DEMEAU Newsletter No. 2 · January 2015
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1 Editorial

Dear readers,

We are pleased to present you the 2nd DEMEAU newsletter, which delivers insights and shares developments within the DEMEAU FP7 project. The newsletter is distributed through our network that reaches a broad target audience including water practitioners, researchers, policy-makers and the media. However, we always appreciate it if you forward our newsletter to interested colleagues. If you do not yet receive our newsletter automatically and are interested, please write to us with the subject "newsletter subscription" to mail@demeau-fp7.eu or visit our home-page www.demeau-fp7.eu where you can subscribe.

Within this second issue of the DEMEAU newsletter, we provide an update of the milestones of the project. First, we present an interview with Debbie Middendorp, Director of Global Marketing and Communications at PWN Technologies. The interview gives insight to the practical applications of one of the water technologies DEMEAU is exploring. Next, we give a brief overview of DEMEAU and its ongoing objectives. We also summarize recent achievements using a timeline. In the remainder of the newsletter, each Work Area (WA) offers a brief glance into ongoing project elements.

We also continue with our series of presenting members of the Project Advisory Committee and their vision of DEMEAU's impact. This time, we feature a word from Dr. Rüdiger Wolter on the importance of connecting the various Work Areas of DEMEAU. We also again provide an overview of project outputs and publications that project members have already produced. Within the section Utility Updates we visualize an updated map of the demonstration sites. We conclude the newsletter with an overview of future events.

We encourage you to visit our website, demeau-fp7.eu, which gives further details on the DEMEAU project. All finalised public deliverables can be downloaded there. If you are present at one of the conferences where DEMEAU partners present their findings, feel free to get in touch with us!

If you have recommendations to improve our website or news-letter, or would like to explore the opportunity to cooperate, please do not hesitate to contact us (mail@demeau-fp7.eu). We also welcome any questions or inquiries in general.

All the best,
The DEMEAU Team

Content Map

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2 Interview with Debbie Middendorp, Director of Global Marketing and Communications at PWN Technologies

As part of our 2nd newsletter, we provide an interview with ***Debbie Middendorp****, Director of Global Marketing and Communications at PWN Technologies (PWNT) to gain some applied perspectives on one of the four technologies explored within DEMEAU, Hybrid Ceramic Membrane Filtration (HCMF).*

Debbie Middendorp started her career at the Netherland's Organization for Applied Scientific Research (TNO). She held different marketing and communications positions within TNO for nearly a decade. In 2000, she started her own marketing and communications company, D'Launch Communications, where her clients included midsized and large profit and non-profit organizations. Most recently, Debbie launched the commercial subsidiary of the Water Supply Company PWN in Singapore, PWN Technologies. PWNT offers advanced, efficient and sustainable water treatment solutions to the international water industry. Since the successful launch, she has worked on the branding and marketing of PWNT from the Netherlands, and also helped set up the first international company in Singapore, as Director of Global Marketing and Communications. Debbie holds a MA in Communication Management from the Singapore Management University.

In this interview, we go in depth and explore ceramic membranes, one of the featured DEMEAU technologies, from the applied perspective. PWNT has been integral in the design and construction of one DEMEAU's demonstration sites in Andijk, the Netherlands, where patented ceramic membrane technologies are already in operation. Debbie Middendorp helps provide insight to the promising new technologies provided by PWNT, based on her experiences launching them at Andijk.

Interviewer: Please introduce yourself and your background. What got you interested in the field of water quality?

Debbie Middendorp: My background is in the marketing and communications profession. Though I don't come from a technical background, I've always been fascinated with the innovations and technology that companies like PWNT offer. I believe water is the most important asset to society, and so water quality is an important topic to address.

After starting my own business in the early 2000s, I transitioned into working with PWNT when it was just a startup business to launch the company in Singapore. From the start, PWNT was appealing to me because of its world class innovations, and its commitment to continuously innovating water filtration processes regardless of how difficult the treatment source is. The research and development team at PWNT is also very passionate, which is important. Just five years ago, PWNT was a startup and now it's a full blown company.

Describe the basic process of the ceramic membrane water filtration technology. How does it work? At what scale(s)? What exactly are the benefits of ceramic membranes over polymeric membranes? And what are the assets that PWNT offers?

DM: Hybrid Ceramic Membrane Filtration (HCMF) is based on the idea that strong oxidants, mainly ozone, can be added directly onto the membrane surface. When ozone is added directly onto the membrane surface there is a unique interaction and the permeability is increased substantially. This allows for high fluxes to be achieved and very high recoveries, due to the fact that the membrane requires very minimal backwashing. These performance enhancements have been well documented and were the focus of a two year demonstration study at PUB, Singapore's National Water Agency. With the needs of ozone to improve water quality, particularly with micro-contaminant reduction, disinfection, and taste and odour removal, the HCMF becomes an efficient advanced treatment technology scheme, particularly in combination with GAC. This has been considered a far more sustainable option for water recycling as opposed to MF in combination with reverse osmosis (RO), and has been the focus of a recent study with the Australian Water Recycling Centre of Excellence.

Currently, the majority of the water industry is still using polymeric membranes. But at PWNT, we really believe that HCMF offers a more robust and sustainable solution to water filtration. Firstly, ceramic membranes have an indefinite lifetime. Also, their high permeability and high backwash rates allow much higher gross fluxes (3 to 4 times), reducing membrane area, and therefore their footprint. In the past, application of ceramic membranes was limited by the high capital costs due to the huge amounts of steel and valves that go into the production of a ceramic membrane plant.

At PWNT, we've designed a system, CeraMac® that combines up to 192 ceramic membrane elements into one vessel, making it a highly economical and compact solution with a lower energy consumption and overall footprint. The membrane itself is also very durable, and can be backwashed under high pressure with almost all cleaning solutions. Life cycle costs are especially important to consider when weighing the different technologies. For ceramic membranes, the benefits are really seen over the long term.

Does the technology have broader applications? If so, where and how?

DM: Currently, we're mainly focused in the developed world, as there is a clear need for such technologies there. As you know, CeraMac® has been successfully launched at Andijk, in the Netherlands, and we hope to expand to plants with similar capacity and efficiency needs internationally. For example, we're in the process of securing another pilot project in Perth, Australia for water reuse treatment of secondary effluent as feed water using HCMF technologies.

At the same time, decentralized systems are also getting increasingly important as well. To address this, PWNT also offers smaller scale systems. We've created CeraMac® packages that matches the variable flow requirements, which is often the case in more rural areas. PWNT is a relatively young company, but we aim to expand into these markets as well.

You have accompanied the process of the development of two technologies, Suspended Ion eXchange (SIX®) and CeraMac®, in Andijk, the Netherlands. What was the invention and implementation process like? Can you name some 'lessons learned'?

DM: The drinking water treatment plant at Andijk was an interesting process because the upgrade to these technologies was really born out of necessity. The former plant was outdated, and it also was in need of a higher capacity to accommodate the growing need. In addition, the input water from Jssel Lake was increasingly polluted. All these issues—age, capacity, and water quality—were important aspects to assess going into the upgrade.

Our approach was to integrate innovation and the implementation into a continuous improvement learning process, tackling problems as they surfaced. We first compared conventional and less conventional technologies to SIX® and CeraMac®, and the results clearly indicated that the latter lead to less waste, a smaller footprint, and less energy consumption. We were really looking for a sustainable solution that did not compromise water quality or efficiency. We also found it critical to assess the local water source as well as the local situation in order to find the most appropriate technology or combination of technologies for the plant.

We were really lucky with our client PWN. They were open to new technologies and were fully committed throughout the process. The result was a creative journey where we were continuously researching and developing solutions for the design elements, the combination of technologies to use, ongoing assessments of the water quality, etc. Eventually, we got great results. The SIX® process was also key because we were able to remove natural and organic matters, nitrates and sulphates before the water enters the ceramic membranes. That was really exciting for us.

In the end, we built the plant in a relatively short amount of time, two years, and even now, we're continually optimizing as the plant runs. Flexibility and continued innovation have been mainstays for improving the plant in real time. We're already finding new areas to explore, such as water recycling of waste streams.

How do you make the transition from a theoretically developed technology to the actual application of the technology at an operating water plant?

DM: It really comes down to having clients who believe in the value of the technology who are willing to apply research to solve a current problem and to think long term. Partnering with clients who are open to piloting the technology is also crucial. From the developer side, it is important to understand the science as well as the application aspects. The theoretical solution is important, but the ability to really implement this successfully is just, if not more, important to consider.

But really, gathering knowledge, innovation, research and development leading to sound proven solutions is the core of being successful. At PWNT, we are not only providing technologies but also provide expertise in knowledge, research, development that works toward the best possible solution. We seek to continually address feedback loops to ensure the technology is being properly and efficiently applied, making necessary changes as we go.

A main point of innovation processes is communicating the need for new technologies between scientists, utilities and policy makers. How can we improve the gap in communication between those groups to enhance the innovation and implementation process?

DM: Conferences and platforms that bring together diverse stakeholders are really important to continue. From what I understand from our researchers this is crucial in their process not only to gather knowledge and expand their network, but also in testing their hypothesis. Part of getting commitment from clients is providing the space for creating discussions and talking through their concerns, challenges they experience, as well as their needs. For example, in Singapore, they're really great at bringing together scientists, policy makers, and utilities. Social media might also help to bring discussions beyond the conferences, allowing for ongoing conversations. On the other hand, it's also important to realize the need for moving beyond simply discussing. It is also very essential to mobilize the discussions into action by making progress and really following through with some action. The government can prove really helpful by putting innovation on the political agenda, as is the case in the Netherlands.

3 A Brief Overview of DEMEAU

The drinking water and wastewater sectors face tremendous challenges in assuring safe, cost-effective and sustainable water supply and sanitation services. Proper detection of and treatment for emerging pollutants has become particularly relevant to both sectors in recent years. To address these challenges, both sectors have turned to innovative technologies that promise effective solutions to a safe and sustainable water supply.

DEMEAU, a three-year EU FP7-funded project, is currently working to understand the potential of such innovative technologies for the drinking water and wastewater sectors. Its objective is to demonstrate the suitability and cost-effectiveness of innovative methods and technologies in reducing levels of emerging pollutants in drinking water and treated wastewater.

DEMEAU is actively exploring the potential for new technologies to address emerging pollutants in water and wastewater in both water sectors. To do so, DEMEAU is researching four relevant technologies: managed aquifer recharge (MAR), hybrid ceramic membrane filtration (HCMF), hybrid advanced oxidation (HAO) and bioassays (BA), for their potential for widespread application. Through its partnership with research institutions and water utilities, DEMEAU is currently applying these technologies at demonstration sites across Europe.

As part of the project, DEMEAU is also providing environmental impact and costs assessments (both life cycle assessment and life cost assessment) for the four technologies, examining barriers to market implementation. In order to support the market penetration and broader application of innovative methods and technologies in the water and wastewater sectors, DEMEAU is working in cooperation with relevant policy makers, regulators, and standardisation bodies in addition to technology producers and users on the national- and EU-level.

DEMEAU is led by KWR Watercycle Research Institute, based in the Netherlands. The project consortium consists of 17 members from five EU countries.

4 Timeline

October 2013	**First year deliverables and milestones finalized**
15 Oct 2013	**MAR to MAR-ket** workshop held in Beijing (CN), where strategies to bring Managed Aquifer Recharge techniques to the industry were explored in depth.
21–22 Nov 2013	**DEMEAU WA1 project partners** presented their work at the Hydrogeology workshop organized by the European Federation of Geologists in Brussels (BE)to highlight where they are playing an important role in European water policy.
5 Dec 2013	**Managed Aquifer Recharge in Europe – Challenge or Opportunity for the Environment?** The first DEMEAU utility event was held at Berliner Wasserbetriebe (BWB) in Berlin Tegel (DE).
6 Feb 2014	**Knowledge Exchange** held in Loeben (AT) where discussions regarding the best ways to foster uptake of novel technologies in the water sector were explored.
27 Mar 2014	**Report on Drivers & Barriers of Successful Implementation** of Innovative DEMEAU techniques released.
19–20 May 2014	**2nd annual Project Steering Board meeting** of the FP7 project DEMEAU was held on the KWR premises in Niewegein (NL).
2 Oct 2014	**Managed Aquifer Recharge utility event** held in Barcelona (ES) to present research and implementation of MAR. An interactive part dealt with drivers and barriers to MAR implementation.

5 Progress & Achievements

WA1: Managed Aquifer Recharge

Closer cooperation among European initiatives exploring aquifer recharge management established
At the European level, several projects (DESSIN, MARSOL, DEMOWARE) as well as other initiatives such as the MAR to MAR-ket action group are currently exploring various aspects of managed aquifer recharge. Collectively, these initiatives overlap in their efforts, sharing many common goals.

During meetings at the European Innovation Partnership Water Platform in Barcelona (held from November 5–6, 2014) and another in Tel Aviv (held from December 3–4, 2014) fields of cooperation were identified among the initiatives. Such cooperative efforts aim to explore and tap into synergies of common tasks between the projects. As a first step, partners agreed that quality assurance of some outstanding reports will be performed on a mutual basis moving into the future.

Tools developed within DEMEAU will be tested on their practicability by experts from the above mentioned initiatives. Policy recommendations arising from the different projects will be aggregated to improve its impact. The initiatives plan to further intensify cooperation through common workshops and dissemination.

Participants of MAR – SAT expert forum Workshop in Tel Aviv

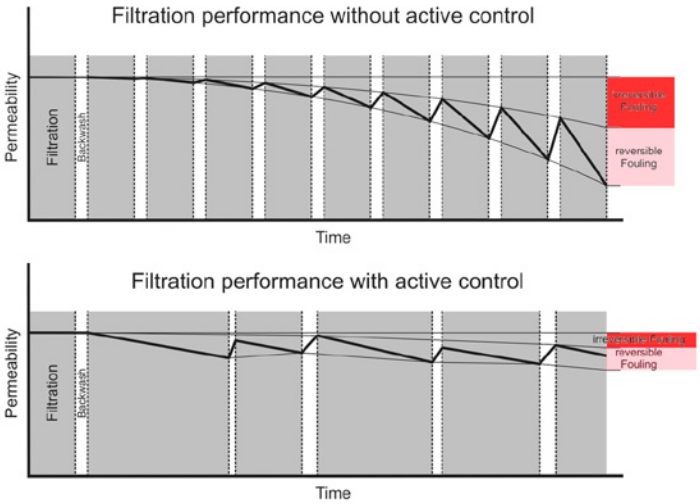
WA2: Hybrid Ceramic Membranes

Removal of pharmaceuticals from waste water effluent using a hybrid ceramic membrane system
Pharmaceutical consumption has been on the rise in recent decades. As a result, there has been a simultaneous increase in the concentrations of pharmaceuticals in waste water from a variety of sources, including households, hospitals and nursing homes. Removing these pharmaceuticals prior to discharging into natural water bodies or surface water is necessary to prevent impacts of these pharmaceuticals to ecologic systems.

One option for addressing this concern is removal of pharmaceuticals using a hybrid ceramic membrane system: powdered activated carbon (PAC) in combination with ceramic membrane filters (CMF). The performance of this technology will be tested in the next six months during a pilot trial at the waste water treatment plant in Almelo of Waterboard Vechtstromen. The pilot tests are organized by the Waterboard Vechtstromen, RWB and KWR Watercycle Research Institute.

The treatment system itself follows several steps. First, the PAC is dosed to the waste water effluent and adsorbs the pharmaceuticals. The CMF then removes the PAC from the effluent. During this process the PAC forms a cake layer on the membrane which is removed and renewed after every time the filter is backwashed. During filtration, the cake layer of PAC will be adsorbing pharmaceuticals and other pollutants. Moving forward, the stable operation of the PAC-CMF process will be realized. Dosing experiments with pharmaceuticals will also be conducted to determine the removal efficiency by PAC-CMF. The experiments start in December 2014 and will finish in May 2015.

For further information please contact Erwin Beerendonk of KWR Watercycle Research Institute (Erwin.beerendonk@kwrwater.nl).



Comparison of filtration performance with and without active control

Technological leaps in Roetgen provide promising results
Membrane filtration is a complex process of altering filtration and backwash cycles. Process performance is highly dependent on the quality of the raw water input. To ensure high performance process parameters, filtration and backwash duration require frequent adjustments as a result of the dynamic conditions of the raw input water. To automate the control process, an Automatic Neural Net Control System (ANCS) based on artificial neural networks (ANN) and Genetic Algorithms (GA) was developed in EU-Life project "Purifast." It was recently applied at UF filtration plant at WAG in Roetgen.

This is the first time such technologies have been applied to membrane filtration in an active waste water treatment plant. The goal was to reduce costs of operation significantly. It was successfully shown that ANN is able to give accurate predictions of relevant process parameters. Furthermore, it was found that Genetic Algorithms are well suited for solving the problem of finding the optimum values of operating parameters.

In November 2014, the system was switched from training mode into full operation mode. Based on the predictions calculated by the ANN, the system calculates optimum values for filtration time, filtration flux, backwash time and backwash flux. The proposed values are displayed by a graphical user interface. The human operator is effectively supported in his challenging task. The initial success of the new technologies underway in Roetgen provides a promising outlook for addressing emerging pollutants.

WA3: Advanced Oxidation Techniques

Switzerland's first advanced, full-scale wastewater treatment plant goes live
Wastewater treatment plant (WWTP) Neugut in Dübendorf officially launched into operation on March 24, 2014, making it the first WWTP with advanced treatment in Switzerland. The construction of the ozone reactor took a little over a year, and added an additional element to the already existing conventional treatment part. Investment costs to build the treatment system totaled to 2.7 million Euros.

Since its launch, the ozonation treatment has worked without any major problems. The new treatment system has already demonstrated successful removal of micropollutants from its waters, reducing the amount of pollutants that enter the environment and human populations.

Despite its overall success, some aspects still remain unclear. In response, Eawag and the Ecotox Center in Dübendorf are investigating the effectiveness of the treatment technology for chemical and for ecotoxicological water quality. Their research focuses on the transformation products that are formed during ozonation. To do so, several emerging substances frequently found in wastewater have been selected for further investigation. On the technical side, appropriate control and operation strategies are also being assessed. These investigations will help to further improve the technologies.


The ozonation reactor with ozone diffusors has a volume of 530 m^3 and a minimal residence time at peak water flow of 12 minutes.

WWTP Neugut has become increasingly important in the last year. The new Swiss Water Protection Act, which aims to enhance water quality by the elimination of micropollutants reaching the aquatic environment via WWTPs, was approved in March 2014. Since then, there has been a great deal of focus turned to WWTP Neugut to learn from its experiences on advanced wastewater treatment. The goal is use lessons learned from WWTP Neugut to upgrade an additional 100 WWTPs in the near future.

Research on the optimization of a UV/H_2O_2 reactors leads to more efficient techniques in the Netherlands
KWR, in cooperation with Wetsus, the Joint Research Program of the Dutch drinking water companies, and Van Remmen UV Techniek, recently developed a kinetic model to optimize process conditions in oxidation processes using UV/H_2O_2. Because the effectiveness of the oxidation treatment strongly depends on the quality of the water to be treated, information on natural organic matter in the water and the concentration of nitrate or hydrogen carbonate are important to appropriately fine-tuning the treatment plant.

As a first step, already existing data from previous research was assessed across a wide array of emerging pollutants. The results indicated the models provided an accurate prediction of the natural circumstances. It was also found that application of another model accurately predicted the doses of the UV light required to eliminate emerging pollutants under different circumstances. In addition to optimizing current processes, the results will also support advances in optimizating new reactors.

Until recently, UV disinfection reactors were applied and optimized for much higher flows than are required in UV/H_2O_2 processes. DEMEAU, in collaboration with Van Remmen UV Techniek, built four new, optimized reactors. It has been predicted that, depending on the water quality, eliminating pollutants could be achieved at the same efficiency but with a 30–40% lower energy demand.

The four optimized reactors were tested in two pilot scale experiments at two different drinking water companies. At the production site of Dunea in Bergambacht (NL), three types of reactors with a flow of 10 m3/hr were tested: two types based on modeling, and one which was developed by van Remmen UV Techniek. All reactors showed good elimination of organic micropollutants at a 30–40% lower energy demand than conventional UV reactors. A smaller type of reactor, which operates at lower flows of 1–3 m^3/hr, is also currently being tested in a pilot scale experiment at WML in Heel (the Netherlands). Preliminary results indicate high conversion of organic micropollutants.

WA4: Bioassays

Automated monitoring of estrogenic activity in drinking water using Bioassays

It has been shown that surface water used as a source for drinking water production contains complex mixtures of compounds that can interfere with endocrine functioning similar to hormones. Efficient monitoring and adequate treatment of source waters are required to avoid any additional risk to consumers by such compounds.

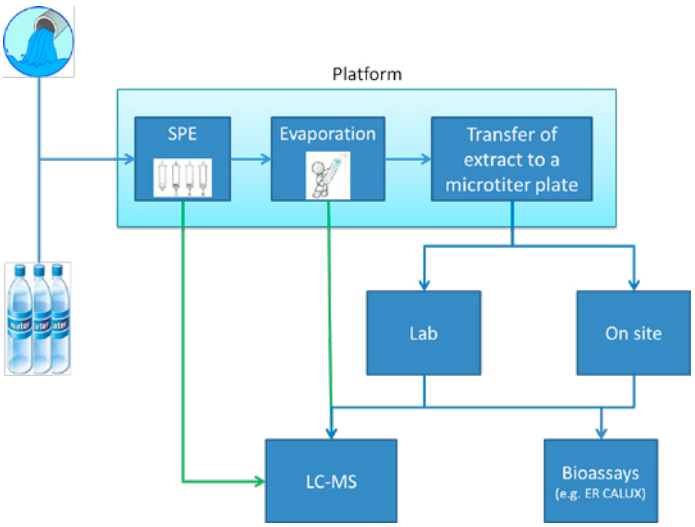
At present, regular analytical monitoring is being done for chemicals that are known for a long time. Such monitoring might, however, overlook:

- Non-target chemicals,
- Chemicals present below the detection limit of the selected analysis technique and
- The fact that water contains a mixture of chemicals, not only single chemicals, which might interact with each other showing additive, synergistic, or antagonistic effects.

In vitro bioassays can be used to quantitatively assess the potential endocrine disrupting effects of water samples containing complex mixtures of chemicals. These assays overcome the above mentioned challenges by measuring the total toxicological effect of the chemicals present in drinking water regardless their structure, concentration and identity; and subsequently quantitatively evaluating the measured effects for low/high risk based on a set of trigger values.

In order to apply this approach as early warning system for drinking water contamination, rapid turnaround time of the analysis is a prerequisite. Effect-based analysis of water, however, always consists of a number of sequential steps:

1. Sample preparation (purification and concentration);
2. Toxicity screening;
3. Data evaluation



Automated sample preparation (SPE) platform suitable for toxicity assessment of drinking water (image courtesy of Vitens)

The keyword for express effect-based analysis is **Automation** of the sequential steps.

The choice and quality of the sample work up determines the analysis with the bioassay. A research consortium led by Vitens (Dutch Drinking Water Company) is currently working on the development of an automated sample preparation (SPE) platform suitable for assessment of estrogenic activity in drinking water. The first trials are aiming to detect estrogenic compounds in drinking water by coupling the automated extraction and evaporation to *in vitro* estrogen receptor bioassays (CALUX-technology, BioDetection Systems).

Moving forward, this work area seeks validation of the automated analysis, and hopes to expand the assay panel, allowing comprehensive human safety assessment.

WA5: LCA/LCC

Fostering communication between stakeholders through interactive workshop sessions as part of life cycle assessments

Work area 5 (WA5) brings together environmental, economic and social aspects to promote sustainable pathways for market implementation of emerging water technologies. Environmental and economic life cycle assessments (LCAs and LCCs, respectively) and stakeholder analyses give an integrated insight into the sustainability of DEMEAU technologies. Communication with stakeholders on preliminary and final results and facilitating interactive exchange of views among stakeholder groups build important cornerstones of the efforts of WA5.

In October 2014 several DEMEAU partners joined forces for a DEMEAU utility event at Aigües de Barcelona. The event was attended by researchers, utility operators, administrators and water agencies. During the event, environmental LCA and economic LCC results for an MAR system Sant Vincenç dels Horts were presented by Dr. Christian Remy (Kompetenzzentrum Wasser Berlin) followed by an overview of social drivers and barriers

by Miranda Pieron (KWR Watercycle Research Institute). She presented a series of statements to which workshop participants could indicate their agreement or disagreement by rising red or green cards in order. The activity helped to validate findings reported in DEMEAU deliverable 52.1 (Drivers and barriers for successful implementation of innovative DEMEAU technologies). Three working groups, based on the affiliated stakeholder type (researchers, water operators, as well as administrators and water agencies), brainstormed about implementation barriers, ways to overcome such barriers and expectations from other stakeholders.

According to some participants, the workshop was the first time stakeholders had a platform to share their experiences and expectations with each other. This is an effective first step towards the joint efforts required for the implementation process DEMEAU is aiming for. Interactive sessions are planned for all DEMEAU upcoming utility events and will contribute to formulating recommendations for market impact.

Evaluating DEMEAU technologies in their life cycle
Innovative technologies tested in DEMEAU for addressing emerging pollutants in the water cycle are often in competition with conventional processes or systems which are already available in the market. To foster the uptake of innovative technologies, they have to be evaluated against a benchmark technology to show their benefits and reveal potentials for further optimization. Within DEMEAU, new technologies are assessed in their economic as well as environmental profiles, adopting the holistic "life cycle" perspective. With applying the methods of Life Cycle Assessment (LCA, ISO 14040/44) for environmental aspects and Life Cycle Costing (LCC) for economic aspects, direct and indirect effects of the DEMEAU technologies on the water management system are assessed and quantified.

DEMEAU partners deliver the required input data which are derived from the testing of the innovative technologies in pilot and full-scale plants. This data is then processed by experts in the WA5 team and evaluated with use of specific indicators, e.g. "net present value" for economics, "carbon footprint" or "water footprint" for environmental impacts. Thus, innovative and conventional processes can be compared in a transparent and robust framework with defined system boundaries, enabling a fair comparison without overlooking any trade-offs. The interpretation and validation of the final results together with the case study partners ensures data quality and facilitates further discussion within DEMEAU towards process optimisation. Finally, DEMEAU will formulate unique selling propositions for each of the innovative technologies based on the findings of LCA and LCC, thus promoting their market uptake and future development.

WA6: Dissemination

As part of ongoing dissemination strategies for Work Area 6, Ecologic Institute has been leading efforts to capture, communicate and distribute the milestones of DEMEAU to relevant target audiences. In early February, Ecologic will debut a short animated video, to showcase such ongoing efforts to raise awareness of emerging pollutants.

The educational video aims to situate the importance of DEMEAU in the broader context of environmental health, as it relates to emerging pollutants. It will provide information regarding the sources of emerging pollutants and the ways in which they enter our water cycle and affect our drinking and wastewater systems. The video will also posit proactive solutions to the ongoing issue of emerging pollutants, showcasing the promising impact of the innovative technologies currently being researched and demonstrated by DEMEAU. Upon release, the video will be displayed on the DEMEAU website and distributed widely to partner organizations, policy-makers, and the general public for greatest impact.

In addition to the animated video, Ecologic will also be releasing an updated version of the DEMEAU website, slated for release in March 2015. With the changes in effect, the website will be more dynamic, organized, and user-friendly than before. The landing page will contain new features, including rotating graphics to catch the attention of the visitor and an increased emphasis on target audiences. The restructuring of the website, through the use of mosaics and new drop-down header, will also allow for enhanced access to information and better overall visualization. This improved website will continue to play a central role in increasing the reach of DEMEAU content for the duration of the project, and beyond.

WA7: Project Management

From the project management side, much headway has also been made. The second annual Project Steering Board meeting for DEMEAU took place on May 19th–20th at the KWR Watercycle Research Institute in Nieuwegein, the Netherlands. Project coordinator Theo van den Hoven welcomed the DEMEAU project members with a brief introduction of KWR, its services and activities and the scope and objectives of DEMEAU. Subsequently, the Work Area (WA) leaders had the opportunity to give an overview of their work progress. As the project deals with different technologies, the goal of the meeting was to encourage further exchange of knowledge and experiences, and to search for collaborative opportunities.

During the afternoon, the DEMEAU project team visited the newly developed CeraMac® plant of water company PWN in Andijk. Gilbert Galjaard, Director of R&D at PWN Technologies, gave an introduction to the development of this innovative technology and to the full scale ceramic membrane drinking water treatment system as well. Afterwards, a tour through the plant was organized and offered by PWN to the DEMEAU partners, giving them insight into the technologies developed and applied by PWN. The visit proved to be a great opportunity for further cross-pollination among project leaders.

6 The DEMEAU Storyline

The Project Advisory Committee (PAC) serves as DEMEAU's primary connection to the "outside world," that is, the broader network of key actors in the field of emerging pollutants. The PAC supports the project by linking relevant elements to national and international networks with the goal of enhancing the broader impact of DEMEAU. The PAC also advises the project team in its approach to research and outreach by providing expertise in a diversity of sectors.

PAC members include: Helge Daebel (Innovation), Frans Schulting (Water Research), Thomas Ternes (Emerging Pollutants), Frederic Leusch (Bioassays and policy integration) and Rüdiger Wolter (Regulation).

Dr. Rüdiger Wolter has a background in mineralogy and geology and is responsible for groundwater conservation at the Federal Environmental Agency of Germany. His specializes in the broader issues pertaining to water and soil. In Germany, the most pressing issues regarding water quality are nitrates and pesticides that both stem from agriculture. In the last years, pharmaceuticals and biocides were emerging as an additional threat to water quality. Working on these topics, Rüdiger Wolter is a member of many national and international working groups regarding water quality such as the EEA, the EU Commission and its working group "Groundwater" and the LAWA (working group on water of the German Federal States). With such a broad overview on the current issues and his close connection to the policy makers, Rüdiger Wolter advises the DEMEAU project team on its impact on its target groups, including policy makers, general public, utilities and technology providers. Here, we present thoughts from Rüdiger Wolter (Federal Agency for the Environment, Germany) on the storyline of DEMEAU.

"When I was approached to participate in DEMEAU as part of the PAC, I was very happy to do so. From the start, I was drawn to the project because it is composed of so many different sub-projects. In addition, my background in groundwater and drinking water protection made my involvement in DEMEAU a natural decision. I was particularly interested in foreground issues pertaining to groundwater recharge, groundwater protection and water treatment. Very quickly, I started asking the ways in which these topics could contribute to other work packages, as well as how the work packages are interconnected more broadly. Of course, it is possible to take a more passive approach, and leave the task of establishing links between the various work packages to the leaders of the various work areas. However, I found it important to actively and more explicitly make links among the various work packages, not only for enhancing understanding but also for increasing communication channels among work areas.

At first glance, the individual work packages appear to have very little in common. Upon closer inspection, there is an abundance of logical connections to be made. Such connections are beneficial, and can best be summed up using a storyline. To begin telling the story of DEMEAU, I first began with the determining the pollutants in the drinking and waste waters at hand. The next part of the storyline explores the water extraction and treatment of groundwater recharge. The final part of the storyline discusses drinking water treatment and quality assurance aspects. In the end, all work packages provide important contributions for detecting pollutants as well as methods for reducing these pollutants through a variety of methods, as this edition of the newsletter will explore."

The goal of the storyline is to describe the bigger picture and interconnectedness of the four key technologies. Depending on the target group, the content includes technical or policy oriented information. The main frame of the storyline is as follows:

Polluted and contaminated water is and has been the main source for diseases. In the developed world, this problem has been tackled since a century whereas 768 million people worldwide still do not have access to safe drinking water. In Europe, there are upcoming challenges to react on. In face of demographic changes, climate change, ageing and deteriorating infrastructure, as well as the detection of emerging pollutants such as pharmaceuticals, personal care products and industrial chemicals, innovation in the water and waste water sector is needed to ensure the long-term sustainability and quality of water resources. DEMEAU demonstrates technologies that address emerging pollutants in water and wastewater, showcasing their benefits and feasibility through Life-Cycle and Life-Cost Assessments and highlighting current barriers such as regulatory and authorization issues. The project thus contributes to driving future development of legislation by compliance with current legislation in Europe. Companies and utilities need to work together to implement solutions that will drive down costs and improve both efficiency and water quality.

7 Outputs

Update: Project reports and DEMEAU publications

DEMEAU (2013) D12.1: Decision Trees for MAR Impact Evaluation; Documentation.
Miret, M., Vilanova, E. & Molinero, J.
http://demeau-fp7.eu/content/d121-decision-trees-mar-impact-evaluation
http://demeau-fp7.eu/D121

DEMEAU (2013) D42.1: Position paper(s) how bioassay derived data can be applied for water quality assessment (12 months)

DEMEAU (2014) D41.2: Establishment of trigger values and validation of bioassay panel (14 months)

DEMEAU (2014) D52.1: Driver and barriers for successful implementation of innovative DEMEAU technologies ; Documentation.
Pieron, M. & van der Zouwen, M.
http://demeau-fp7.eu/content/d521-drivers-and-barriers-successful-implementation-innovative-demeau-technologies
http://demeau-fp7.eu/D521

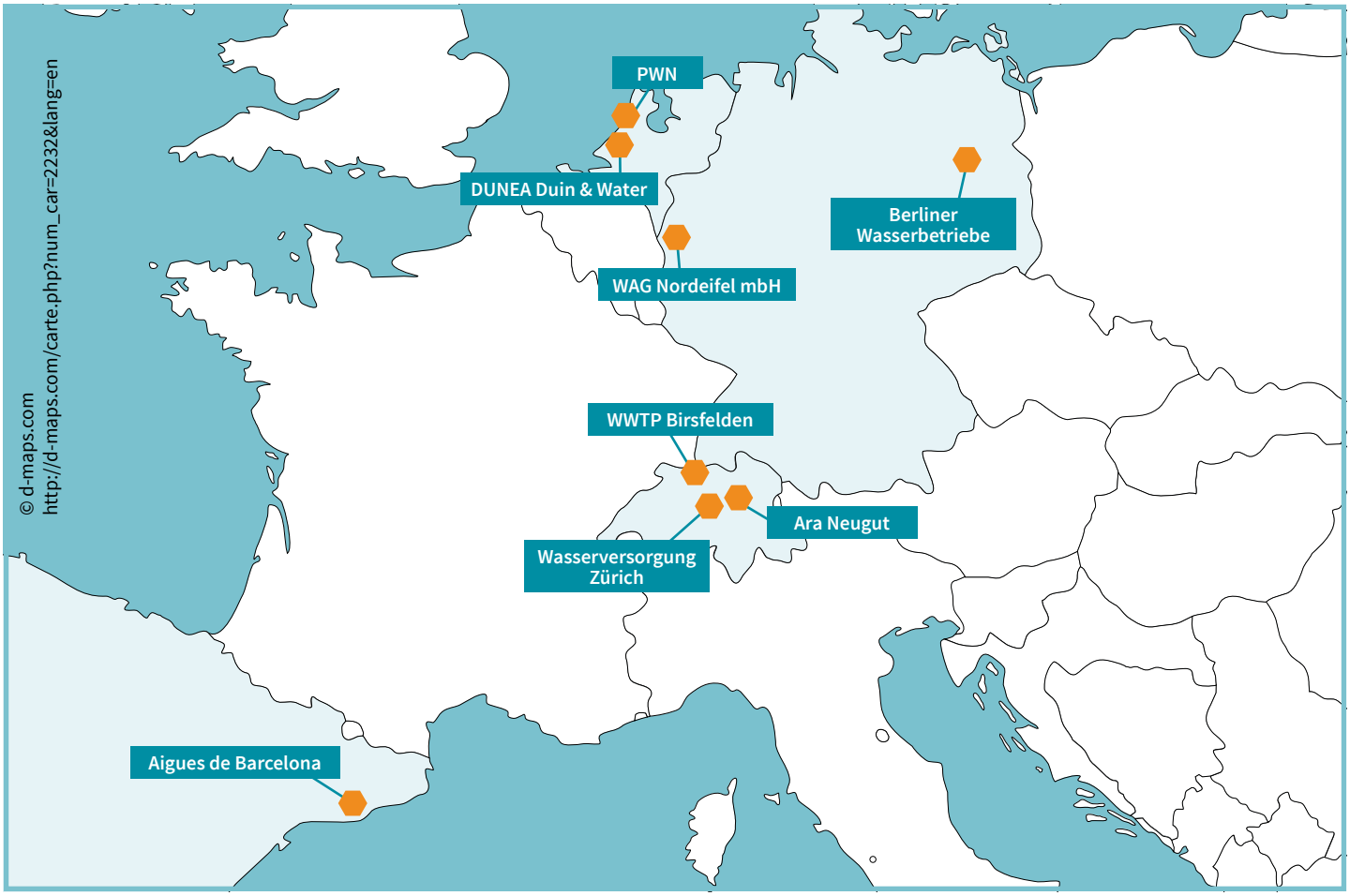
DEMEAU (2014) D23.2: ANCS completely trained and adjusted with the automatic functions (18 months)

DEMEAU (2014) D21.1 : Performance an added value of the new and patented Ceramac reactor design (24 months)

DEMEAU (2014) D32.1: Compilation of kinetics and mechanisms for the transformation of organic substances (24 months)

DEMEAU (2014) D41.1: Selection criteria to select bioassays for implementation and use (24 months)

8 Utility Updates



9 Future Events

Type of event and topic	Organising partners	Location	Preliminary date
2015			
Workshop on effect-based monitoring techniques: "Bioassays as innovative tools for water quality assessment"	Veolia, BDS, KWR, EAWAG, Ecologic Institute	Paris, France	29 January, 2015
Utility event: Process Control Enhancement for Water Treatment Systems with Artificial Neural Networks	IWW, Aquatune	Roetgen, Germany	10 March, 2015
Workshop on bioassays and regulatory barriers with small-scale demonstration	Vitens, KWR, BDS, Ecologic Institute	TBC	Spring 2015
Utility event on oxidation, demonstrating the large scale Ozonation at Neugut	Eawag, Neugut, Ecologic Institute	Zürich, Switzerland	Summer 2015
Final conference	KWR, Ecologic Institute	TBC	Summer 2015

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10 DEMEAU partners

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