INSPIRE WATER

NEWS

INNOVATIVE SOLUTIONS IN THE PROCESS INDUSTRY FOR NEXT GENERATION RESOURCE EFFICIENT WATER MANAGEMENT

ISSUE 02/2018

EDITIORIAL

We would like to welcome you to the 2nd issue of our INSPIREWATER newsletter. The INSPIREWATER newsletter will provide you with current information on the project progress, especially at its demo sites and its technologies and it gives an overview on the activities within INSPIREWATER.

It has been two years since INSPIREWATER started. A lot of things have happened and a lot of work has been carried out since then. INSPIREWATER is an application-oriented project that needs a strong input from the global companies, SME's and research institutions to reach solutions in the process industry for next generation resource efficient water management – in order to support the reduction of water use, raw materials, chemicals, save energy and reduce waste and wastewater discharge. Our newsletters will have a "series on the INSPIREWATER demo sites" where descriptions and actual actions of the sites are presented. This issue presents all demo sites of ArcelorMittal in Gijon, Sandvik in Sandviken and Clariant in Tarragona, Spain. It gives a good insight in how strong the partners in INSPIREWATER work together.

Now, enjoy the newsletter. Please visit the website www.inspirewater.eu or LinkedIn in order to learn more about INSPIREWATER in general, and to get detailed information on upcoming events.

Your INSPIREWATER Team

INSPIREWATER Consortium at the project meeting in Tarragona, Spain (Photo: DOW).

INSPIREWATER in Brief

INSPIREWATER (Innovative Solutions in the Process Industry for next generation Resource Efficient Water management) is a Horizon 2020 project funded by the European Commission.

The main objective of the project is to demonstrate solutions that **increase water and raw material efficiency in the process industry.**

The project aims to:

- Increase water and resource efficiency by 20-30% in the process industry.
- Use new and established resource-efficient technologies, to **reduce water consumption, energy, use of chemicals and to reduce waste.**
- This will be underpinned by a holistic **water management framework** which will complement existing management structures in **process industry** companies.
- The holistic framework and individual technologies having been proven and integrated, it is crucial to the success of the project that INSPIREWATER's work is widely disseminated and exploited by industry to guarantee maximum uptake and impact.

Within the field of these topics, **new and established technologies** will be tested and demonstrated. For demonstration, 3 sites are involved, 2 in **Spain** and 1 in **Sweden**.

CONTENTS

Project Duration: 01.10.2016 – 31.03.2020

Project Consortium: coordinated by IVL Swedish Environmental Research Institute, involved are 11 partners from seven European countries with involvement of SME's and RTD centers amongst others.

Project Website: www.inspirewater.eu

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Holistic management approach and KPIs (WP 1)

The scope of this work package is to develop a model and a framework for a holistic water management and to define relevant performance metrics (key performance indicators, KPI) that support the activities within water saving and process optimisation. The idea is to provide a system approach for implementation where no dedicated water management exists, but also that components of this system can be used and integrated into existing water management systems (WMS) at companies in the process industry.

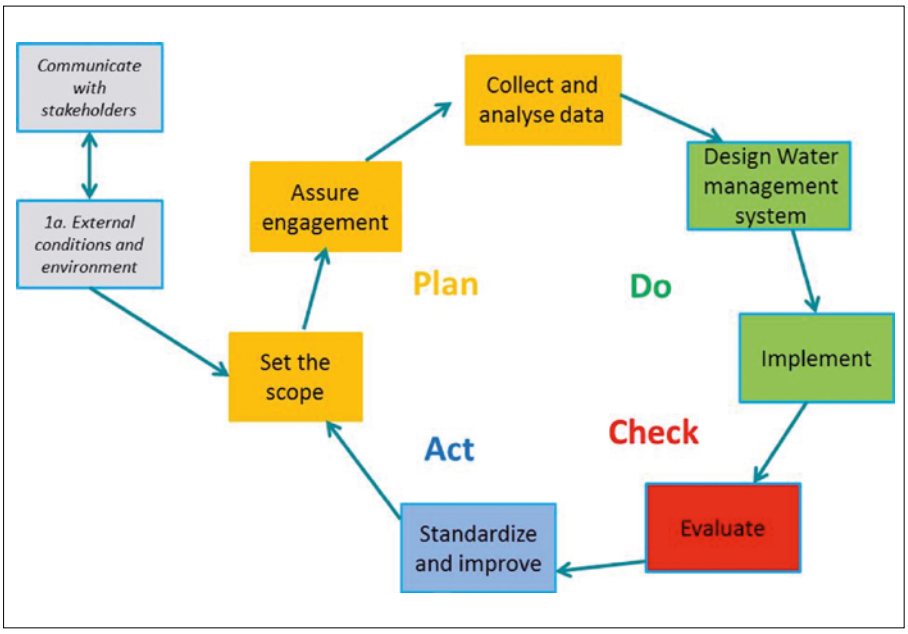


Figure 1 The overall procedure of Water management

The WMS proposed in deliverable 1.1 takes into account experiences from existing frameworks that usually address parts of a whole system, e.g. reporting systems with a focus on company. The suggested system is based on the different needs for different stakeholders like corporate management, site management, plant operators, the supply chain etc. A step by step model has been developed and will be further tested at the industrial partners in the project. The overall procedure is described in Figure 1 as a so called PDCA-cycle and the steps and implications are further described in the deliverables in this WP.

On site level a model for a water balance is proposed as illustrated in Figure 2 below:

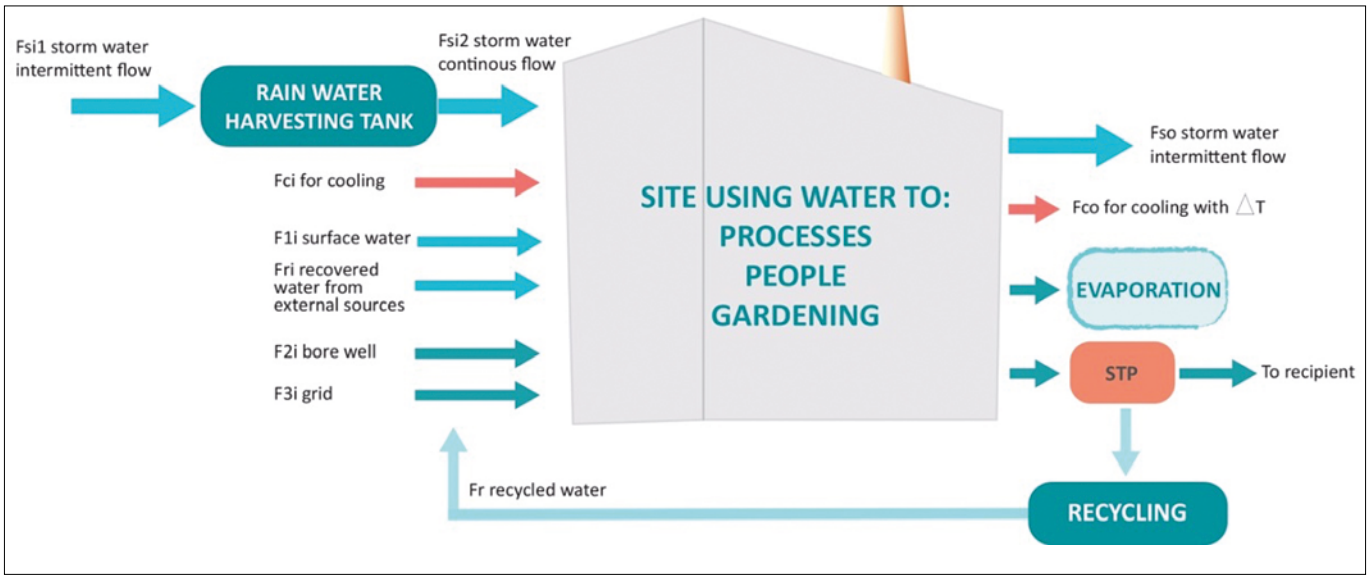


Figure 2 Site level water balance

To further optimise each water using part of the site is analysed and improvements and KPIs are identified related to the specific need for each user as illustrated in Figure 3.

This WP also describes how to establish an efficient indicator system with KPIs to support the WMS implementation. There are mainly three purposes of KPIs:

- **Control** of operations/processes to stay within certain limits
- **Reporting** for internal/external reports and benchmarking
- **Improvements** within the organisation

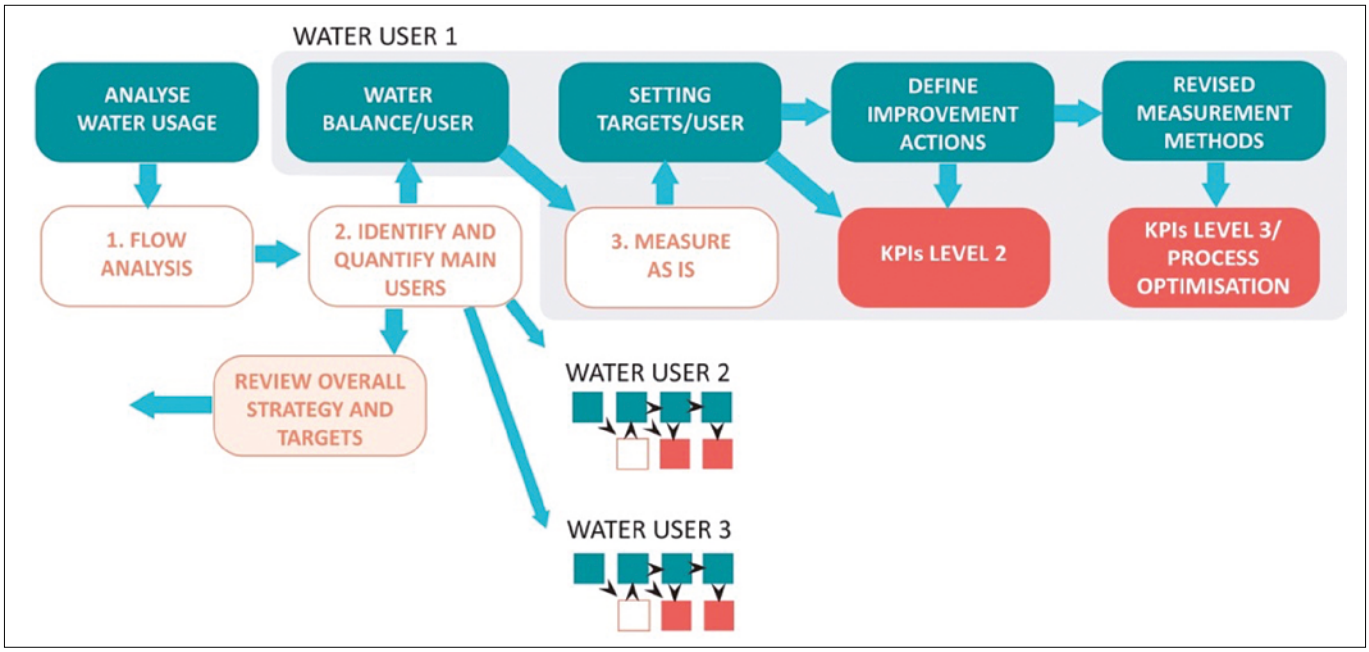


Figure 3. Water balance and KPIs are developed for each specific water using process and activity at the site

A well designed KPI will also increase the motivation of the employees.

When designing a KPI there are a number of questions to consider:

- What is the purpose of the KPI?
- Who will use the KPI?
- What information is necessary for the users of the KPI to fulfil the purpose?
- How does the KPI need to be defined to fulfil its purpose?
- How should the KPI be presented?
- What data and data quality is needed to collect the information?

This means that there is a need for different KPIs to support each step in the process and directed to different stakeholders. A list of suggested KPIs is included in Deliverable 1.2.

Results of laboratory pre-trials and resulting design concepts for demo sites in WP 2

General work description

During this task, preparatory actions to increase the technology readiness level (TRL) of the demonstrated technologies were conducted. Currently, most of the processes and technologies are at TRL of 4 to 5. The outcomes were used to confirm the technology selection of process components as well as key design assumptions and operational conditions of major plant equipment and elements.

Pre-trials and design concept of ArcelorMittal case

The first case aims at more resource efficient processes at a direct rail mill cooling water circuit in the steel industry (ArcelorMittal). For the determination of suitable technologies for a chemical free solid removal and for improving the removal efficiency of suspended solids and dissolved salts, different feasibility studies were conducted in lab scale. Thereby, the novel approach of a magnetic separator and 3layer filtration decreased the solid content above 90% and were chosen as an appropriate pre-treatment before the reverse osmosis (RO) (Figure 4). The determined RO membrane, operated under defined optimum conditions, achieved lower conductivity values and waste streams in comparison to the ion exchange and was integrated in the concept for reducing factors causing corrosion like ions and microorganisms.

Pre-trials and design concept of Sandvik case

Different membrane applications were tested for (1) the recovery of phosphorus acid from spent pickling acid and (2) the treatment of phosphorous and heavy metal contaminated rinsing water for reuse as well as necessary pre- and post-treatments for the steel industry (Sandvik). Several nanofiltration (NF) membranes and feed compositions were examined to identify the optimal operation point and unit configuration (Figure 5). To successfully recycle spent pickling acid by using NF, a Cr6+ reduction with iron (II) sulphate heptahydrate, followed by a bag filter and microfiltration for preventing blockage of the membrane by precipitates is nec-

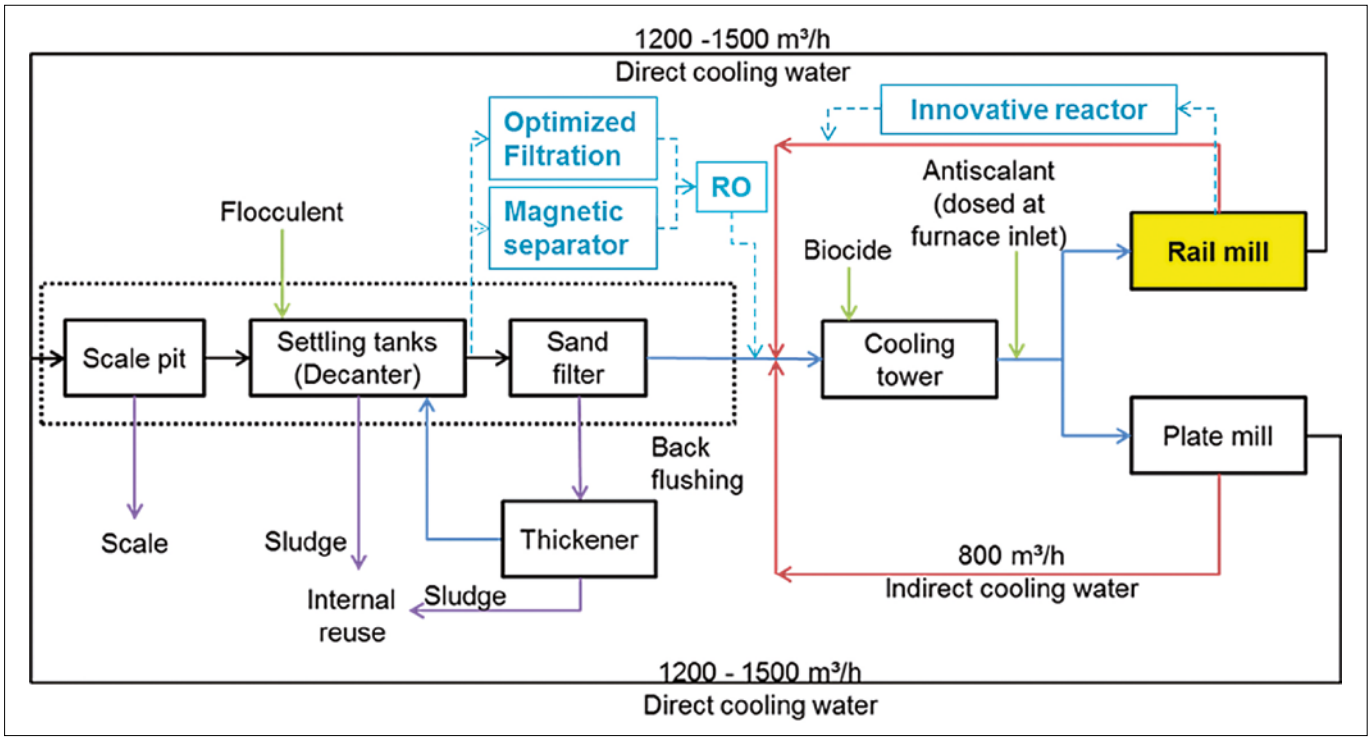


Figure 4 Design concept of the combination of the determined technologies of the ArcelorMittal case

essary. As a post-treatment, the evaporation under vacuum conditions showed promising results recovering the pickling acid of a dilution caused by the addition of the reduction agent. For reusing the rinsing water, the tested RO membranes were evaluated as suitable considering a sufficient membrane size.

Pre-trials and design concept of Clariant case

Secondary effluent with high fouling potential from the chemical industry (Clariant) is used for demonstration of water reuse and concentrate treatment towards zero liquid discharge. Laboratory pre-trials were conducted of water treatment by sequential ultrafiltration (UF), reverse osmosis (RO) and subsequent brine treatment by forward osmosis (FO) (Figure 6). The tests confirmed the high fouling risk and the need for sound backwash and CIP cleaning strategies. The evaluated RO membranes showed a good performance at recovery rates up to 65% in lab tests, which now has to be confirmed during piloting. To reduce the organic load on UF and RO stages, it was decided to pretreat the secondary effluent with activated carbon. FO, operated with NaCl or $MgCl_2$ draw solution, was found suitable for dewatering the RO concentrate and additionally increasing water recovery. Membrane technologies were combined with an innovative catalyst (MOL-LIK) to study new potential applications, improvement of the permeate flux and minimising the scaling risk.

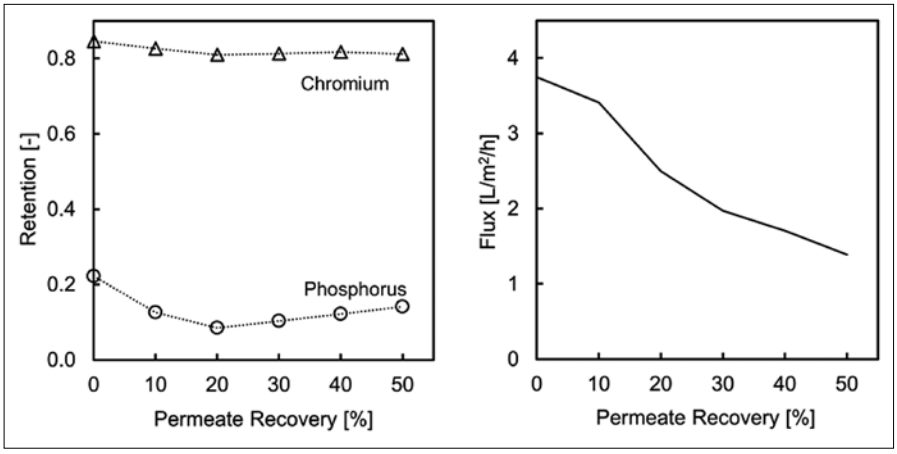


Figure 5: Phosphorus retention and chromium retention as a function of permeate recovery (left) and flux as a function of permeate recovery (right) for a specific model solution using a Duracid (GE) membrane at p = 35 bar, T = 20 °

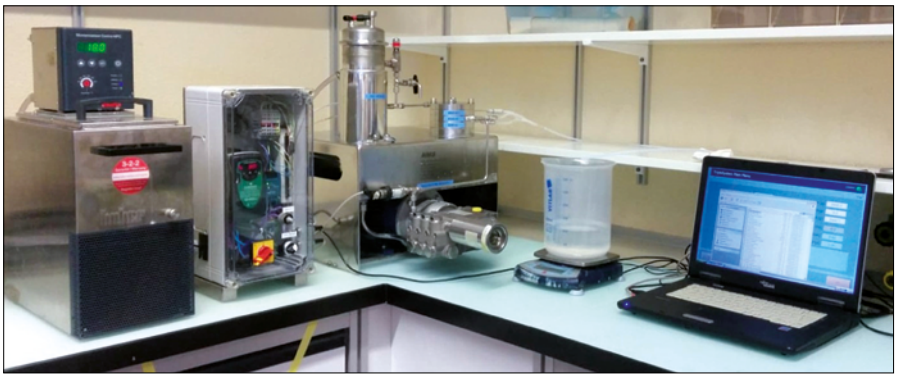


Figure 6: Laboratory test for water recovery by RO treatment of secondary effluent with high fouling tendency

Demonstration site at ArcelorMittal in Gijon, Spain

Partners involved

ArcelorMittal Innovación, Investigación e Inversión is a steel company that belongs to ArcelorMittal Group and is the largest Spanish steel producer with an annual production of about 10 Mega tons. It is the leading supplier of quality steel products in all major markets, present in over 60 countries, 32 in Europe. The Asturias R&D Centre has WaterLab facilities equipped with different modules and pilot plants for treatment, analysis, characterisation including corrosion and scaling and the assessment of water treatment technologies.

BFI is one of Europe's leading private-sector institutes for applied research and development in the field of steel technology and connected branches, providing an important link between basic research and industrial application. Main object of the BFI's work is the optimisation of steel production processes e.g. in the area of water and energy. Research work is carried out in steel plants as well as at own experimental facilities including analysis own lab. Focus in water is particle separation, desalting, water control and recovery of valuable materials.

Introduction of the site

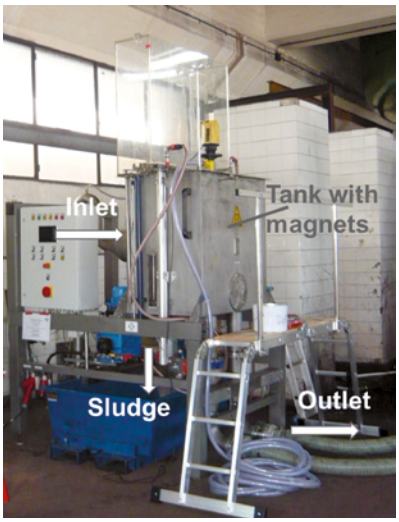
The project focuses on Rail Mill cooling water being treated together with the cooling water of the Heavy Plate Mill in the central cooling water Water Treatment Plant at AM in Gijon, Figure 4. It was chosen because of corrosion, scaling and biological activity, caused by unavoidable production-related intake of oil, temperature, particles (scale) or the salting because of evaporation. Further intakes take part at the cooling towers. Chemicals are dosed to control scaling, the biological activity or to improve the solid separation. Sand filters are operated 15% above their nominal flow rate/velocity and with grain sizes differing from the design, effecting the solid removal.

Objectives of the demo site trials

Focus of the demonstration is the investigation of the long term behaviour and monitoring the performance of the selected technologies in treating abrasive solids, organic as oil or fat and dissolved salt containing cooling water. Selected technologies are strong field magnetic separator and 3layer filtration, reverse osmosis (desalting/softening) and the innovative reactor (disinfection, softening), Figure 7.

Current state of demo trials

The demonstration was performed from 09/2017 to 02/2018 with the magnetic separator, 3layer filtration and reverse



Magnetic separator

3layer-filtration

Reverse osmosis

Innovative reactor

Figure 7: Installed technologies

osmosis. Further an enhanced sludge dewatering and online solid measurement for a tailored magnet cleaning were investigated. Data evaluation including corrosion analysis will be completed and results shared with IVL and FHNW for a live cycle assessments and adaption of a holistic water management concept. The demonstration of the innovative reactor started after finishing the trials with the previous mentioned technologies to exclude possible interactions between the technologies.

New technology developments in demo trials – BFI

About 31,000 m^3 were treated in the **magnetic separator** designed for a flow rate of 50 m^3/h allowing a chemical free and energy saving (no specific operational pressure required) removal of particles by a special arrangement of the permanent magnets. This produces a high concentrated sludge with solid contents from 19 – 31 wt.-% compared to sand-filters (0.1 – 0.5 wt.-%) and a low sludge amount. The magnetic separator operated stable and reliable with constant outlet solid contents often close or below limit of detection for solid measurement with gravimetric methods of 5 – 10 mg/l even in the case of strongly varying inlet solid contents.

The **enhanced sludge dewatering** of the separated sludge was performed with different filter materials. A clear effluent was achieved during dewatering with scale while the effluent with fleece filtration showed a high turbidity. Regarding the solid content, an increase from 19 – 31 wt.-% of the sludge up to 39 – 49 wt.-% after scale filtration and a certain drain time was achieved.

A BFI developed and **patented solid measurement sensor**, based on the magnetic separation of particles and its quantification was used to determine correlations between sensor and magnetic separator load to achieve a tailored magnet cleaning instead of a fixed periodical. The period between two cleaning procedures could be prolonged in general up to factor 2 – 3, in maximum to factor 7, meaning a decrease of water use of 50% to 85% as well as the occurring sludge amount.

Parameter for desalting and softening of solid removal effluents with **RO** were investigated including use of acid, antiscalent and concentration factor. First results showed a significant decrease of the corrosion behaviour after solid removal and RO treatment.

New technology developments in demo trials – ArcelorMital

The **3-layer-filtration** is based on the principle of a pre-coat filter, meaning that after a limited period of low solid retention, a particle layer is formed on the filter media acting like a deep bed filtration. The combination of three different materials allowed an increase of the turbidity removal from 40% with a single sand layer up to 92% – 98% with a the 3layer filtration at high flow velocities of 25 m/h.

The **Innovative electro-precipitator reactor** is based on the transition of high-frequency electrical pulses with sharp oscillations effecting microorganisms (biocide effect) and changing in the forces of repulsion of solids, transforming typical precipitate into a non-sticking “dust”, flocculating faster

Demonstration site at Sandvik in Sandviken, Sweden

Partners involved

SANDVIK	**Sandvik** Materials Technology is a world-leading manufacturer of high value-added products in advanced stainless steels and special alloys for the most demanding industries, such as energy, aerospace and chemical. Sandvik Materials Technology is one of five business areas within the Sandvik Group. New materials are developed in close cooperation with customers, and the focus is on making the customers' processes safer and more efficient while reducing the environmental impact. The cutting-edge expertise is based on an integrated production platform and world-leading metallurgy and R&D. Sandvik Materials Technology consists of three product areas: Primary Products, Tube and Strip, Wire and Heating Technology. Sandvik Materials Technology has about 6 500 employees, are present in 25 countries and have an annual sales of 15 000 MSEK (2014). The largest production unit with in Sandvik is located in Sandviken with 3600 employees and an industrial history of more than 150 years.
ivl	**IVL** is Sweden's leading organisation for environmental research and one of the most qualified institutes in Europe. Research into the complex environmental questions of today demands a comprehensive view and interdisciplinary expertise; qualities which IVL has built up over 40 years. IVL has a leading position within the international scientific, e.g., within EU´s research programmes. IVL is a limited non-profit company, has a net sales of 29 M€ in 2014, about 200 employees, 95% having academic degrees of which 29% with PhDs or similar. The competence in environmental technology is focused on holistic process optimisation, including closed loop processes, monitoring and control as well as optimising of production plants with respect to quality, economy and resource efficiency in real-time. IVL has internationally acknowledged expertise in Life Cycle Analysis.
n|w	The University of Applied Sciences and Arts Northwestern Switzerland (**FHNW**) is one of the leading Swiss universities of applied sciences and has a current enrolment of about 12 000 undergraduate and graduate students. The FHNW School of Life Sciences (HLS) is located in the centre of the internationally leading life sciences region, the tri-national Basel area (CH-F-D) featuring a strong representation of chemical and pharmaceutical industry and world leading research institutes. Focusing on environmental technologies, the Institute for Ecopreneurship (IEC) is one of the 4 institutes of the HLS. The R&D activities encompasses a wide range of projects ranging from development of new products and devices, optimisation of processes in terms of material recovery and energy saving to life cycle and risk assessment. Top level research at FHNW includes a large number of FP7 and H2020 projects. Industrial partners of HLS are SMEs as well as international companies such as Clariant, Novartis, Roche, Syngenta, Sigma, Alstom, DSM Bayer. The institute covers the whole life cycle of technologies from proof of concept and assessment over implementation to monitoring and evaluation.

Introduction of the site

Sandvik Materials Technology specialises in high value-added products made from advanced stainless steel grades and special alloys for the most demanding industries. Its cutting-edge expertise is based on an integrated production platform and world-leading metallurgy and R&D. Product areas are tube, strip, wire and heating technology, and primary products. The production site in Sandviken consists of melting, casting, hot working of bars, tube and strip products, and finishing mills for bars, tube, strip and wire products. The size of the site is about 3 million square meters with about 3 500 employees and has been in use since the company was founded in 1862.

The demonstration case SANDVIK is carried out in a pickling mill at one of the Sandvik Materials Technology tube production mills at the Sandviken site. The pickling of the tubes is carried out using a mixture of phosphoric and sulphuric acid. After a certain time of use, the acid is replaced and the spent acid is neutralised and landfilled. This pickling process is an important step in the production and no replacement have been found. If the acid could be regenerated and reused the amount of landfill and the spending of a finite resource would be minimised.

Objectives of the demo site trials

The main objectives of the Sandvik case are to reduce

- amount of new acid during the pickling process and thereby of spent acid as waste.
- water consumption and amount of wastewater during rinsing.
- energy during pickling and rinsing.

Phosphorus is a limited resource of global importance with natural deposits that are restricted to a few countries. Most nations heavily depend on P imports while wasting the resources contained in

Figure 8: Sandvik site in Sandviken

sewage, industrial by-products or spent acid. Therefore, the aim of the demo site trials is firstly to demonstrate the recovery of mixed pickling acid (phosphoric and sulphuric acid) by using a nanofiltration (NF) for seperation of metals and high concentrated acid for obtaining a closed loop process (Figure 9). The pre- and post treatments of the NF will be demonstrated for reducing the chromium, removing solids and concentrating the permeate to obtain a suitable recycled acid for re-using. Additionally, for water reuse towards zero liquid discharge, the performance of a reverse osmosis will be tested. The energy consumption will be reduced through optimising the interplay of existing and new treatment units.

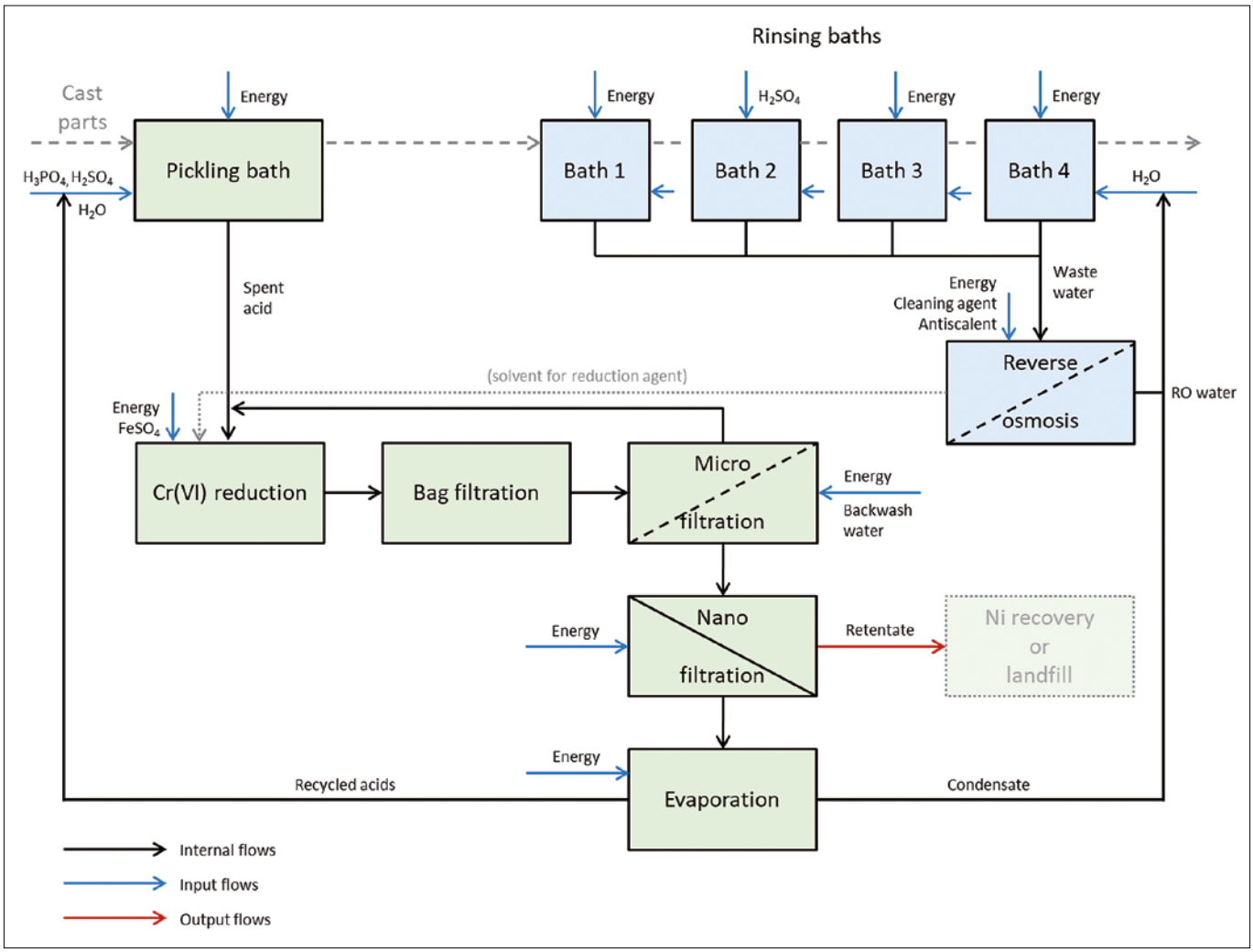


Figure 9: INSPIREWATER solution for the recovery of both pickling acid and rinsing water at the Sandvik demonstration case

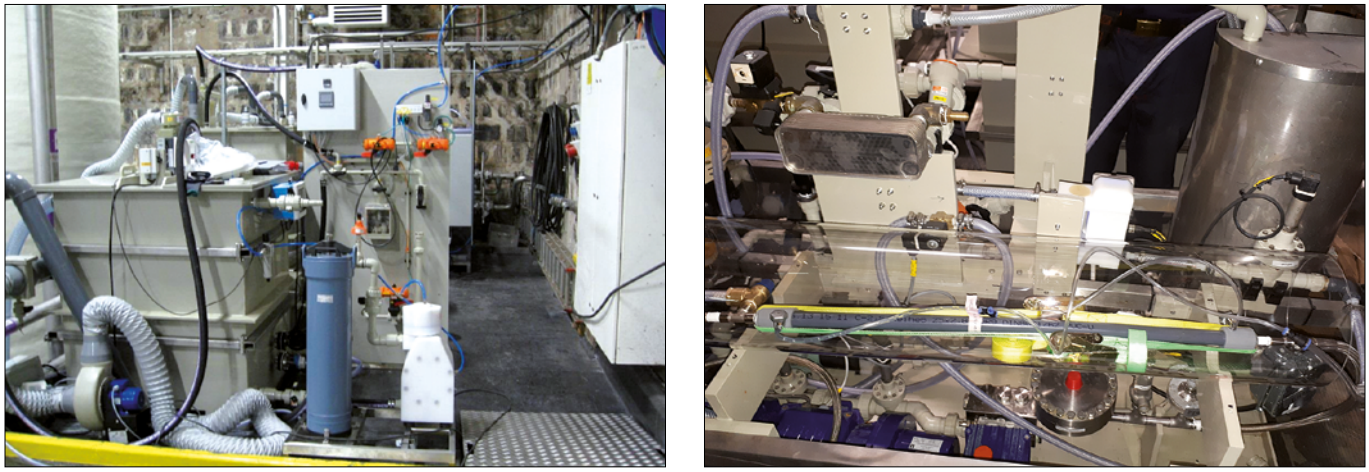


Figure 10: Installed technologies at the Sandvik demonstration site. Storage tank for chromium reduction, bag and microfiltration unit (left) and nanofiltration unit (right)

Current state of demo trials

At Sandvik demonstration site, the nanofiltration unit and pre-treatment is installed and successfully in operation for treating the pickling acid by testing different NF membranes and parameters (Figure 10). The pre-treatment piloting already showed good results in chromium reduction and P recovery of the microfiltration (>95%). The evaporator is already onsite and will be installed during October 2018. The RO will be demonstrated by using the NF unit after or between the NF experiments. Later on, long-time piloting of the complete acid treatment train will be tested.

New technology application in demo trials

At the Sandvik demonstration site, a nanofiltration unit will be demonstrated with the pre-treated spent pickling acid. The technology enables P-recovery from waste streams by allowing the phosphorus to permeate through the membrane and retaining multivalent metals. A scheme of the nanofiltration step is depicted in Figure 11. By applying nanofiltration batch-wise or semi-continuously, over 50% of phosphorus recovery will be achieved.

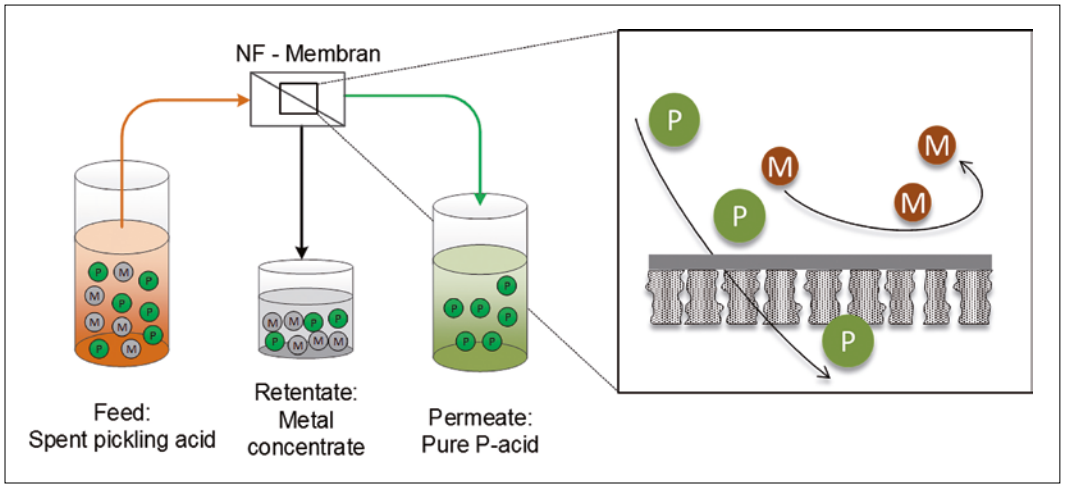


Figure 11: Scheme of P-recovery process at Sandvik

Demonstration site at Clariant in Tarragona, Spain

Partners involved

CLARIANT	**Clariant** is a globally leading specialty chemicals company, based in Muttenz near Basel/Switzerland. On 31 December 2017 the company employed a total workforce of 18 135. In the financial year 2017, Clariant recorded sales of CHF 6.377 billion for its continuing businesses. The company reports in four business areas: Care Chemicals, Catalysis, Natural Resources, and Plastics & Coatings. Clariant's corporate strategy is based on five pillars: focus on innovation through R&D, add value with sustainability, reposition portfolio, intensify growth, and increase profitability.
Dow	**Dow** Water Solutions has a legacy of providing innovative water and process solutions to both communities and industries alike. As a differentiated business unit of The Dow Chemical Company, Dow Water Solutions offers a broad portfolio of ion exchange resins, reverse osmosis membranes, ultrafiltration membrane, and electro-deionization products with strong positions and expertise in a number of major application areas, including industrial and municipal water, industrial processes, power, residential water and wastewater and water reuse. Its mission is to provide membranes and ion exchange resins that are used throughout the world for the full spectrum water treatment applications and especially in water recycling and reuse. Dow Water Solutions has large experience in developing specific products for water recycling and reuse, specifically for improving performance while decreasing the environmental impact of treatments. The firm continues to redefine the parameters of how water can be utilised to fuel business opportunities, conserve energy resources, and improve quality of life.
MOL	**MOLKAT** (MOL Katalysatortechnik GmbH) is a specialty catalyst company, based in Merseburg near Leipzig/Germany. With 25 employees and a turnover of ~ 1.7 Mio. EUR, MOLKAT has an R&D expenditure of ~ 300 TEUR. MOLKAT´s equity ratio is higher than 80 %. The novel and high advanced technologies for the purification of air and water developed by MOL Katalysatortechnik combine energy-efficiency with eco-friendly approaches. This technology allows water treatment devoid of any biocides, toxic gases & high energy radiation. MOL-Technology has been proven to be highly reliable, efficient & cost effective for domestic area as well as power plants, refineries, RO and many other applications.
bluetec	**BLUE-tec** is a Dutch SME specialised in membrane processes, located in Renkum, The Netherlands. The company was founded in 2014 and it currently has 9 employees. The core technologies developed at BLUE-tec are forward osmosis and ammonia stripping and since its foundation 2 pilot scale installations have been built for each technology. The installations have been operated in The Netherlands, Ireland, Switzerland, and Spain. Since 2014 the company was involved in feasibility studies, laboratory research, and pilot testing for membrane separation processes, applied in food and beverage industry, domestic waste water treatment, industrial waste water treatment in the oil and gas industry, land fill leachate or other heavy polluted industrial streams.
n|w	See above

Introduction of the site

In Tarragona (Spain), Clariant operates a production plant for the business unit "Industrial and Consumer Specialties" (ICS). The Industrial & Consumer Specialties Business Unit (BU ICS) of Clariant is one of the largest providers of specialty chemicals and application solutions for consumer care markets such as personal care, home care and crop solutions and industrial application markets including industrial lubricants, paint & coatings, construction and deicing for aviation.

This Clariant site provides the testing ground for the innovative wastewater treatment solutions. The region is one of the areas in the European Union already experiencing serious water shortages. The reduced river volumes put pressure on local municipal and industrial consumption of water.

Objectives of the demo site trials

The aim of the demo site trials is to demonstrate that the water reuse and concentrate treatment can achieving the zero liquid discharge for secondary effluent with high fouling potential. Executing the trials in

Figure 12: Aerial view of the Clariant site in Tarragona (© Clariant)

an environment with real industrial discharge in a dry region ensures that the developed process works under actual conditions later on.

DOW will demonstrate the Ultrafiltration and Reverse Osmosis treatment for high fouling feed solutions with suppression of biofouling by the innovative MOL catalyst solution. Blue-Tec will demonstrate the Forward Osmosis coupled with High Brine Reverse Osmosis™ and Membrane Distillation as an energy efficient solution for concentrate treatment. Additional support is provided from the Clariant Innovation Center in Frankfurt, Germany.

Current state of demo trials

Today, the whole pilot treatment is installed at Clariant's Tarragona site. The DOW pilot plant with the MOL catalyst was installed in September 2017, then the commissioning was done starting the piloting in October 2017.

The Blue-Tec pilot plant was installed in July 2018, currently the commissioning is taking place and the connections from the DOW pilot plant will be finished during September. It is expected that the whole treatment will be working in series in October 2018.

New technology developments in demo trials – Dow

The ultrafiltration operation is being performed using two DOW IntegraFlux™ SFP-2880XP modules. These modules contain PVDF fibers with a nominal pore size of 30 nm being operated in out-in mode. Innovative cleaning strategies are being tested and optimised.

Four-inch prototypes of the fouling resistant DOW FILMTEC™ FORTILIFE™ CR100 elements are being tested in this case study downstream of the ultrafiltration. This type of elements show high resistance especially against biofouling and a low differential pressure along the feed channel dealing with less frequency of chemical cleanings.

New technology developments in demo trials – MOL

The MOL®LIK technology reduces the scaling potential and minimises the risk of deposits in water on downstream surfaces, even at long distances. As a result, the manual cleaning intervals are extended and the efficiency of used chemicals is markedly raised. When surfaces are cleaner, the differential pressure is reduced. Furthermore, less deposits means, there is also a less risk for microbiological activity. To sum up, the maintenance efforts are minimised.

The core element of the MOL®LIK water treatment technology is presented by very thin metal catalyst foils. Within INSPIREWATER this technology is tested in the challenging field of effluent treatment – in direct comparison to various conventional operational strategies.

New technology developments in demo trials – BLUE-tec

The FO-HBRO™ technology developed by BLUE-tec as part of this project is currently tested with synthetic water to determine the optimal operation parameters. The technology is designed to treat RO concentrate and it aims at increasing its concentration above what is possible with the conventional RO. The pilot will be connected to the DOW pilot in September 2018 and DOW RO concentrate will be used as feed water. It is expected that the installation will be operated until March 2019.

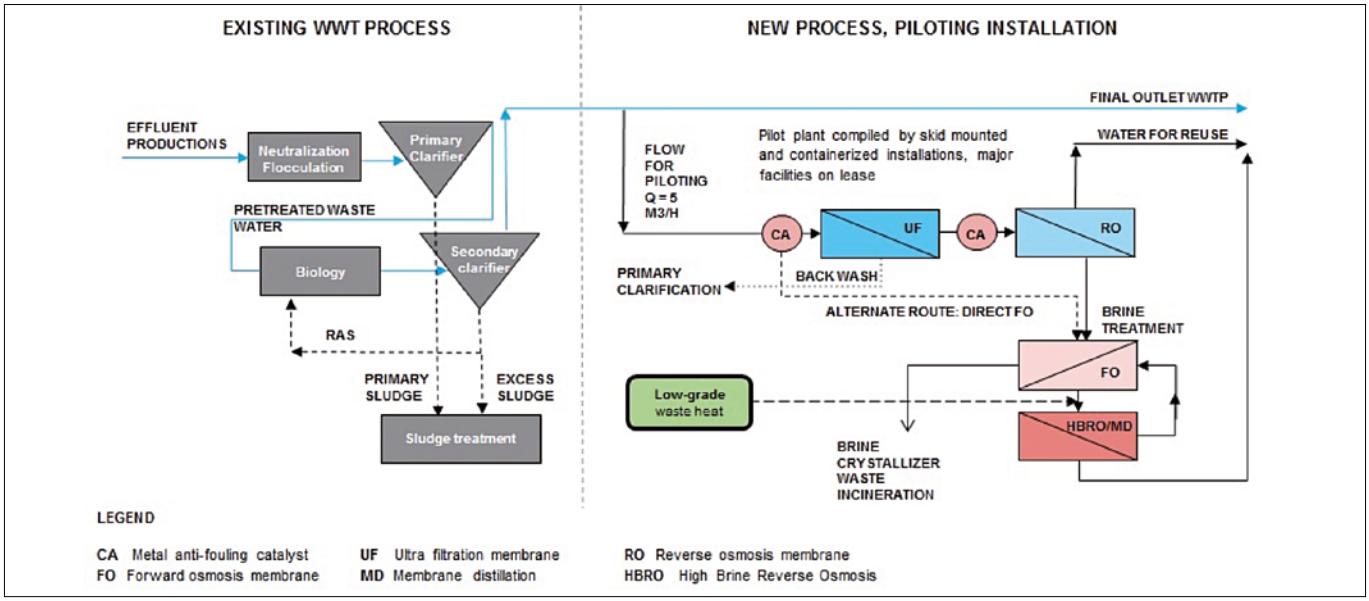


Figure 13: Overview of the old and the new wastewater treatment process chain (© Clariant)

BLUE-tec: Membrane technology for a sustainable future

BLUE-tec is a Dutch SME specialised in membrane processes, located in Renkum, The Netherlands. The company was founded in 2014 and it currently has 9 employees. BLUE-tec is involved in developing promising technologies that improve on water and nutrient recovery. We also provide guidance, support and practical application, for example by testing on bench and pilot scale. Practical value of water technology aiming for environmental sustainability is the focus of our work. Our dedicated employees form a team in which all aspects of applying technology come into place. Together with other actors in the field of expertise BLUE-tec aims at continuous development of knowledge on sustainable water technologies.

The main technologies developed by BLUE-tec are forward osmosis and ammonia stripping. Forward osmosis uses a semipermeable membrane to extract clean water from a wastewater stream towards a higher concentration draw solution. This way the wastewater is concentrated without evaporating the water, making the forward osmosis a good candidate for zero liquid discharge waste water concept. The BLUE-tec goal with the technology is to replace the evaporators currently used in zero liquid discharge. Ammonia stripping uses a hydrophobic membrane which allows ammonia vapour to pass from the wastewater towards an acidic solution. This way ammonia is extracted from the wastewater in form of a salt solution. The ammonia salt solution can then be used as fertilisers. The process requires less energy than biological processes such as Anammox. The goal of BLUE-tec with the technology is to contribute to the transition from a linear to a circular economy in the field of ammonia based fertilisers.

More information about the company can be found on www.blue-tec.nl.

Video presentations of Technology providers (SME's) in INSPIREWATER

"This technology allows you to see if it's working or not within just a few minutes" – BFI is one of the project partners in INSPIREWATER developing a technique allowing chemical free and energy saving separation of magnetic particles.

"If it is food, drinking water or how we process our wastewater, we have to do it more sustainable" – BLUE-tec is one of the project partners in INSPIREWATER developing a technique for a more sustainable water treatment.

"It's a little bit like magic, but I can ensure you that it's really working" – see the video about an innovation that will change water treatment in the process industry and make the limited water resources on our planet last a bit longer.

Events

2nd INSPIREWATER Workshop (at the Industrial Water Conference in Frankfurt)

After the successful first joint cross-cutting issue workshop together with the other water management related SPIRE projects SPOTVIEW and ReWaCEM, we organised a second workshop together with the EU-project WaterWatt.

The cross-cutting-issue workshop of the EU projects WaterWatt and INSPIREWATER addressed a holistic view on water and energy efficiency measures regarding process and cooling water that was discussed with stakeholders from the process industry. Certain case studies from e.g. the steel and the chemical industry regarding water and energy efficiency measures were presented. Participants were introduced to the recently developed online tool for evaluating energy efficiency (E3 Platform) and got the opportunity for testing the tool during the workshop.

WaterWatt is an EU funded project which addresses the improvement of energy efficiency in industrial water circuits (IWCs). It aims to remove market barriers for energy efficient solutions, in particular the lack of expertise and information on energy management and saving potential in industrial water circuits. The main objective of the project is the development of an Energy Efficiency Evaluation Platform (E3 Platform) to offer stakeholders the expert knowledge on improving energy efficiency.

INSPIREWATER aims to increase water and raw material efficiency in the process industry. We will use new and established resource-efficient technologies, to reduce water consumption, energy, use of chemicals and to reduce waste. This will be underpinned by a holistic water management framework which will complement existing management structures in process industry companies. The project will focus initially on the steel and chemical industries, with the long-term goal of applying the technologies across further process industry sectors for maximum impact.

As each project deals with energy efficiency in the process industries the exchange will contribute to solutions for the process industry as a whole.

Here you can find the agenda of the workshop.

INSPIREWATER will also be present at the IWA Water Reuse Conference on Water Reclamation and Reuse 2019, 16 – 20 June 2019 in Berlin, Germany.

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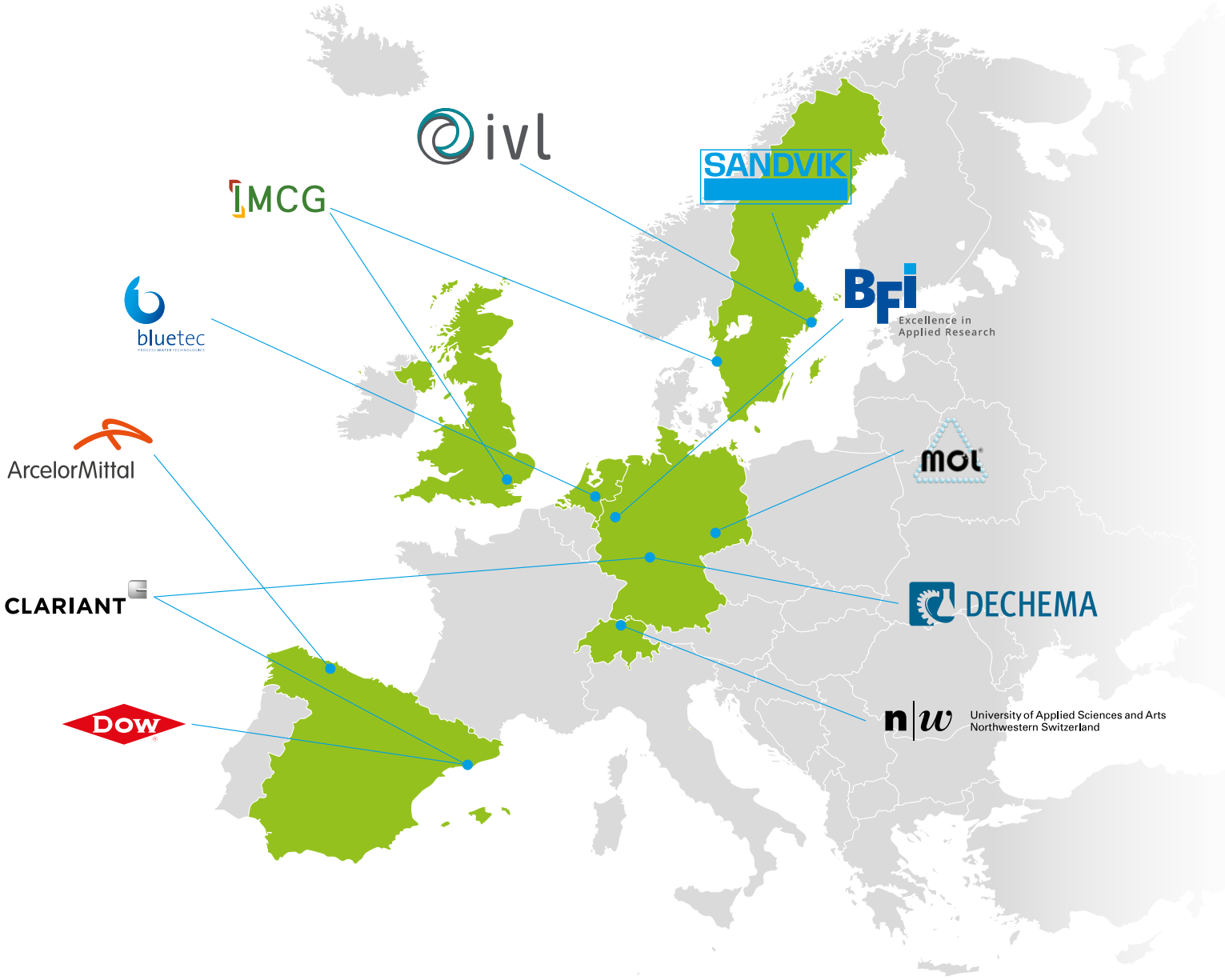

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This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No 723702.