paulo (Brazil)

Project Goals
Development of nutrient recyclates from wastewater path into next-generation fertilisers; Improving fertiliser use efficiency in agriculture.

Bundesministerium für Bildung und Forschung

Recycled Struvite in wastewater treatment plant Amersfort

Energy Efficiency	Climate Resilience	Infrastructure	Water Protection	Resources	Digitisation

Material Recovery from Wastewater

SMART-Plant
Scale-up of low-carbon footprint material recovery techniques in existing wastewater treatment plant

http://smart-plant.eu

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Duration	6/2016 – 05/2020
Project Volume	9,7 million euro; KWB: 291,000 euro
Financing	EU Horizon2020

Partners
Kompetenzzentrum Wasser Berlin in a consortium of 25 partners from Europe and Israel, coordinated by the University of Ancona (IT)

Project Goals
Demonstration of material recovery in municipal wastewater treatment plants at industrial scale

Domestic wastewater contains many valuable raw materials which have not been tapped so far. Their systematic recovery could be beneficial in environmental and economic terms.

The SMART-Plant project aims to make increased use of domestic wastewater as a source of material and energy and to test the corresponding processes on a technical scale. The focus is on the recovery of cellulose fibers or plant nutrients as fertiliser, and also the production of biopolymers and biomethane. Besides recovering these resources, the project also tests potential routes for post-processing of intermediates into commercially attractive end products.

The project will demonstrate the feasibility of recycling of different materials originating from domestic wastewater and assess the environmental and economic benefits with LCA. To this end, existing technologies for material recovery are optimised on an industrial scale at five existing municipal WWTPs over a period of more than two years and tested under real conditions. This includes two concepts for post-processing of cellulose fibres and biopolymers. A market study and the development of novel business models will consolidate the partnership between the wastewater sector and the chemical industry and consequently stimulate the implementation of the relevant technologies. The task of KWB comprises the Life Cycle Assessment of all processes to demonstrate the sustainability of the concept.

The project was launched in June 2016. In the meantime, seven pilot plants have been started up and are currently optimised. KWB uses the operating data for the preparation of LCAs.

Horizon 2020
European Union Funding
for Research & Innovation

Cellulose recovery at WWTP Geestmerambacht

Energy Efficiency | **Climate Resilience** | **Infrastructure** | **Water Protection** | Resources | Digitisation

Development of Planning Criteria for Climate-resilient Water Infrastructure in Cities

The design of climate-resilient cities requires an integration of urban development and infrastructure planning. The project aims at initiating a comprehensive discussion on the future design of urban water infrastructure in cities to support its sustainable transformation.

In cooperation with municipal decision-makers, specific feasibility studies are designed and developed for two urban districts in Norderstedt and Berlin, in the scope of which grey, green and blue elements of stormwater and wastewater infrastructures (technical infrastructure, infrastructure with visible green and with visible water surfaces) are considered. The aim is to demonstrate how to achieve an increased resilience of the water infrastructure to expected climate impacts as well as a positive social impact through the coupling of the different elements. Together with the cities of Berlin and Norderstedt, suitable approaches for the future design and planning of water infrastructure will be developed and verified.

Within netWORKS 4, Kompetenzzentrum Wasser Berlin investigates how the resilience of water infrastructure can be quantified and what will be the advantages and disadvantages in terms of achieving climate resilience. In addition, KWB focuses on the further development and application of stormwater management strategies developed in the BMBF-funded project KURAS. For this purpose, KWB and the project partners are supporting a current planning process in the Berlin district of Pankow.

Measures of rainwater management featuring high urban public space quality: Swales combined with trees at the Rummelsburger Bucht

netWORKS4
Resilient networks: Contributions to Urban Supply Systems for Climate Justice

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Duration	10/2016 – 09/2019
Project Volume	1,0 million euro; KWB: 121,000 euro
Financing	German Federal Ministry of Education and Research (BMBF), with cofinancing by Berliner Wasserbetriebe

Partners
Kompetenzzentrum Wasser Berlin, ISOE – Institute for Social-Ecological Research (project management), German Institute for Urban Affairs (Difu), Ramboll Studio Dreiseitl, Berliner Wasserbetriebe, Berlin Senate Administration for Urban Development and Housing, Berlin Senate Administration for the Environment, Transport and Climate Protection, City of Norderstedt

Project Goals
Coupling of grey, green and blue elements of the stormwater and wastewater infrastructure aiming at a sustainable transformation of urban areas; Goals at different urban levels are linked with effects of this infrastructure in the frame of two case studies in Berlin and Norderstedt.

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Berliner Wasserbetriebe

FONA Nachhaltiges Wassermanagement BMBF

Energy Efficiency | **Climate Resilience** | Infrastructure | **Water Protection** | Resources | **Digitisation**

Construction and Renovation as Source of Pollution in the Urban Environment

UFOPLAN BaSaR
Construction and renovation materials as source for pollution in the urban environment

Contact
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Duration	07/2017 – 07/2020
Project Volume	447,000 Euro
Financing	German Federal Environment Agency (UBA)

Partners
Kompetenzzentrum Wasser Berlin (coordination), HSR Hochschule für Technik Rapperswil, Switzerland; Berliner Wasserbetriebe

Project Goals
Enhanced understanding of the interaction of construction materials with stormwater; Identification of relevant pollutants released from construction materials during rain events; Development of a guideline with recommendations for measures contributing to the reduction and avoidance of the entry of pollutants from construction materials into the urban environment.

Despite good water monitoring there is only little knowledge, which pollutants can leach from urban construction and redevelopment areas, possibly leading to the exceedance of environmental quality standards in urban surface waters or groundwater.

Within a three-year research contract with the Federal Environment Agency (UBA), a combination of product tests and on-site investigations will be carried out to determine which building products are in fact responsible for the suspected leaching of relevant compounds. For this purpose, two construction or redevelopment areas connected to the separate sewer system of Berlin will be identified with the assistance of the Berlin Senate in order to record the relevant building products. On this basis, a subsequent approximately two-year sampling period of roof and façade outpourings as well as of rainwater runoff in the stormwater sewer will be carried out with the aim of recording site-specific pollutant concentrations and balancing loads. In addition, construction products used in both areas and supposed to be relevant as pollutant source for rainwater runoff will be examined by standardised leaching tests. The release of environmentally critical micropollutants will be determined.

Incorporating the results of the leaching tests as well as weather data (precipitation, wind), the release of target contaminants from façades and roofs of both investigated areas is modelled using COMLEAM (COnstruction Material LEAching Model) and will be compared with concentrations and loads derived from the monitoring programme. In addition, weather data from Hamburg and Munich are included in additional scenario calculations in order to extrapolate results to conditions of other locations.

Based on the results of the leaching tests, the monitoring programme and the modelling, recommendations for measures and combinations of measures contributing to the reduction and avoidance of the entry of pollutants from construction materials into the urban environment are summarised in a guideline for architects, builders, regulators and planners.

Densely development area in Berlin

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Sewer Deterioration Models for Asset Management Strategy

Recent studies about the wastewater infrastructure in Germany show that current investments for sewer rehabilitation are not sufficient to tackle the aging and deterioration of the networks. In the framework of the research project SEMA-Berlin different deterioration models have been developed and tested. Such models can be used to predict the future condition of the sewer pipes and give decision support for investment planning. Four different models were developed on basis of more than 140,000 camera inspection data sets as well as information on the individual pipe properties and environmental factors of the city of Berlin, e.g. the age and material of the sewer, the surrounding trees and groundwater levels. Investigations have shown that by means of a statistical model the current condition of the sewer system can be simulated with a very small error of less than 1 %. Individual sewer sections with severe defects can as well be detected with a relatively high accuracy by a machine learning model. This information can be very useful for defining target inspection areas and the planning of sewer rehabilitation measures. In addition, such models can be used for long-term investment management. The next step is to transfer the models into planning tools which will be implemented by Berlin's water utility Berliner Wasserbetriebe.

SEMA-Berlin
Test and selection of a model approach to support sewer inspection and investment strategies

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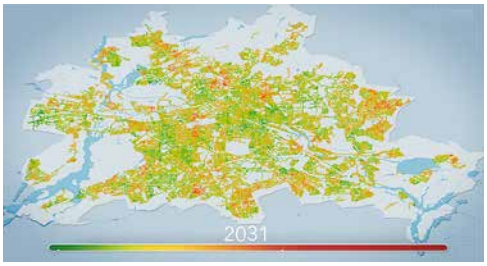
Duration	11/2016 – 12/2017
Project Volume	140,000 euro
Financing	Berliner Wasserbetriebe

Partner
Berliner Wasserbetriebe

Project Goals
Analysis of the current condition of the Berlin sewer system; Identification of the main deterioration factors; Assessment of different modelling approaches for sewer deterioration; Quantification of uncertainties in camera inspections.



Screeenshot animated video: supporting sewer inspection and investment strategies

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Numerical Models for Optimisation of Sewer Asset Management Strategies

Reliable Sewer
Optimisation of sewer inspection and rehabilitation strategies

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Duration	4/2016 – 1/2019
Project Volume	k.a.
Financing	Veolia / VERI (Veolia Recherche et Innovation)

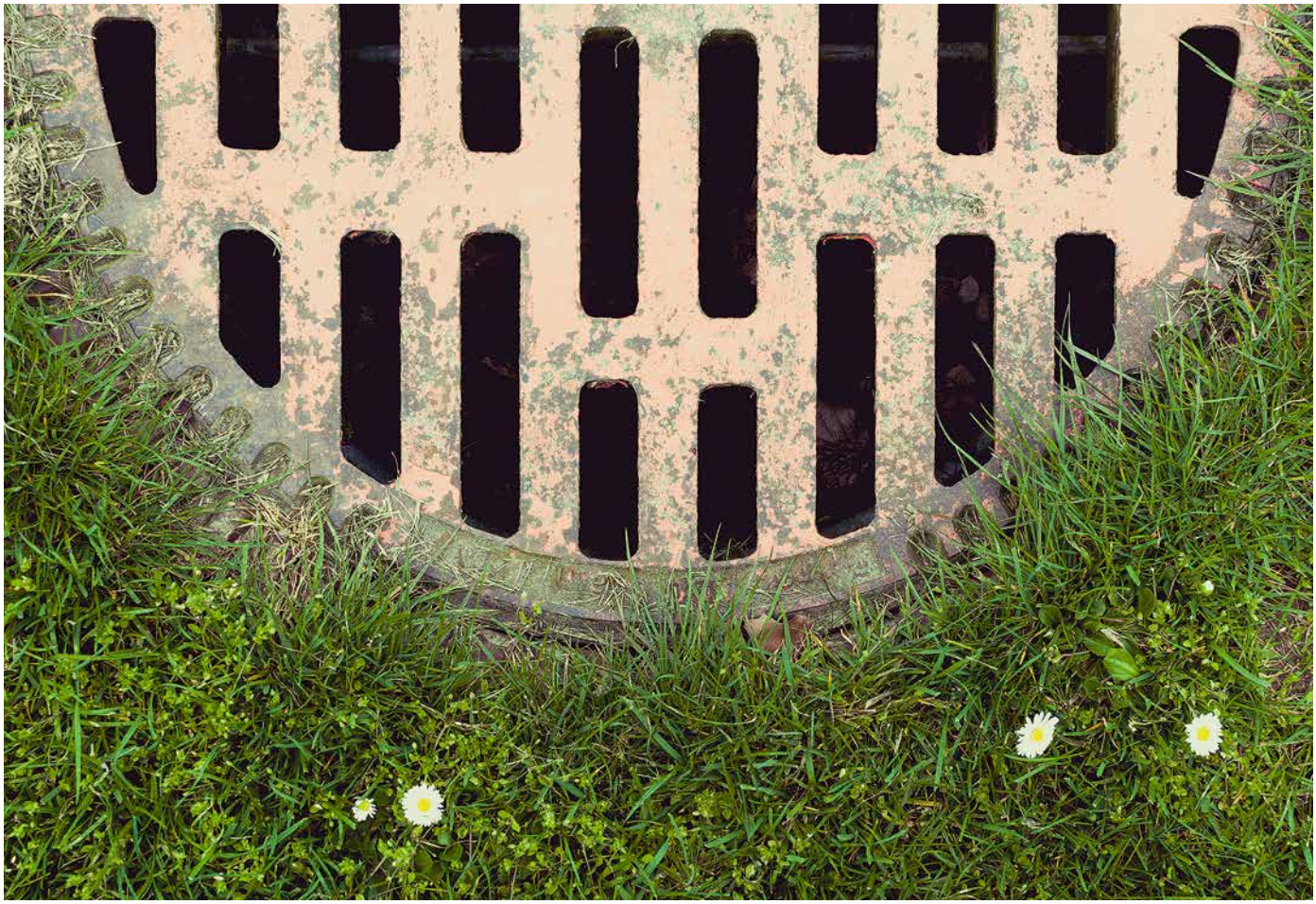
Partners
Veolia / VERI (Veolia Recherche et Innovation)

Project Goals
Development of numerical models supporting rehabilitation strategies of sewer networks; Support of sewer operators in the preliminary planning of sewer inspections; Estimation of maintenance costs.

The maintenance of wastewater infrastructure systems is expensive. The costs for replacement and maintenance amount to several millions of euros which have to be procured by cities and communities. To date, population growth in urban areas has led in the first place to the upgrade and expansion of wastewater treatment plants and sewer systems. The rehabilitation of existing networks however, has been neglected to some extent. As a consequence, most cities face an ageing infrastructure in extensive and emerging need of repair, rehabilitation or renewal.

The RELIABLE SEWER project develops a panel of model-based tools to be used by municipalities and utilities in the definition of cost-efficient sewer inspection and rehabilitation strategies. The project will improve the reliability of current sewer deterioration modelling approaches and, in addition, simulate the evolution of the network condition for different investment and rehabilitation scenarios. This will facilitate the estimation of uncertainties in budget forecasts, the optimisation of asset management scenarios and the identification of the most appropriate balance between replacement, renovation and repair measures.

Three case studies carried out in Brunswick (Germany), Sofia (Bulgaria) and Woonsocket (USA) demonstrate the benefits and potential costs savings obtained from the use of deterioration modelling. RELIABLE SEWER was started in April 2016 and is sponsored by Veolia.



Energy Efficiency | Climate Resilience | Infrastructure | Water Protection | Resources | Digitisation

Management of Bathing Water Quality

Many rivers in Germany are used for bathing. However, in many places the hygienic water quality is negatively impacted by entries from urban drainage systems and agriculture. Above all, short-term pollution after heavy rainfall leads in part to massive faecal pollution, which poses a risk to bathers. For the river sections impacted by many different contamination sources, no reliable methods have been developed so far in order to assess the relevance of the various entry paths, predict the effectiveness of counter measures and inform the population in a timely manner about the occurrence and duration of temporary pollution incidents. These conditions make it difficult to implement the EU Bathing Water Directive (2006/7/EG).

The results of the FLUSSHYGIENE research project bridge this gap. Based on seven different river types the project developed statistical and deterministic models which can now be used by the responsible authorities for the management of bathing waters.
By means of these modelling tools the following issues can be addressed:

- Determination of the origin of faecal contamination
- Prediction of the effectiveness of action plans to reduce pollution loads
- Forecast of water pollution after rainfall as a basis for realtime information of the population
- Support in selecting new bathing locations

The results will be available at the end of 2018, summarised in a manual covering the management of short-term pollution and a checklist relating to the opening of new river bathing sites.

The Spree in Berlin

Hygienically relevant microorganisms and pathogens in multifunctional water bodies and hydrologic circles – Sustainable management of different types of water bodies in Germany

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Duration	06/2015 – 05/2018
Project Volume	2,7 million euro; KWB: 713,000 euro
Financing	German Federal Ministry of Education and Research (BMBF) with additional co-financing by Berliner Wasserbetriebe

Partners
Kompetenzzentrum Wasser Berlin (Coordination), Berliner Wasserbetriebe, The German Federal Institute of Hydrology (BfG), German Federal Environment Agency (UBA), IWW Water Centre, Ruhrverband, Dr. Schumacher – Ingenieurbüro für Wasser und Umwelt, Bavarian Environment Agency (BLU), inter 3 Institute for Resource Management, University of Cologne, Berlin Senate Department for the Environment, Transport and Climate Protection, Bavarian Health and Food Safety Authority (LGL), Stiftung Zukunft Berlin (SZB), Münchner Stadtentwässerung (MSE)

Project Goals
Development of models for the short- and long-term prediction of the sanitary water quality of rivers; Implementation of early warning systems on river bathing sites for the short term prediction of pollution events; Gaining a better understanding of the self-purification processes of rivers in terms of pathogenic viruses and indicator bacteria; Analyses of the socio-economic conditions to be taken into account in the development of new river bathing sites.

Bundesministerium für Bildung und Forschung

Berliner Wasserbetriebe

Energy Efficiency | Climate Resilience | **Infrastructure** | Water Protection | Resources | Digitisation

Optimisation of the Design and Operation of Dewatering Wells

RWE-BO
Planning, implementation and evaluation of investigations on the optimisation of dewatering wells

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Duration	10/2014 – 12/2017
Project Volume	k. a.
Financing	RWE Power AG

Partners
RWE Power AG, German Federal Institute for Geosciences and Natural Resources, RWTH Aachen

Project Goals
Development of strategies for an optimised operation and design of dewatering wells

The mining of lignite in the Rhenish lignite mining area requires the area's groundwater table to be lowered. To this end, dewatering wells reaching down to a depth of about 750 m are used. In the entire Rhenish lignite mining area, approx. 1,500 dewatering wells are operated by RWE Power AG to drain the opencast mines. Declining groundwater levels and well ageing processes lead to substantial reductions in productivity of individual wells which have to be compensated by considerable investments for the construction of new wells.
With the aim of reducing ageing processes in dewatering wells and generating long-term savings, KWB was asked by the RWE Power AG to develop suitable measures towards adjusted well design and operating regimes. As a result, a new well design was developed and implemented successfully to reduce ochre formation, which is a main well ageing process. Smart adjustments of well operation regimes sustainably have maintained or even boosted the productivity of existing and newly constructed wells.

Last year, KWB's main tasks focused on the analysis and assessment of the schemes which had been implemented by RWE as well as on the identification of further optimisation potential.

Rhenish lignite mining area

© KWB

Energy Efficiency | Climate Resilience | **Infrastructure** | Water Protection | Resources | **Digitisation**

Temperature Signals for Continuous Monitoring of Groundwater Travel Times

About 80 % of Berlin's drinking water originate from river bank filtration or managed aquifer recharge. The routine operation involves iron and manganese removal via aeration and filtration but no chemical disinfection. To ensure the hygienic safety of drinking water supply, the drinking water protection zones, in particular those in the proximity of drinking water wells (zone II) are of particular importance. Zone II is defined as the start line, from which groundwater has a travel time of 50 days in the underground before it is pumped from the wells to the waterworks.

The subsurface travel time of groundwater can be determined by means of tracer tests. However, as these tests are technically complex and time-consuming, it was proven within the TMON project that seasonal temperature variations of the surface water bodies and the delayed and damped temperature signals in the drinking water wells can be used to quickly and easily evaluate the subsurface travel times.

During the project one riverbank filtration site and one groundwater augmentation site have been equipped with data loggers and accompanying samplings have been carried out. The continuously measured temperature data were visualised, assessed and validated by tracer experiments. The TMON scheme for temperature measurements in terms of the visualisation of flow times has been transferred into the routine operation of Berlin's water utility Berliner Wasserbetriebe after completion of the project.

T-MON

Development of a strategy for the continuous monitoring of the travel times from groundwater recharge basins and bank filtration sites to drinking water wells at the demonstration sites Berlin-Tiefwerder and Berlin-Spandau

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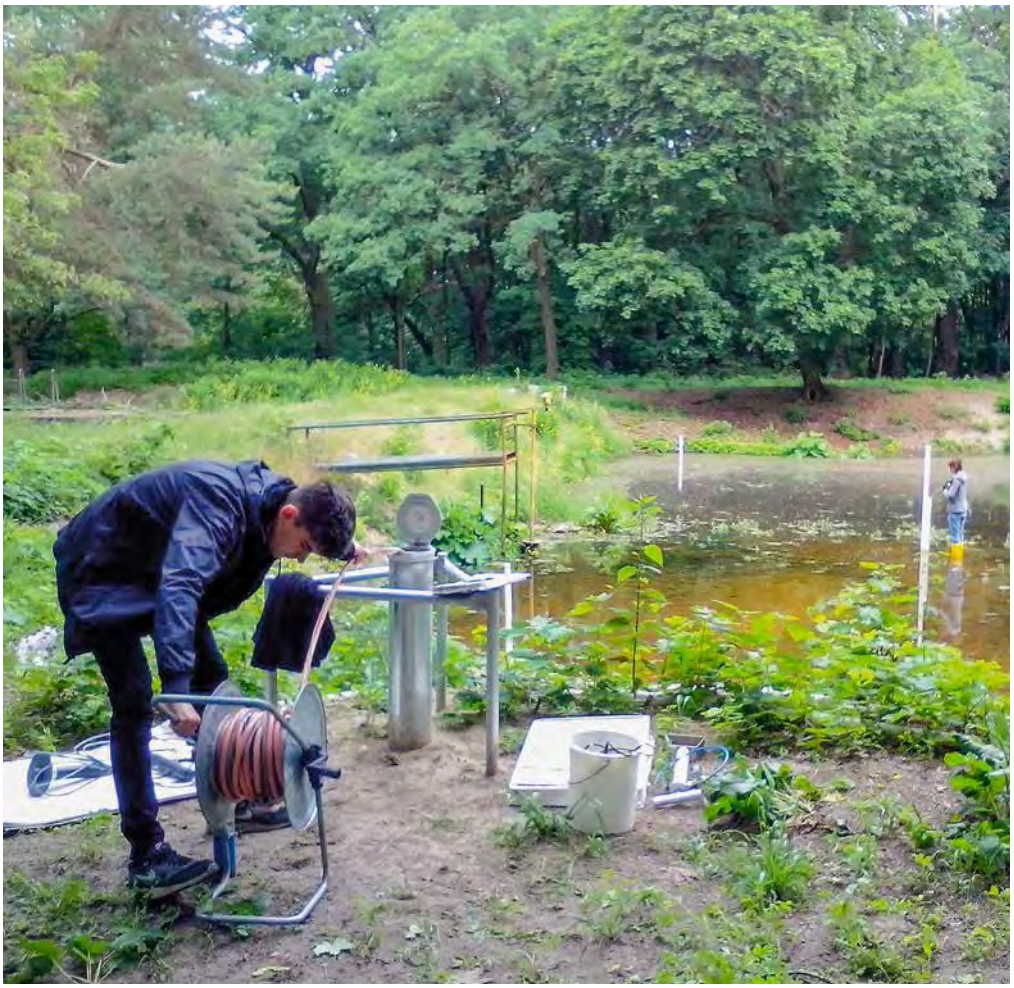
Duration	04/2015 – 08/2017
Project volume	174,000 euro
Financing	Berliner Wasserbetriebe

Project goals: Development of model-based method determination scheme illustrating the residence time of water in the underground during bank filtration and artificial groundwater recharge processes

Berliner Wasserbetriebe

Monitoring at a groundwater replenishment site in Berlin



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Energy Efficiency | Climate Resilience | Infrastructure | Water Protection | Resources | **Digitisation**

Development of Standardised Processes for Research Data Management

FAKIN
Development of Standardised Processes for Research Data Management

Contact
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Duration	05/2017 – 04/2019
Project Volume	157,665 euro
Financing	German Federal Ministry of Education and Research (BMBF)

Project Goals
Implementation of a sustainable research data management scheme as a case example for small research institutions

Bundesministerium für Bildung und Forschung

Research data management comprises all activities related to the processing, storage, archiving and publication of research data. The importance of research data management has grown immensely in recent years due to the large amount of data generated in the course of digitisation and automation. Their administration and processing can hardly be managed with the existing tools. This applies in the same way to data generated in the field of water research.

For this reason, research sponsors more and more demand expanded access to research data and the creation of data management plans.

At Berlin Centre of Competence for Water (KWB) a large number of data are processed within the scope of research projects which are either collected by KWB itself or made available by project partners. These include metrics, metadata, photos / videos, inventory and state data, and processed data (e.g., time series, aggregated values, computer simulations results). In order to make such data available, usable and processable, standardised processes, tools and methods are to be developed that ensure the reproducibility of the results across the entire project.

The FAKIN project aims to develop a suitable research data management scheme for KWB in close cooperation with its project scientists and to establish it throughout the company. Within the internal kick-off workshop relevant topics were identified and prioritised. For these topics best-practices are being developed and their practical utility is tested within two research projects. The results are transferable to other research institutions.

Energieeffizienz | Klimaresilienz | Infrastruktur | Gewässerschutz | Ressourcen | Digitalisierung

Small Funded Projects and Contracts

Project	Client	Department	Contact
Joint municipal and industrial wastewater treatment	Water and Wastewater utility Kalundborg Forsyning, Sweden	Process Innovation	Dr. Ulf Miehe
Phosphorus recovery technologies from wastewater – Preparation of a global study	GWRC - Global Water Research Coalition, Great Britain	Process Innovation	Dr. Ulf Miehe
LCA on phosphorus recovery	Easy Mining, Sweden	Process Innovation	Fabian Kraus
Monitoring of addictive drugs in the wastewater path	Universität der Bundeswehr München	Urban Systems	Dr. Pascale Rouault
Data analysis on the basis of the data yielded by the OgRe project: Trace organic compounds in Berlin's stormwater effluent	Robert-Murjahn-Institut, Hessen	Urban Systems	Dr. Daniel Wicke
System analysis of central and decentralised stormwater management facilities at high watermarks	Berliner Wasserbetriebe	Urban Systems	Dr. Pascale Rouault
Study: Acceleration of masterplan implementation "SolarCity Berlin"	InfraLab Berlin (Stromnetz, Vattenfall, BSR, GASAG, BWB)	Urban Systems	Dr. Pascale Rouault
Asset Management of sewer systems in Germany and Colombia	German Academic Exchange Service through funds from the German Federal Ministry of Education and Research	Urban Systems	Nicolas Caradot
Assistance with data analyses related to wells and groundwater levels	Berliner Wasserbetriebe	Groundwater	Dr. Hella Schwarzmüller
Scientific study as a basis for argumentation in terms of "Water Reuse" and the relevant protected resources, in particular groundwater and soil	Ministry of Agriculture and Environment, Mecklenburg-Vorpommern	Groundwater	Dr. Hella Schwarzmüller

Network | Communication

Our tasks also include informing the (professional) public about the results of our work, current research trends and developments in the water sector. For this purpose we organise both specialist events and events for the interested public and communicate with journalists.

Based on our network of actors from science, industry and public administration, we promote communication both at national and international level.

The European Water Platform

WssTP
European Technology Platform for Water

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www.wsstp.eu

The European Water Platform (WssTP) was initiated in 2004 by the European Commission to stimulate integrated research and technology development in the European water sector. KWB is one of the founding members. In the meantime, more than 160 institutions from academia, industry and policy have joined the platform, which provides recommendations on future research programmes to the European Commission. The recent trends and challenges in the European water management are gathered and recorded by several expert groups. KWB participates in the working groups „Ecosystem Services“, „Green Infrastructure“, „Emerging Pollutants“ and heads the working group “Bathing Waters”.

Membership in the research platform Watershare®

Watershare®

https://www.watershare.eu/watershare-tools/

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Duration since 2013

Watershare® is an international knowledge management model for the water sector, organised by the Dutch KWR Watercycle Research Institute. The currently 18 members of this platform are leading non-profit water research institutes from all over the world having committed themselves to share their knowledge and expertise, e.g. software tools, and make it available to the international water industry.

In 2017, the five Communities of Practice (CoPs) established in the preceding year to work on global priority issues in the water sector, organised several workshops to consolidate their work: Natural Water Treatment, Future-Proof Water Infrastructures, Resource Recovery & Upcycling, Micro-pollutants and Resilient Urban Water Management.

Member of German Water Partnership

German Water Partnership

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Duration since 2016

The German Water Partnership is a joint initiative of the German private and public sectors, combining commercial enterprises, government and non-government organisations, scientific institutions and water-related associations. The network is supported by by the five Federal Ministries of the Environment, Research, Development, Economic Affairs and the Federal Foreign Office.

KWB has been a member since 2016 is actively involved in the working groups »Water 4.0« and »Water and Energy«.

Workshop „Dialogue between Science and Industry“ at the Congress Forum of WASSER BERLIN INTERNATIONAL

Congress and International Trade Fair WASSER BERLIN INTERNATIONAL

As a partner of the Trade fair and Congress WASSER BERLIN INTERNATIONAL, KWB was again an exhibitor at the joint stand “Water Expertise from the Berlin-Brandenburg Capital Region”. Medium-sized companies, individual departments of Technische Universität Berlin and KWB presented their products and expertise to the trade professionals. In addition, KWB was co-organiser of the congress and together with TU Berlin and Berlin’s water utility Berliner Wasserbetriebe carried out the workshop “Dialogue between Science and Industry”. On behalf of IWA, KWB organised the 2nd transnational Workshop “Water Management 4.0“ for the IWA Young Water Professionals.

Opening event with Christian Rickerts (State Secretary of the Berlin Senate Department for Economics, Energy and Public Enterprises) visiting KWB stand.

Discussion Series „Wasser bewegt Berlin“

The series of these Berlin-specific discussions started in 2010 was continued with another two sessions in 2017. The event format, which is deliberately designed for the interaction with the attendants, is to push public discussion about issues of regional water management The results are having some influence on Berlin’s national policy. In 2017, the following topics were addressed: **“AufREGENdes Berlin – Berlin Stormwater Management”, “Wasser bewegt Berlin – 5 years Water as Talk of the Town”, “Berlin its Water Utilities: What about public participation? And how much public involvement is reasonable?”**

Workshop

Long Night of the Sciences

In 2017, KWB again contributed to Berlin's »Long Night of Sciences«. In close cooperation with the Department of Fluid Dynamics of the Technische Universität Berlin KWB presented, amongst other things, a functional model explaining urban rainwater management as well as an experiment demonstrating the challenges of groundwater management through a play. The event was held at the »House of Water« of the Technische Universität Berlin.

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KWB at „House of Water" of TU Berlin

Berlin Water Workshop

The Berlin Water Workshop sessions initiated in 2004 was continued. The 2017 series was hosted by The CINIQ Center for Data & Information Intelligence/Fraunhofer Institute for Telecommunications and Berliner Wasserbetriebe. Last year, the following topics were presented and discussed: **"Predicting the Aging of Sewer Systems with Visual Computing and Special Models"** and **"Ozonation for Trace Organic Compound Removal in Wastewater Treatment – The Method of Choice?"** As usual, all presentations can be downloaded from our homepage.

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Berlin Water Workshop held at CINIQ Center for Data & Information Intelligence/Fraunhofer Institute for Telecommunications, Berlin

Jeannette Jährig
Research Assistant,
Environmental Engineer

Dr.-Ing. Christian Remy
Research Assistant,
Environmental Engineer,
Project Management: SMART-Plant

Edith Roßbach
Managing Director, Sociologist

Vahid Toutian
Research Assistant,
DAAD Scholarship Holder,
Chemical Engineer

Michael Stapf
Research Assistant,
Environmental Engineer,
Project Management: CWPharma

Dr.-Ing. Ulf Miehe
Deputy Director, Head of Research Unit Process Innovation,
Environmental Engineer;
Project Management: DEMOWARE, TestTools, OEMP, MeReZon

Fabian Kraus
Research Assistant,
Environmental Engineer,
Project Management:
PHORWÄRTS, nurec4org,
NEWFERT, CLOOP

Rabea-Luisa Schubert
Research Assistant,
Environmental Engineer

Kuangxin Zhou
Research Assistant,
Environmental Engineer

Dr. Hella Schwarzmüller
Head of
Research Unit Groundwater,
Geologist,
(currently on parental leave)

Dr. Christian Loderer
Research Assistant,
Agricultural Engineer,
Project Management:
POWERSTEP, E-VENT, REEF2

Jan Schütz
Research Assistant,
Process Engineer

Dr. Christoph Sprenger
Deputy Head of
Research Unit Groundwater,
Hydrogeologist,
Project Management: T-MON

Dr. Christian Menz
Research Assistant,
Hydrogeologist,
Project Management:
RWE-BO

Michael Rustler
Research Assistant,
Geoecologist,
Project Management: FAKIN

TEAM 2017

Stand: 12/2017

Dr.-Ing. Pascale Rouault
Deputy Director,
Head of Research Unit Urban Systems,
Water Engineer,
Project Management: netWORKS4

Hauke Sonnenberg
Research Assistant,
Environmental and Computer Science Engineer

Dr. Daniel Wicke
Research Assistant,
Environmental Engineer,
Project Management: BaSaR, AquaNES

Dr. Roberto Tatis Muvdi
Research Assistant,
Biologist

Malte Zamzow
Research Assistant,
Environmental Engineer

Dr. Andreas Matzinger
Research Assistant,
Limnologist and Environmental Scientist

Wolfgang Seis
Research Assistant,
Environmental Engineer,
Project Management: FLUSSHYGIENE

Mathias Riechel
Research Assistant,
Environmental Engineer,
Project Management: SEMA-Berlin

Dr. Nicolas Caradot
Research Assistant,
Civil Engineer,
Project Management: Reliable Sewer

Tobias Evel
Commercial project management,
Commercial Graduate

Dr.-Ing. Bodo Weigert
Deputy Director, Head of Unit Finances, Administration, Communication, Biotechnologist

Monika Jäckh
Multilingual Administrative Assistant

Andrea Lüty
Business Administration,
Executive Assistant

Julian Romeike
Voluntary Ecological Year

Kristine Oppermann
Commercial Graduate,
Project Controlling, Accounting

Sylvia Deter
Multilingual Administrative Assistant

Trainees 2017

Status: 1. Dezember 2017

Johannes Böhm, TU Berlin, Environmental Technology
Anika Christiane Conrad, Universität Greifswald, Environmental Sciences
Kristin Diercks, Universität Weimar, Environmental Engineering
Gleb Dietrich, Beuth-Hochschule für Technik, Process and Environmental Engineering
Leona-Rosalia Dühmke, TU Berlin, Environmental Technology,
Matthieu Fesneau, Ecole Centrale Lyon, General Engineering
Kerstin Gerundt, TU Berlin, Environmental Technology
Sina Henke, HWR Berlin, Business Informatics
Nathalie Hernandez Rodriguez, Pontificia Universidad Javeriana, Colombia, Civil Engineering
Timo Hoff, University of Applied Sciences Mannheim, Chemical Engineering
Christina Hofmann, Freie Universität Berlin, Geographical Sciences
Richard Hofmann, Beuth Hochschule für Technik Berlin, Geoinformation
David Kahlert, RWTH Aachen, Civil Engineering
Josephine Kielmann, HWR Berlin, Public und Nonprofit-Management
Sebastian Kirchner, TU Berlin, Environmental Technology
Franziska Knoche, TU Berlin, Environmental Technology
Kai Simon Kostrzewa, TU Berlin, Chemical Engineering
Franziska Sarah Kudaya, University of Natural Resources and Life Sciences, Vienna, Austria
Kathrin Leicht, TU Berlin, Environmental Technology
Tomáš Macsek, Brno University of Technology, Civil Engineering
Jonas Mauch, TU Berlin, Environmental Technology
Finn-Niclas Meyer, Voluntary Ecological Year
Anju Andezhath Mohanan, BTU Cottbus-Senftenberg, Environmental and Resource Management
Mario Pfeifer, Hochschule für Forstwirtschaft Rottenburg, Water Resource Management
Minh Anh Pham, Beuth Hochschule für Technik Berlin, Pharmaceutical and Chemical Engineering
Max Lyonel Pilger, BTU Cottbus-Senftenberg, Land Use and Water Management
Francesco del Punta, TU Berlin, Civil Engineering
Michael Rau, TU Berlin, Environmental Technology
Julian Romeike, Voluntary Ecological Year
Victoire Schellenberg, Université de Technologie Compiègne, France, Process Engineering
Julia Schmidt, TU Berlin, Environmental Technology
Robert Schmidt, TU Berlin, Environmental Technology
Christian Stankov, TU Berlin, Environmental Technology
Sneha Suresh, Universität Duisburg-Essen, Water Science
Julia Szwajnoch, TU Berlin, Environmental Technology
Carsten Vick, TU Berlin, Environmental Technology
Sandra Weidlich, TU Dresden, Water Science

Publications 2017

All relevant information on our projects, including the project reports, is available on our website: *www.kompetenz-wasser.de*

Reports

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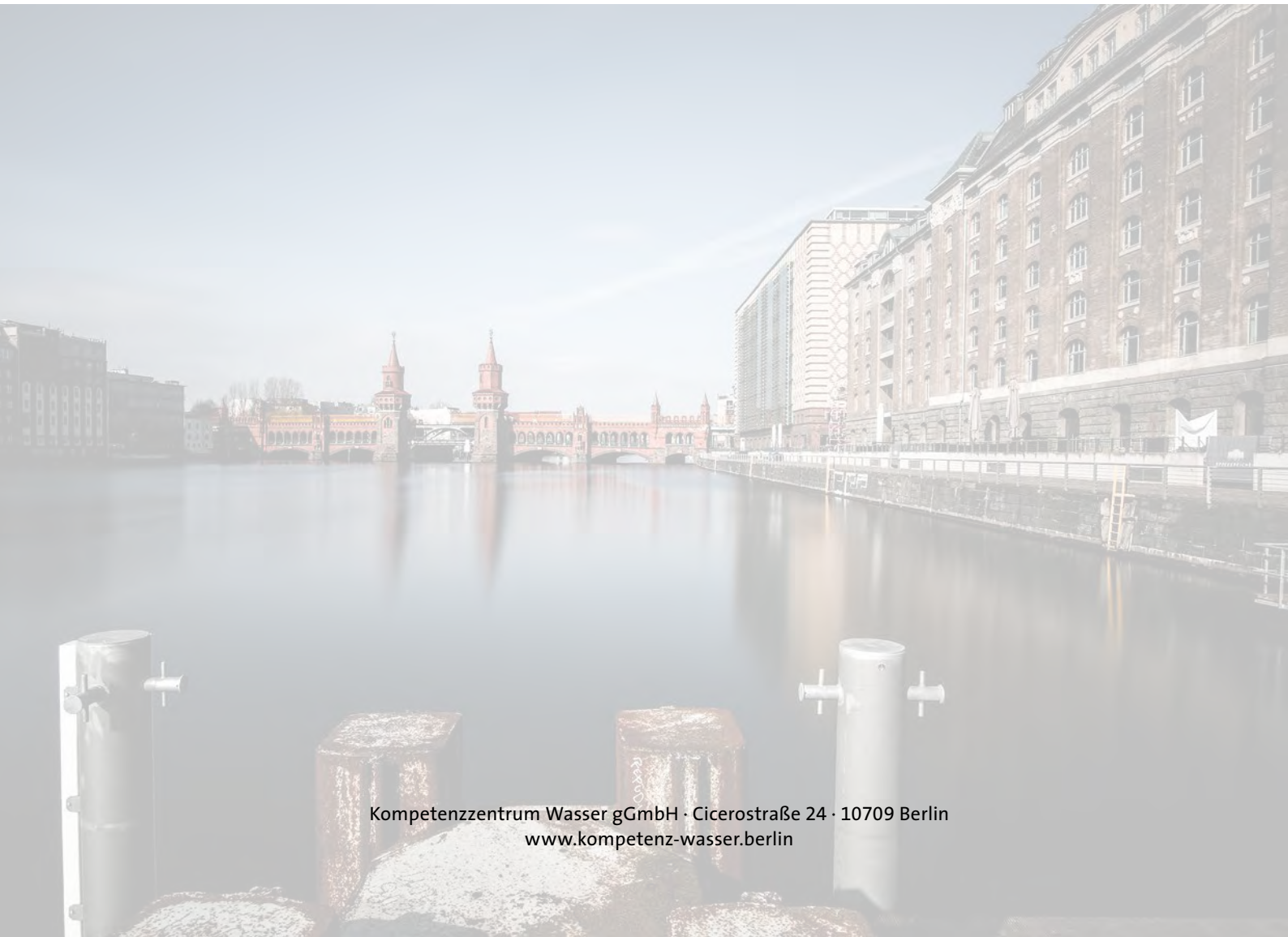

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