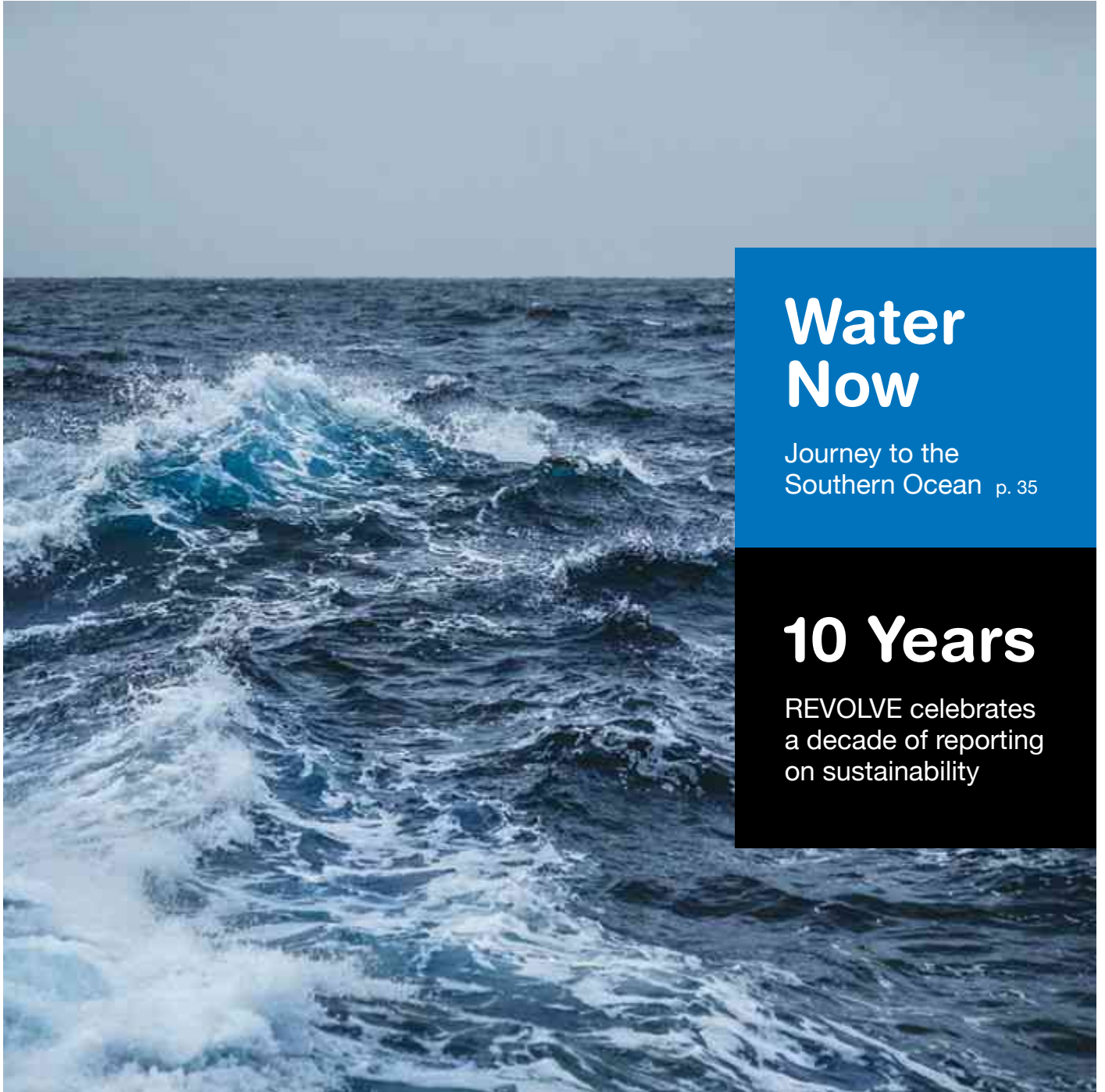


REVOLVE

QUARTERLY INSIGHTS INTO A CHANGING WORLD

N° 34 | Winter 2019/2020



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10 Years

REVOLVE celebrates
a decade of reporting
on sustainability

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Celebrating 10 Years of Communicating Sustainability

This Winter issue of REVOLVE magazine celebrates 10 years of fostering cultures of sustainability. REVOLVE started with the Winter 2009/2010 Issue #1 of the magazine and has become a full-blown communication group, working on projects with clients and partners across a variety of sectors, with offices in Barcelona, Brussels and Vienna. REVOLVE has published 34 issues of the magazine, thematically addressing water, nature, energy, transport and the circular economy.

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Cover image: The Southern Ocean, Antarctica Circle. This image was used at the entrance of the UNFCCC COP25 in Madrid, Spain, 2-13 December 2019. Visit our VIEWS section for the full photo essay.
Photo: Jack Pan

Twin Sisters: Water and Sustainable Development

Agenda 2030 and the related Sustainable Development Goals (SDGs) are the best opportunity to frame water research and innovation efforts; and they belong to us (citizens, companies, communities) – not just to governments.

I am at the Water Innovation Europe event, presenting the Sustainable Development Goals to a large audience of water experts, the best innovators in Europe. This is the place where the best technology advancements are discussed; the point I am trying to make in my talk is maybe obvious nonetheless I take my chance there: we all have produced in our organizations great innovations, however what is the ultimate goal? What global challenges are we contributing to?

I continue and claim that Agenda 2030 and the SDGs prove to be a marvelous “compass” for our innovation engines. Then the question comes: “Excuse me Gaetano, what does SDG mean?” Wow, I never thought I would get this question from this audience? I start asking myself if we folks from the water sector are all aware of the importance of Water in the 2030 Agenda? The story continues – just as in that panel session (and maybe on a less funny note), after trying to convince the audience about the compass story, a more fundamental question comes: “These SDGs are nice, but they feel too abstract to me, and it’s difficult for us to understand what’s in it for us?”

This distance between big policies and the “normal” people and communities (including civil society organizations, local governments, or private sector organizations/companies) are luckily getting shorter and shorter. Part of the reason lies in the fact that we are getting closer to tipping points so that such communities (outside the experts and the scientists who have known this for long time) start observing clear impact of water-related issues in their day-to-day lives. The Cape Town crisis (and still after that current water shortage in South Africa and in other regions), extended droughts, flooding becoming a regular part of daily news, are probably creating more awareness without even needing special awareness campaigns.

So, the positive news: the distance from big policies and us is becoming slowly smaller. Still, we need more and more policies that guide broad actions at local, national, regional, and international levels, in support of the SDGs. We can be proud of the fact that for

example at EU level there is clear intention to streamline a large number of policies around the SDGs and even EU organizational structures are being formed around the people, planet, and prosperity pillars of the SDGs.

Agenda 2030 and the SDGs prove to be a marvelous “compass” for our innovation engines.

At the same time, in many (mostly large) companies the SDGs are no longer the remote domain of an isolated Corporate Social Responsibility (CSR) person or (small) department but are more integrated in company strategies. And there is no choice now, since depleting the world of its resources or continuing to contaminate them in a way that makes them unusable does not exactly make sense from a business perspective (check out initiatives like the WBCSD SDG Compass¹).

Another concrete response to the question of how to make SDGs a concrete topic lies in its complex yet fascinating discussion about monitoring. The goals at first sight might look quite abstract, however at the indicators level (and its monitoring) you can really get a better grip of what they mean. Many organizations are even trying to do innovation at the monitoring level of indicators, with the purpose of studying how to make them more relevant and how to involve entire communities in the monitoring activity, for example with citizen engagement activities and again with company impact reporting.

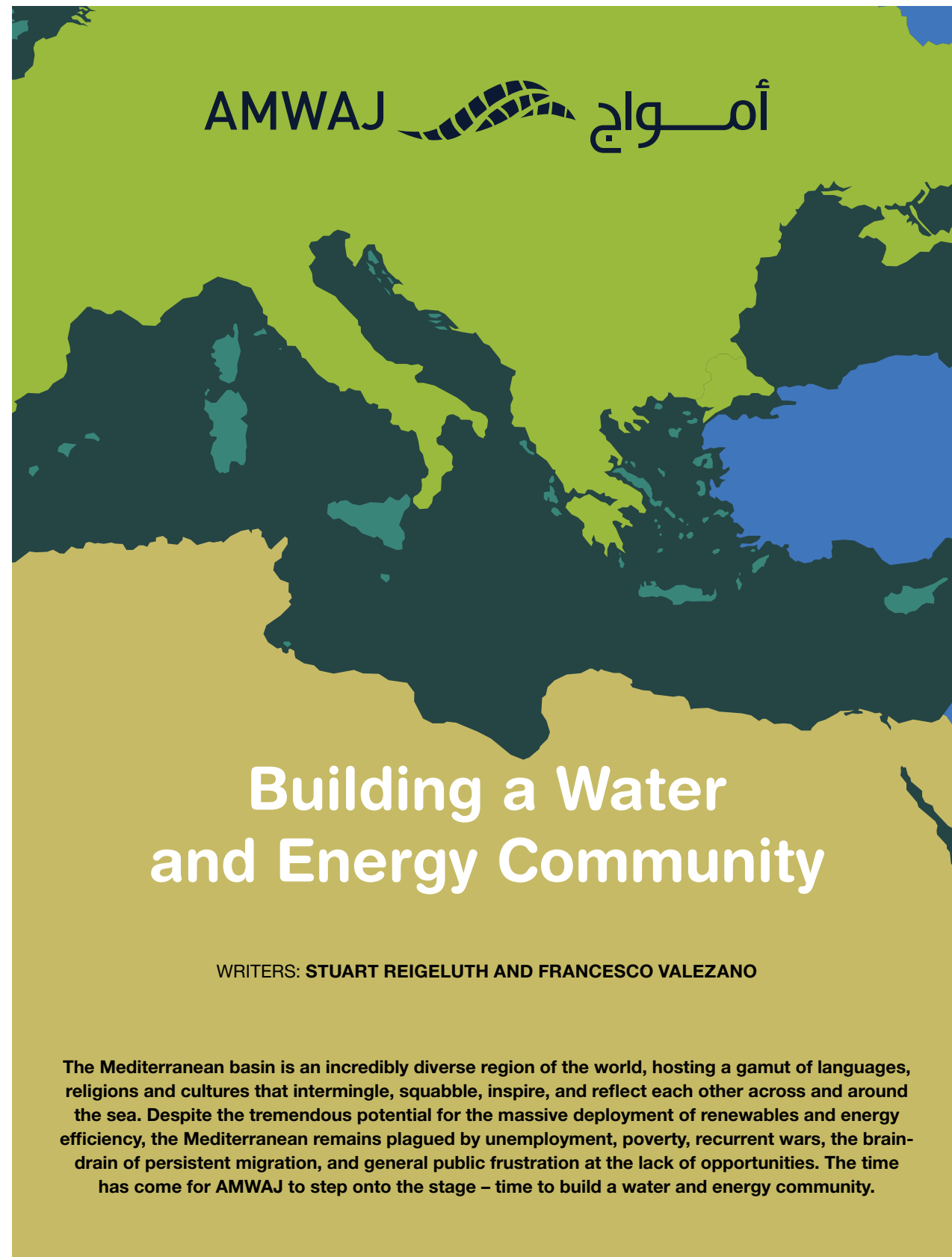
Despite the questions above, society is slowly but recognizably moving towards actively participating in the achievement of the SDGs beyond the obvious policy-making arena. Now who can tell me by heart each of the 17 SDG goals? (And its relation to better water management of course...) ●

GAETANO CASALE

Manager Liaison Office, IHE Delft Institute for Water Education

1. <https://www.wbcsd.org/Programs/People/Sustainable-Development-Goals/Resources/SDG-Compass>





25 years ago, countries from around the Mediterranean came together to launch the Barcelona Process at a conference endorsed by the European Union in 1995 with the goal of improving, increasing and incorporating relations between Europe and the Maghreb (Northern Africa) and the Mashreq (Middle East). Also known as the Euro-Mediterranean Partnership (Euromed), the Barcelona Process aspired to advance and consolidate three ‘baskets’: 1) to bring peace and stability to the region (Political and Security Basket), 2) to build a regional free-trade zone for shared prosperity (Economic and Financial Basket), and 3) to encourage understanding and exchange amongst different people (Social, Cultural and Human Basket). It’s safe to say without too much hesitation that the Barcelona Process does not carry too many fruits in its baskets.

Seen through a darker prism, we are now witnessing a region that is going to suffer the most intense temperature rises in the world due to global warming, accompanied by the highest levels of water scarcity and water stress (also due in part to climate change) but largely because of poor governance and bad management; we are talking about a region that is already suffering the highest levels of unemployment in the world, particularly for women and young adults, and the highest levels of migration to Europe and elsewhere – not only from local populations but also from migrants coming from further south, using the Mediterranean as a transit station to, supposedly, brighter shores. This is a region with ongoing wars and border conflicts, with the domino effect of regimes being overthrown by popular unrest, and with unresolved general socioeconomic malaise.

On the lighter end of the spectrum, the Barcelona Process did spawn positive progeny, particularly in the ever-nascent arena of civil society that was essentially non-existent across North Africa and the Middle East prior to the

1990s. Local communities for sports, recreation and religious activities of course existed, but ‘civil society’ in the Western definition of doing independent research and free thinking about different societal issues such as the economy, the environment, energy and politics was definitely strengthened by Euromed – and continues to be so with growing networks of associations, research centers, university departments, and programs aimed at bringing people together to share and exchange ideas, to build and implement projects that are meant in theory to make the Mediterranean a better place to live.

That’s the theory. As Cervantes famously said in one of the innumerable popular sayings by Sancho Panza in *Don Quixote*: “entre el dicho y el hecho hay gran trecho” (between what is said and what is done, there is an abyss). Cervantes was very much made in the Mediterranean and fought the Turks at the famous Battle of Lepanto (1571) that the Spanish and Venetians won. Cervantes was later captured by the Turks and spent some years in a prison in Algiers, where he had time to contemplate the madness of things and to compose his masterpiece. This was around the time that the Ottomans finally routed the Knights of the Order of St. John from the walled city of Rhodes; the Knights went on to Tripoli in Libya and lost that, and then barricaded themselves in Malta for a couple of centuries until Napoleon came along and ousted them on his way to Egypt in 1789.

In practice, and as part of the largest EU enlargement ever, Malta and Cyprus joined the European Union in 2004 (along with the Czech Republic, Estonia, Hungary, Latvia, Lithuania, Poland, Slovakia and Slovenia) and by default, obviously, these barren Mediterranean islands, placed strategically in the eastern and middle segments of the sea, became part of the Barcelona Process. Politically, the inclusion of (southern) Greek-speaking Cyprus was premature

because the (northern) Turkish-speaking Cyprus would remain out which made for a divided and walled capital of Nicosia – a symbol in many ways of the failed attempts to harvest the efforts of Mediterranean cooperation. Rather than attempting political leveraging and economic incentives, including southern Cyprus simply crystallized a division and difference with Muslim Turkish Cyprus, also congealing their position...

★ ★

On 7 February 2007, Nicolas Sarkozy, during a speech held in Toulon for the French presidential election campaign, presented his proposal for a Mediterranean Union – a political project in which only the Mediterranean coastal countries could participate. The idea behind the political design was to create a small cooperative format reinforced by a strong geographical identity of the participants, capable of responding more effectively to the challenges of the region. The daring objective was making the Mediterranean the largest intergovernmental cooperation laboratory. A regional governance entity in which all members could have taken decisions regarding social development, security issues, and trade cooperation.

This Union for the Mediterranean (UfM) would come to include 43 member states (the 28 EU countries plus 17 southern and eastern Mediterranean states). Turkey could be one of its members, ‘no problem’ said Sarkozy – as long as the Turks did not join the European Union... old rifts never die. An ambitious young Jordanian was the UfM’s first Secretary General – with a slight Napoleonic complex, he did not last long and was replaced by a Moroccan diplomat who put in place the annual co-presidency of having a northern and southern country work together in advancing the UfM agenda(s). The agendas would slowly emerge around different themes and more process.

The UfM was never intended to be an implementing agent – it's a supra-national entity that brings politicians, technicians, ministries, and media together from the 43 countries to discuss, learn and advance projects related to water and environment, energy and climate, women and youth, transport and infrastructure, but the UfM does not actually pay for any project in particular.

There are some profound differences between Euromed and the UfM. Euromed was the expression of a multidimensional framework of Euro-Mediterranean cooperation which, at least in the wake of initial optimism, aimed to create a macro Euro-Mediterranean region. On the contrary, in the idea of Union for the Mediterranean, we immediately perceive a more pragmatic vision. Therefore, the UfM is an intergovernmental organization in which members are not obliged to submit to "take or leave" logic but enjoyed full independence and their autonomy of sovereignty was protected. In the institutional mechanism of the co-presidency, there is a clear desire to place the participants on a level of absolute equality. The intergovernmental nature of the UfM would like to ensure participants in achieving closer and more conscious cooperation dialogue.

If Euromed represented the European way to create a peaceful region in the Mediterranean, the UfM for its part never offered itself as an expression of the will of Europe to pacify the Middle East. The Union for the Mediterranean, although it did not want to embody a caesura with the political network deriving from the Barcelona Process, marks a notable change in the design of Euro-Mediterranean relations, both political-institutional and as regards the geopolitics perspective. What emerges

is a more pan-Mediterranean vision of governance whose political profile, depends very much on the dialogue capacity of the representatives of individual governments. So that the very same effectiveness of initiative requires mutual trust from the participating countries.

The peculiar aspect of the UfM is the ambition to focus the organization on a truly tangible collaborative basis, feasible through the participation of members in projects that have immediate applicability. The UfM Secretariat can only suggest certain projects to be labelled by the UfM logo and asks its members

The daring objective was to make the Mediterranean the largest intergovernmental cooperation laboratory.

to endorse the given project with how-ever millions may be necessary to get the job done. In this way, the UfM plays a catalytic role and, through a network of partners, assists in all aspects of the development of project proposals: from the definition of financial planning to fundraising, technical support and the monitoring process.

The UfM chose the Gaza Desalination Plant as its first label-endorsed project around 2010 – 10 years later Israel is still bombarding Gaza (as of November 2019) and the plant is not operational. Arguably, the UfM could have chosen an easier location to get an early win:

perhaps Tunisia, Lebanon, Turkey... yet, the UfM has done important work on advancing the depollution of Lake Bizerte in Tunisia as part of the initial €22 million for cleaning up the Mediterranean, which was part of the larger €72 million the European Commission contributed to the UfM through the European Neighbourhood Policy Instrument (ENPI) allocated in July 2009.

ENPI also included €7.5 million for maritime and land highways, plus €5 million for the Mediterranean Solar Plan (not sure what happened to this plan), and another €1 million to get the Euro-Mediterranean University of Slovenia going. ENPI was replaced by the European Neighborhood Instrument (ENI) for 2014-2020 with a bigger budget of €15.4 billion for the development of the eastern and southern partners and parts on Europe's periphery. Development, in theory, will bring more employment, thwart migration, and enhance environmental sustainability.

A primary piece of the sustainability puzzle of course is water – and this is where the new water-employment-migration (WEM) nexus comes into the picture. Climate change is reformulating geopolitical and environmental patterns. Nowadays 24% of irrigated lands are affected by problems that limit their productivity, such as salinization. Drought is already affecting at least three-quarters of the world's population, and such drama will be accentuated more and more as the populations continue to increase in the immediate future.

According to the Internal Displacement Monitoring Agency 60% more of the population is prone to having to

1. Pollution of Lake Bizerte in Tunisia.
Photo: UfM Secretariat



leave their homes than in 1975. The International Organization for Migration (IOM) emphasizes that the poorest strata of societies may not have the means to emigrate; the absence of migratory movements does not necessarily mean that there are no social impacts... In times of global warming, it is necessary to change the paradigm itself that leads us to consider the act of leaving the place where one was born. Moving can be an effective way to adapt and is the only way to deal with threats and disruptions unknown in human history.

James Hansen, an eminent climatologist and former director of the Goddard Institute for Space Studies (GISS) of NASA, foresees a possible increase in sea level by five meters within 50 years. A five-meter increase in sea level would mean the loss of most of the coastal cities of the Mediterranean basin. Sea level rise varies regionally for a variety of geophysical conditions but is expected to be 20 per cent higher in the tropics and below average at higher latitudes. Yet not all suffer the effects of climate change in the same way. For example, the impacts of sea-level rise will be asymmetric even within regions and countries. Coastal cities are highly vulnerable, but geomorphological differences will cause different impacts even within individual countries.

In 2050, the number of refugees could reach 143 million, 86 million of which, according to a World Bank report, will move from Sub-Saharan Africa, due to the tightening grip of drought, cyclic famines, and soil depletion. Mediterranean countries will be major players in this social, cultural and political escalation.

In 2050, an expected 535 million people will live in the Mediterranean area. Water consumption in the region has already exceeded the limits of 20% and 40% of the total available water resources and climate change will only push the



2

threshold, considering that the region's economies will have less than 200 m³ of water per capita per year for 2050. Any value below 500 m³ is considered a risk; keep in mind that currently in the European Union the average available water is around 3,500 m³ per year. In the Mediterranean region, climate change will determine a temperature increase of ~ 0.7° C in the next two decades, an increase that will more than double in the middle of the century.

Episodes of drought will become more and more frequent, doubling, at best, with respect to the historical frequency. The Mediterranean has its strategic



3



4

centrality also as a "microcosm" of global challenges. It is the place that catalyzes, in an extreme form, dilemmas that cross the entire contemporary world. In the Mediterranean area, more generally, and in particular in North Africa, the increasing instability, the structural competition for access to reduced natural resources accompanied by high birth rates and climate change effects, are factors that contribute significantly to encourage the transfer of populations to more stable areas.

The physical proximity and the historical, cultural, social ties and the reciprocal economic interests existing between the two shores of the Mediterranean proved to be profound reasons for which the balances of this region hold a great importance for the whole of Europe. Indeed, as Aldo Moro stated, "No one is called to choose between being in Europe or being in the Mediterranean because the whole of Europe is in the

Mediterranean" – the Mediterranean manifests a historical and geographical inclination to interdependence and presents itself as a "geopolitical paradox". The Mediterranean is both a hub for virulent crises, hegemonic competition, and ideological clashes, and an area that could be a platform of socio-economic, water-energy and electricity-gas-infrastructure connectivity between Europe, Africa, and Asia.

The WEM nexus emanates from the particular geographic context of the Mediterranean where the convergence and crisscrossing of different cultures and peoples is particularly poignant. As a potential theoretical response to the colossal challenge of global warming, WEM runs in parallel now as a policy framework to the updated water-energy-food-ecoystems (WEFE) nexus that aims to square the global circle of reconciling incremental urban growth, depleting natural resources, unstoppable

population growth, and environmental resilience. These frameworks are intellectually stimulating but have been largely disconnected from the political Euromed process of trying to achieve regional cooperation in different sectors, which in turn add another level of complexity, including oil and gas, transmission and distribution, alternative and renewable energies...

- 2. Kastelorizo, an island with 430 inhabitants off the Turkish coast, is supplied with drinking water from tanker boats. Photo: Chris Vlachos
- 3. Looking at a dried-out irrigation canal, Egypt. Photo: Hamish John Appleby (IWMI)
- 4. Farmer refilling a water through with transportable diesel water pump, Egypt. Photo: Hamish John Appleby (IWMI)
- 5. Syrian and Iraqi immigrants getting off a boat from Turkey on the Greek island of Lesbos. Photo: Ggia



5



6

In many ways, the Mediterranean is a microcosm of the world: a melting pot of different races, diverse species, plentiful natural resources of sun and wind, open deserts and closed seas, accessible technological solutions – and the human energy is palpable. The potential of skipping dirty fossil fuels and jumping the curve to the full integration of renewables and greater energy efficiency measures is simply massive. This will require an equitable sharing of natural resources across all strata of society. This would help reduce societal disparities and bring greater equality between urban and rural areas. This will need powerful political endorsement, strong economic incentives, and much greater environmental awareness – all three of which are missing entirely in the equation today.

The concept of "sustainable development" is embodied jointly in a path of ethical and political evolution, it implies that dynamics of economic growth are compatible with the improvement of people's living conditions and that the capacity of the environmental resources is guaranteed. In this sense,

Euro-Mediterranean cooperation cannot disregard the current and future needs of the Mediterranean peoples.

This is why **AMWAJ** is important. **A Mediterranean Water And Journalism** (AMWAJ) movement that brings together the next generation of leaders in policy and politics, research and academia, as well as media and communication. This is the troika driving sustainability development. In Arabic, AMWAJ means 'waves' – in reference to the movement of water as the quintessential element of nature, and as a symbol for the movement of people and products, of energy vibes and connections around the sea; and as a reference to waves of communication that come with the freedom of speech, with visual, written and spoken media, with the power of transmitting ideas, sharing knowledge and learning together.

25 years later, the famous adage "you have to break some eggs to make an omelet" applies to the defunct Barcelona Process: the impact on politics and regional integration was minimal, indeed

negligible, but the Mediterranean is more present now than it has been in centuries. There is a point to the process: it provides continuity and a track record to measure success and failures against, but regional cooperation is taking too long and people are clearly tired of waiting for better state services to go into effect, and now – unlike a decade ago – there is greater momentum than before, there are more regional platforms to integrate the different threads of our societies: gas, electricity, and renewables and energy efficiency. AMWAJ acts as a platform for all the leading and emerging networks that are bringing greater sustainability to showcase their results. AMWAJ is building a water and energy community around the Mediterranean from the bottom-up today, join us:

www.amwajforum.com ●

6. WindFloat wind turbine prototype offshore of Agucadoura, Portugal. Photo: Untrakdrover



AMWAJ FORUM 2020

Building a water and energy community
around the Mediterranean

8 October 2020 | Beirut, Lebanon

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Managing Flood Risk in Oslo

WRITER: CONTRIBUTED BY THE EUROPEAN GREEN CAPITAL NETWORK

1

“Combatting and adapting to climate change is the greatest challenge of our time and it can’t be left to someone else, at another time, or in another place.” With these words Raymond Johansen, Governing Mayor of Oslo, officially marked the start of Oslo’s year as European Green Capital 2019. Oslo’s aim for the year has been to spread knowledge, inspire and mobilize citizens and local governments throughout Europe, and beyond, in the struggle against climate change.

Even though cities experience the impacts of climate change in many different ways due to varying geography, infrastructure and many other factors, there is still a lot that they can learn from each other. In Oslo, one major challenge has been the risk of flooding due to its overloaded sewage system. In the spirit of sharing experiences and lessons learned, Oslo has made the story public, of how it is revolutionizing its waterways, and contributed to the Future-proof toolkit for cities, created within the European Green Capital Network.

Heavy rainfall is a major challenge for sewage systems and with episodes of extreme weather on the rise, this is likely to worsen in future. The City of Oslo saw the overloaded sewage system, particularly in the city centre, as a flood risk and as a real threat to water quality and public health. Something had to be done.

“Stormwater management has to be a central part of city planning. The government must ensure that municipalities have the necessary resources and tools to fund green and open solutions in parks and green spaces and thereby also spare the sewage system,” explains Norway’s Minister for the Climate and Environment Ola Elvestuen.

In Oslo, the city decided to change the way it manages its water systems, by adopting a completely new approach – letting its waterways flow freely.

Re-opening Oslo’s rivers and streams

Within the framework of Oslo’s 2014 Stormwater Management Strategy, the city created plans to re-open the rivers and streams of its urban areas. Oslo has 10 main waterways flowing through its urban areas and until 2012, most of the 24 kilometers of waterways were flowing underground. The initial impetus for creating the strategy in the first place, came from the Water and Wastewater Agency in 2010, which alerted the City Council of the urgent need for a stormwater policy. Oslo’s Stormwater Management Strategy, was developed by 2012, approved in 2014 and then incorporated into the city’s action plan in 2016.

Despite initial challenges with urban planners and developers, there was no real opposition to the strategy, partly owing to the open dialogue with these key stakeholders. Another reason was that the action plan was created in 2016, while memories were still fresh of the unprecedented rainfalls of 2014 and 2015. The floodway and retention network laid out in the plan includes large areas reserved for heavy rainfall, as well as minor floodways to bring the excess rainwater to the main floodways.

Stakeholder engagement

One of the reasons for the closed waterways, is that it is simpler for urban planners and developers to put water underground rather than to let it flow openly. It was necessary then to plan new regulations and to carry out good communications with developers, and to provide them with support and guidance. The city offered courses for planners and developers, created 30 factsheets on measures to support

the implementation of the stormwater management regulations, and hosted at least two open meetings for planners and developers each year to share information on the topic. Knowledge and awareness of the importance of the topic has increased, contributing to the widespread acceptance and support for the action plan.

Challenges faced

Although the action plan is an important aspect of the Stormwater Management Strategy, it has not yet been officially approved at a political level. This has delayed the implementation of some of its measures. There is not one single reason for this, but several contributing factors: time-consuming cooperation between different agencies and departments, and the difficulty to maintain political focus on the topic, due to greater awareness of other key sustainability topics, in particular mobility.



2

1. Oslo Opera House. Photo: Vidar Nordli

2. Flood in urban area. Photo: Jonathan Ford

Looking ahead

Despite some implementation challenges, Oslo still sees its Stormwater Management Strategy as a success. Other parts of the strategy are now in place, which means that for example, any new building constructed has to incorporate green solutions such as green roofs. Acceptance of the new regulations among planners and developers has also improved thanks to the solid communications work and knowledge sharing among key stakeholders.

As the 2019 European Green Capital and a leading city in the field of urban sustainability, Oslo is creating a momentum to encourage other cities to follow in its footsteps on the path to becoming “future-proof” in the face of climate change. Oslo is open about the fact that even the green capitals of Europe face obstacles and are still learning. The city’s key message is that by working together and sharing experiences, cities can learn from each other and move forward. ●



3

3. Open retention basin in new development Ensjo. Photo: Tharan Fergus

4. Open retention basin for stormwater in the student city of Bjolsen. Photo: Tharan Fergus



4

The European Green Capital Network

The Oslo case study is available in the future-proof toolkit, created by the European Green Capital Network, a network of former European Green Capital Award winners and finalists. The toolkit is the first in a series of five toolkits on different themes, which address challenges that cities face in becoming more sustainable. Further case studies covered in this Toolkit showcase Nijmegen’s citizen-led approach to reducing flood risk, Hamburg’s plans to build 100 hectares of green roofs, and Lisbon’s green infrastructure programme. The case studies highlight the achievements, but also present the challenges faced – whether political, administrative or related to public perception.

Stay tuned for our city focus on Lisbon, 2020 European Green Capital.



<https://ec.europa.eu/environment/europeangreencapital/lisbon-is-the-2020-european-green-capital-award-winner/>

Cities4Forests

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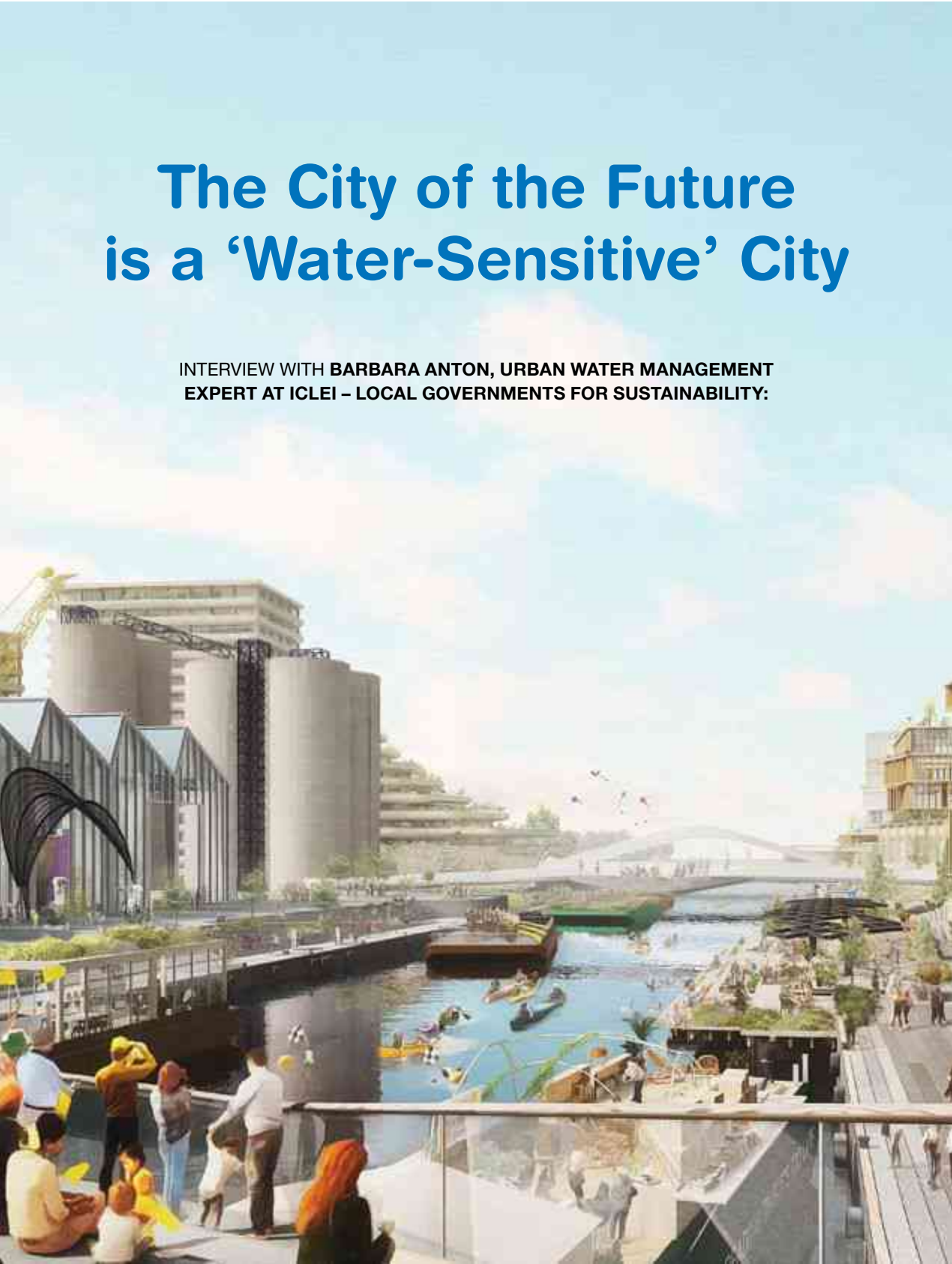
Oslo x Cities4Forests

Oslo is a founding member of the global network Cities4Forests that aspires to connect cities with forests for a healthier world, highlighting the added value of trees and forests for cleaner water resources and better air quality, higher property rates and green urban areas, stronger climate resilience and improved human well-being. Learn more here:

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Cities4Forests is an initiative by Pilot Projects, REVOLVE and the World Resources Institute (WRI)

Photo: Oslo, Norway, by Stuart Reigeluth



1

The City of the Future is a ‘Water-Sensitive’ City

INTERVIEW WITH **BARBARA ANTON, URBAN WATER MANAGEMENT EXPERT AT ICLEI – LOCAL GOVERNMENTS FOR SUSTAINABILITY:**

Why is water key from a local perspective?

Water is essential wherever people decide to settle. It is indispensable for maintaining all kind of life, be it flora, fauna or humankind. It is one of the most precious resources on earth, but it is not available ubiquitously. Its unique value is best felt where its presence is rare – the old proverb still rings true, you never miss the water until the well runs dry.

In an average European city of today, all inhabitants expect an unlimited supply of clean water coming out of their taps: for drinking, washing, cleaning, and enjoying it in all its dimensions. A regular supply of water is, of course, also needed for urban services such as maintaining parks and other green spaces, as well as for industrial and energy production. With climate change taking its toll more and more tangibly, a city that can’t guarantee a regular water supply any more will become less attractive to new companies looking to set up business. The same goes for a city that is frequently exposed to heavy rainfalls, but badly equipped to manage them without major damage happening to people, properties and infrastructure.

Managing water poorly at the local level severely affects a city’s quality of life, and its opportunities for developing sustainably across all sectors and layers of the local society.

What are the main water challenges local governments are facing?

One major issue is that a substantial proportion of the urban water infrastructure across Europe is coming to



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the end of its lifetime, and major investments for its rehabilitation or renewal are required. Decisions have to be long-sighted, while challenges are becoming more and more complex and for some of them no proper solutions even exist yet.

These challenges affect both water quality and quantity. In the European Union, we have an ambitious and globally acclaimed water policy, in particular the Water Framework Directive. But implementation is still lagging behind. Only approximately 40 percent of European surface water, for example, has been found to be in good chemical and ecological status.

Last year’s State of Water Report by the European Environment Agency found that waters in Europe are still exposed to significant pressures. These come from both diffuse pollution, such as excessive inputs of nitrate in agricultural production, as well as from point-source pollution, for example from industrial production.

Water quality is also increasingly affected by emerging pollutants – especially micro-plastics and pharmaceuticals, such as antibiotics. And mercury still plays a major role, at least in some parts of Europe. With the water cycle operating at a catchment scale, all of these substances arrive eventually in the urban water network.

- 1. Rendering of the Sidewalk Toronto project. Photo: Sidewalk Labs
- 2. Barbara Anton is a leading expert in the field of Urban Water Management at the European Secretariat of ICLEI.
- 3. Excessive inputs of nitrate in agricultural production, for example, put significant pressure on Europe’s waters. Photo: PI77
- 4. Emerging pollutants – especially micro-plastics and pharmaceuticals – are also increasingly affecting water quality. Photo: Hungchaka

In addition to water quality issues, climate change has caused both drought and flooding events to become more extreme and more frequent.

In particular, Southern Europe is suffering from summers that are becoming hotter and drier, but central and Northern parts of Europe are not spared. In fact, the areas most affected by drought during the prolonged heatwave in summer 2018, were mostly located in central and northern Europe.

On the other hand, many cities have experienced devastating floods in recent years, which are far beyond the scope of extreme storm water events that were to be expected from time to time in the last century or two.

Adding rising sea levels to the list, coastal cities are especially vulnerable. Just recently more than 80 percent of the city of Venice (Italy) was flooded after an unfortunate combination of high spring tides and a meteorological storm surge. The highest water levels in more than 50 years caused hundreds of millions of euro worth of damage.

How are cities and towns around Europe dealing with all these challenges?

The solutions are just as wide-ranging as the challenges. Innovative technologies, including digital tools, are indispensable, but more and more decision-makers also recognise the benefits of green-blue infrastructures and better urban planning.

The urban water cycle can only be managed effectively when understanding all its different components in a holistic manner: from water supply to water demand, from water consumption to waste water treatment, from

periods of too much to periods of too little water. Integrated approaches that also recognize the strong interlinkages with other sectors – such as energy and environmental management – turn out to be more efficient than managing water in isolation.

Citizen awareness is also key. Citizens can provide a significant contribution to saving water when supplies are going down in times of drought. Citizens are also instrumental in helping prevent flooding, for example by offering their share of unsealing the ground of private properties and disconnecting storm water from wastewater infrastructure. Local governments are well placed to spread latest information and also motivate ‘water-wise’ behaviour through financial or other incentives.



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What is important for urban water systems to contribute to mitigating or adapting to climate change?

Conventional wastewater utilities are significant energy consumers and can therefore substantially contribute to CO₂ emissions. Luckily, numerous new technologies have arrived on the market that can turn wastewater utilities from energy consumers into energy producers, for example by using the waste heat from the treatment process as a renewable energy.

The potential of water management in adaptation is even higher, since most

climate change impacts have an immediate effect on the water cycle. Crucial in this context is that water managers can’t do it alone. Urban planners, for instance, have to keep in mind where storm water is gathering and in which direction it is flowing in the case of extreme flooding events and ensure that it can be retained in selected spaces, or easily infiltrated into the ground. Sealed surfaces have to be replaced by porous, ideally natural ones. Green urban landscapes can include swales and retention areas that are at the same time pleasant to the eye, offer a multitude of leisure, health and aesthetic benefits and also serve the urban biodiversity. Water features, such as small open water channels, fountains or basins are effective means to counteract urban heat island effects.

- 5. Flood in Esztergom, Hungary, 2006. Photo: Villy
- 6. Acqua Alta flood in Piazza San Marco, Venice, Italy. Venice is especially vulnerable to floods: just recently more than 80 percent of the city was flooded after a combination of high spring tides and a meteorological storm surge. Photo: Jean-Pierre Dalbéra
- 7. The Cheonggyecheon Stream Restoration Project (Seoul) is a great example of flood protection. The stream, once artificially buried underwater and covered by an highway overpass, was brought to new life by the city. Not only the stream provides excellent flood protection and significantly reduce urban heat island effect, it also resulted in an increase of biodiversity by 639% in 5 years, and a diminution of small-particles air pollution by 35%.



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What water related projects is ICLEI currently working on?

Excitingly, ICLEI, alongside The Nature Conservancy, and Ecologic Institute, just recently launched a new report titled: ‘Investing in Nature for European Water Security’. In the report, we draw on extensive consultation, existing experiences, and case study research to provide a strategic vision for scaling-up Nature Based Solutions NBS for water security in Europe, including overviewing the role of NBS and examining investments in these solutions.

Cities such as Paris (France), Munich or Augsburg (Germany), for example, have provided incentives to farmers in areas where their water supplies come from in order to encourage them to apply more organic farming practices. In turn, money is saved locally through

less requirements for treating water to make it fit for human consumption. The publication contains several other examples providing evidence that it can be economically sensible to choose green – or hybrid – over grey solutions both for tackling water quantity as well as quality issues.

Let me also mention the [Connecting Nature](#) project, which is funded through the European Commission’s Horizon 2020 programme. A major topic explored through the project is how water and climate resilience can be achieved through nature-based solutions.

Through the project, the City of Glasgow (United Kingdom), for example, has implemented a comprehensive storm water management system comprised of permeable paving, swales, rain gardens, and balancing ponds in the Athlete’s Village, a legacy of the 2014 Commonwealth Games. Or to pick a

completely different example, the City of Poznań (Poland) has made great strides in re-connecting its citizens to the river Warta, by creating municipal beaches and opportunities for numerous other leisure activities. Doing so they also aim to provide thermal comfort zones for the inhabitants suffering from the urban heat islands during the summer when the heat reaches its peak.

Also financed by the European Commission is the [INCOVER](#) project, which ended earlier this year. The project investigated technologies for the recovery of resources from wastewater. Local governments striving to become a circular city should pay close attention to the potential of such kinds of technologies. The ones developed by INCOVER make it possible, for example, to extract nutrients from wastewater for the production of bio-fertiliser, or to generate PHA, a feedstock for bio-plastics.



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How would you describe your ideal city of the future and how would it deal with water?

The city of the future is a ‘water-sensitive’ city. The water cycle – both its natural as well as its man-made dimension – is fully incorporated into the urban design. Water is visible in the city’s landscape. Water users are conscious about its value and the costs of polluting it. And people have ample opportunity to enjoy its benefits without disturbing its ecological balance.

Water is handled as a part of the city’s metabolism. A multitude of valuable materials are being extracted by the local wastewater utility, and the energy and other products contribute to the local economy. Reclaimed water is returned to urban uses such as for

irrigating public spaces and cleaning streets or municipal facilities.

Water is a top priority and water managers work closely with their colleagues from other departments to ensure all water services run smoothly. They work to ensure that a mutually beneficial relationship with the public around water is in place and, also that the city is ready to stand against the vagaries of climate change! ●

8. Municipal beaches along the river Warta, Poznań (Poland). Photo: MOs810

9. A great example of nature-based solution, rain gardens or bioretention areas are designed to reduce the flow rate of stormwater, while remediating and filtering pollutants carried by urban runoff. Photo: Psa1966

The Same Coin: Hydropower Dams and the Biodiversity Crisis

WRITERS: **CLAIRE BAFFERT AND SOPHIE BAUER, WWF EUROPEAN POLICY OFFICE**

Dive below, look high above or walk along the banks – whichever way you look, our rivers, lakes and wetlands are teeming with wildlife. They’re home to over 140,000 species, including 55% of all fish species.¹ And let's not forget the rest of the gang – from amphibians and mammals to thriving birdlife, these ecosystems host it all - yet the reality is these habitats are under increasing pressure by the influx of hydropower dams, putting biodiversity at great risk.

In Europe, all freshwater ecosystems are protected under European Union law. But, despite this, these habitats are being degraded and destroyed to fuel unsustainable industries, such as industrial agriculture and hydropower. While hydropower is often regarded as “green”, the dams needed to operate the plants have an enormous impact on rivers and biodiversity – but the sector is booming in Europe, demonstrating a blatant disregard for these water and nature protection laws, which should limit hydropower plants.

WWF, together with other environmental groups, commissioned a study to find out how serious Europe’s addiction to hydropower is. The results, released last month, are sobering.² With 21,387 existing hydropower plants, Europe’s hydropower potential has been well and truly harnessed. And, yet, a staggering 8,785 additional plants are planned or under construction, more than 4,000 of which are in the Balkans and Eastern Mediterranean. This region holds some

of the healthiest, most pristine rivers in Europe and many vulnerable species. Over 90% of all the existing and planned hydropower plants in Europe are small, meaning that each plant generates a measly 10 MW of electricity tops.

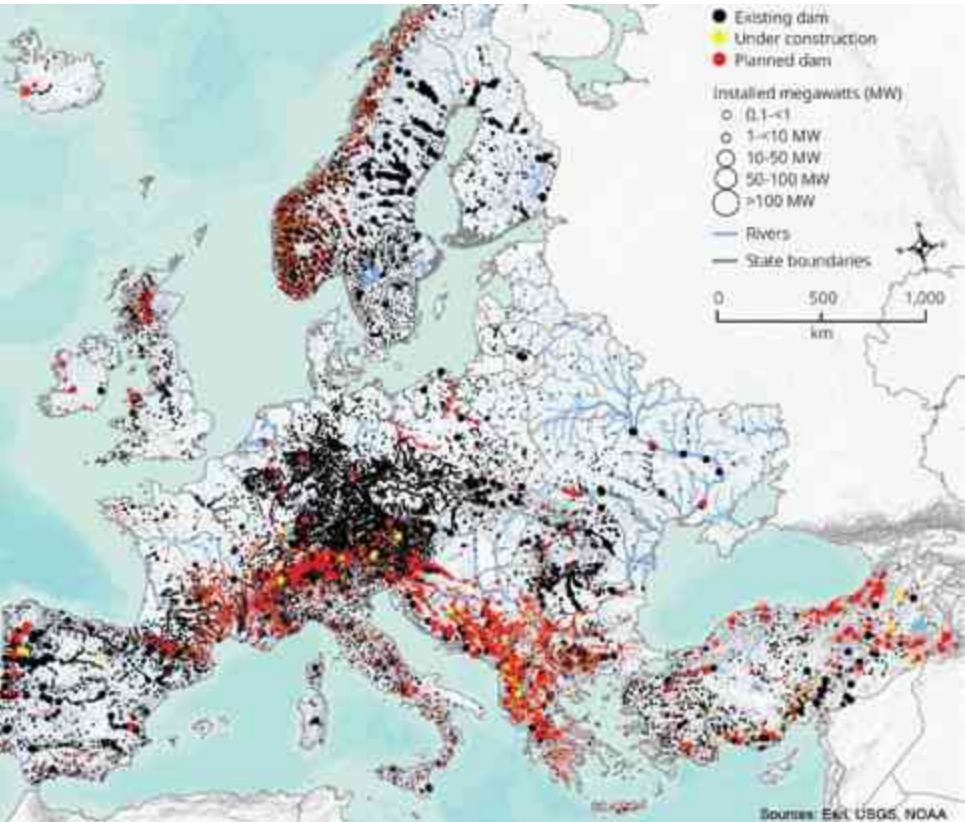


Freshwater species are the most threatened on the planet

An 83% decline in the freshwater species population has been recorded in the past 50 years alone.³ This bleak pattern is reflected all across Europe, where we are experiencing the most significant deterioration of rivers and biodiversity decline to date, with freshwater fish and mollusks being the most threatened. This is happening in spite of existing legislation – the EU Water Framework Directive – under which Member States must ensure all rivers are healthy by 2027.

1. IUCN
2. WWF, EuroNatur, GEOTA, RiverWatch, 2019, [Hydropower pressure on European rivers: the story in numbers](#)
3. WWF, 2018. [Living Planet Report 2018](#)
4. Hydroelectric power station in Arribes del Duero called Mirador de Iberdrola in Salamanca. Photo: Jose Luis Vega





While centuries of abuse have sparked this decline – including pollution and excessive use of water – it is physical change to the shape and flow of rivers which creates the biggest pressure. And for that, hydropower has a lot to answer for. If ever built, it is estimated that the new generation of hydropower dams evidenced by the study could be the kiss of death for up to 30 freshwater fish species.⁵

Big risk, small gain

Hydropower may be a renewable energy source, but it isn't green. The dams needed to harness this natural power destroy both rivers and their surrounding environment, changing a river's natural flow, blocking fish migration routes and trapping sediments that protect riverbanks and deltas against floods and sea level rises. Moreover, they release methane and CO₂ from their reservoirs (and are therefore not climate neutral). Hydropower dams also rely on a healthy supply of water. With droughts and water scarcity on the rise, it is not a climate resilient source of energy.

To add insult to injury, more than 90% of all the existing and planned hydropower plants in Europe are small, meaning that each plant produces less than 10 MW of energy. If all the planned small hydropower projects outlined in our study were carried out, their contribution to the total net electricity generation in the EU would only be between 0.2 and 2%. Compared to wind and solar, this is hardly worth getting out of bed for, let alone the destruction of Europe's

last remaining free-flowing rivers. In addition to supporting our freshwater biodiversity, we need these rivers to recharge vast networks of underground water, maintain floodplains that are essential to agriculture and flood protection, and protect pristine sceneries that have an immense value for recreational and business activities.

Protected on paper, not in practice

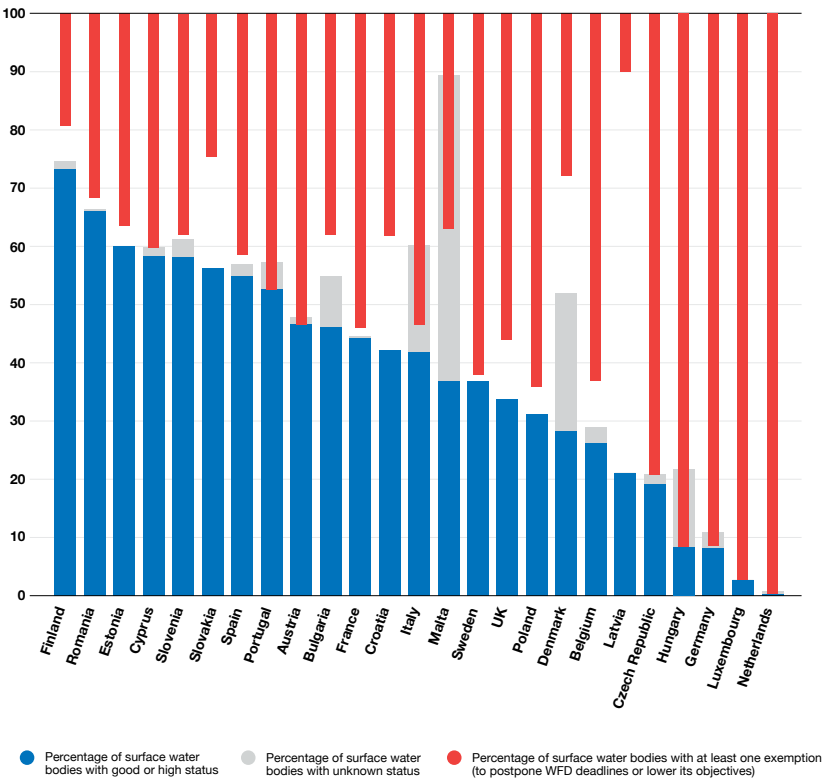
Protected areas – such as national parks, Natura 2000 sites and natural reserves – are protected for a reason. They offer a safe haven to Europe's most threatened biodiversity, as well as the continent's last handful of pristine, free-flowing rivers. In the EU, these areas are also protected under EU legislation – the EU Birds and Habitats Directives (BHD) and EU Water Framework Directive (WFD).

But, all over Europe, these laws are being broken to allow more hydropower. More than a quarter of all planned hydropower in Europe is in protected areas, the overwhelming majority of these in Natura 2000 sites.

Under the WFD, any project that could lead to the deterioration of a river in the EU is against the law. The principle can only be challenged through so-called "exemptions", which were set-up when the law first came into effect in 2000, to be used in exceptional cases only. But these exemptions are being handed out to Member States like a "get out of jail free" card: 53% of EU rivers are covered by at least one exemption, many of which are to allow more hydropower plants to be built.

And that's where the process is even used – new hydropower plants are often built without even asking for an exemption in the first place.

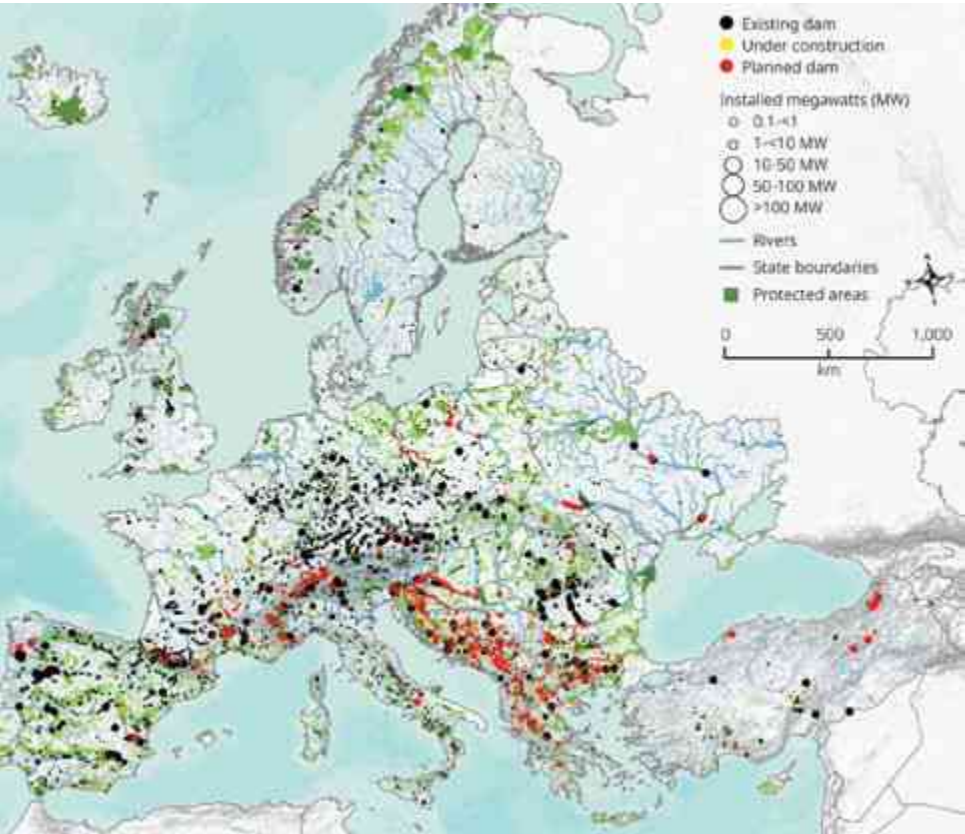
Ambition to make the EU water law work is low amongst member states



The use of exemptions to the EU Water Framework Directive is rampant among Member States. The graph shows that countries where the state of water is especially dire are those employing the most exemptions - either to postpone the law's final 2027 deadline for bringing freshwater ecosystems to "good status", or to lower the law's objective. © WWF European Policy Office. Data source: EEA WISE (2018), (WFD reporting EC dashboards)

The EU water law is critical for the European Green Deal

The European Commission cannot continue "business as usual" and allow its own laws to be breached and misused. In December 2019, the European Commission's final evaluation of the WFD concluded the law to be "fit for purpose", acknowledging that its objectives "are as relevant now as they were at the time of the adoption". The decision concluded a two-year evaluation of the law (known as a "fitness



5. Steven Weiss, 2019.
6. European overview map, © FLUVIUS, commissioned by WWF, RiverWatch, EuroNatur, GEOTA
7. European protected areas map, © FLUVIUS, commissioned by WWF, RiverWatch, EuroNatur, GEOTA
8. Common Frog, Ambleside, UK. Photo: WWF

check") and sets the EU back on course to bring life back to its rivers through full implementation and enforcement of the WFD.

WWF is a staunch advocate of the WFD and strongly supports these conclusions. But the proof will be in the pudding - the Commission must now do everything in its power to ensure that the law's impact is no longer gutted by shoddy implementation, lackluster enforcement, and abuse of exemptions - especially when these are to allow additional hydropower plants to slip under the net.

The WFD is the best barrier to hydropower development. By taking a holistic approach to preserving rivers and their ecosystems, the law mirrors the ambition of the European Green Deal. The European Commission must keep this

Spotlight on: Austria

With more than 4,000 existing plants, Austria is one of the countries with the most hydropower. Despite this, it continues to invest in it – over 100 additional plants are on the cards. A recent study from WWF Austria and ÖKOBÜRO found that less than a third of the permits authorizing new hydropower plants were not in line with requirements of the EU Water Framework Directive, which oblige Member States to go through an exemption to the law to justify building infrastructure that causes deterioration to a river. A large number of them just bypassing the established exemption process.

legal barrier strong, and ensure it works not just on paper but in practice. Any weakening of its standards will put a serious question mark over the credibility of its European Green Deal.

The time to act is now: Biodiversity is sky-high on the new European Commission's agenda and the 2020 Conference of the Parties to the UN Convention on Biological Diversity offers a tremendous opportunity to create a "Paris climate agreement" moment for biodiversity – while the Convention has existed since 1992, in 2020, this meeting will be pivotal for biodiversity conservation, as a post-2020 Biodiversity Strategy will be agreed upon for the following decade. The EU will operate as a single block at the table and the European Commission's new president has promised to "lead the world" and "work with its global partners to



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curtail biodiversity loss within the next five years".

If the Commission is indeed serious about positioning itself as a champion for biodiversity, it needs to tackle the issue at the source. Hydropower is incompatible with the EU's objective of halting biodiversity loss, its objective of having clean, healthy rivers, incompatible with the new European Commission's mandate.

Spotlight on: Portugal

Portugal's Tâmega Hydropower Scheme is financed in large part by the European Investment Bank (EIB). According to campaigners, this is in direct contradiction with the EIB's own guidelines on hydropower investment not undermining EU nature protection rules and being subject to a proper environmental impact assessment. The ongoing construction of the Gouvães hydropower dam on the Torno River, a tributary of the Tâmega, is expected to flood part of the Alvao-Marão area – a Natura 2000 site and crucial habitat for threatened species such as the European otter, the Iberian wolf or the Pyrenean desman. According to our recent study, Portugal is one of the few Western European countries continuing to build large dams rather than focusing on pumped storage or refurbishment of existing turbines.



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9. Dead fish near hydropower dam.
Photo: Amel Emric / Blue Heart Campaign

10. Drawing of Pyrenean desman.
Illustration: WWF / Helmut Diller

In conversation with Dr. Steven Weiss

FRESHWATER BIODIVERSITY EXPERT & ASSOCIATE PROFESSOR AT THE UNIVERSITY OF GRAZ, AUSTRIA

How do hydropower dams affect freshwater biodiversity?

Depending on the type and size of the plant, hydropower affects biodiversity in many different ways. The number one impact is habitat destruction. Additionally, with many plants being built, the whole river network becomes fragmented and fish aren't able to move up or downstream to fulfil their lifecycle needs.



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Additionally, certain plants function with what is known as "hydro peaking", which is highly destructive. Water is released at certain times of the day to meet peak demands for energy. In a matter of minutes, spawning and rearing grounds can go from being several centimeters or a meter or more deep to being completely dry. The fish don't have time to respond and are left stranded. Although your

so-called run-of-the-river plants don't have hydro peaking, they all accumulate fine sediments, which must be periodically flushed from the reservoir.

Which species are at risk should the planned hydropower plants go ahead?

All of Europe's large iconic species, such as the Atlantic salmon, European eel, the last surviving populations of sturgeon, would be impacted by these plants. In southern Europe, the Balkans in particular, there are many hotspots, as this is where the highest concentration of endemic biodiversity is found – virtually all of the endemic fish species in the Balkans would be threatened with massive reductions should the planned plants go ahead.

Is it just fish that are impacted?

Many species are impacted by hydropower, including lots of insect life, which are a basic building block in the food chain of the whole riverine ecosystem. Hydropower dams do indeed affect fish directly but also riverine life more broadly – such as semi-aquatic wildlife (like fish otters) and a wide array of birdlife, particularly fish-eating birds like kingfishers or pelicans. The projects also affect the terrestrial landscape, including species like the lynx, wolf

and local deer species, as they can't carry out their normal migratory pathways due to the fragmentation caused by the construction of the plants and reservoirs.



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So, what needs to happen?

First and foremost, we need to recognize and uphold existing legislation. Wildlife refuges, Natura 2000 areas and other nature reserves – all these areas need to be protected in the way they were meant to be protected. We also need to recognize that we don't have an energy crisis but an environmental crisis, and climate change is only one dimension of that. We can't tackle the climate crisis without taking nature protection seriously – the two are inseparable. ●

11. Fish-eating birds, like the red-tailed tern, are affected by the impact of hydropower on the whole riverine ecosystem. Photo: Goran Safarek

12. Beaver, Austria. Photo: Leopold Kanzler

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VIEWS

A Journey to the End of the World

Photography by Jack Pan.

This is a collection of photographs from a research expedition to the eastern Antarctic Peninsula in 2018. A group of international oceanographers and atmospheric scientists embarked on this journey in Lyttelton, New Zealand, where the researchers and crew boarded the South Korean ice-breaking research vessel, ARAON. The vessel sailed across the Antarctic Circle and eventually arrived at its destination in the Weddell Sea region of the Antarctic Peninsula. During

this expedition, research activities were carried out which included helicopter operations, anchoring near the King Sejong Station, and sea ice and water column sampling. Finally, the vessel crossed the Drake Passage and docked in Punta Arenas Chile where the expedition concluded.

To view more photographs from this series, visit: 500px.com/byjpan/galleries

▲ Antarctic Landfall

Arriving at the continent after nearly 4 weeks of drifting at sea.





▲ James Ross Island

Eastern Antarctic Peninsula
in April 2018.



▲ **Antarctica** Stormy sea near the Antarctic Continent.



▲ **Research vessel ARAON** Korean Polar Research Institute (KOPRI)'s icebreaking research vessel ARAON docking next to a sea ice float.

▼ **Weddell Sea** American and South Korean researchers sampling sea ice in the Weddell Sea.



▼ **King Sejong Station** A corner of the King Sejong Station (S. Korea) on King George Island.



▼ King George Island.

The Glacial-marine interface in Maxwell Bay, King George Island.





▲ Research vessel ARAON Professor Mônica Petti sampling benthic organisms from the sea floor on board of KOPRI's icebreaking vessel ARAON.

▼ Research vessel ARAON A sea ice scientist's observation log on the bridge of ARAON.



▲ King George Island Pieces of glacial ice in Maxwell Bay, King George Island.

▼ Antarctica The south polar skua (Stercorarius maccormicki), often called "the raptor of the south".



▼ Weddell Sea

Weddell Sea, between James Ross Island and the Eastern Antarctic Peninsula



▼ King George Island

Glacial ice pieces washed ashore in Maxwell Bay, King George Island.



▼ Larsen Area

The massive iceberg A-57A originated from the Larsen Area can be seen on the horizon.





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▲ Weddell Sea

A Weddell Seal resting on a piece
of sea ice.

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INTERVIEW WITH
COLOMBE CAHEN-SALVADOR,
CO-FOUNDER & CO-EXECUTIVE
DIRECTOR OF NOW!



What is NOW!?

NOW! is the global movement pushing for humanity to work as One, to solve the biggest challenges of our time.

The idea is that some issues are bigger than countries or even continents, and as a result are not being solved. It is the case of climate change, nuclear proliferation or fiscal justice, but also of many more. Indeed, curbing the effects of climate change, striving to live in a nuclear weapon-free world, or taxing appropriately multinational digital companies requires a higher level of cooperation between countries, regions, intergovernmental institutions, and even citizens, in every corner of the world.

This is exactly why we created NOW!: we believe that humans from all over the world have a huge power when they

unite for a common cause. Thus, from calling for referendums, to lobbying elected officials, organizing protests, levying influencers' voices, supporting political candidates who stand for our beliefs, and using civil disobedience when needed, we will push for concrete change across continents to fight for our future.

We are launching on January 1st, 2020: we need a new movement for a new decade of change and hope!

What does the climate crisis mean, really?

The climate crisis is the reality in which we are living because of decades of unchecked pollution, deforestation, over-consumption etc. Without radical changes, the realities of this planet will change so drastically to make life on Earth way more difficult than it is today, if not impossible. This has been widely documented by scientists across the world. It's a crisis as we have very little time left to change the tide, and no choice but to do it! Yet, it's not being dealt with adequately by governments, nor intergovernmental organizations. The good news is that we already see people uniting across the world and a lot of awareness being created thanks to the amazing job of the youth and of NGOs. Now, we need to ensure that this energy is converted into concrete impact, into laws.

How is NOW! going to bring results?

While great examples of global mobilization exist in the digital space or related to a particular topic, there is no other movement that mobilizes people across the world to implement into law

clear common solutions to the world's biggest issues, and to better the current global system of governance.

NOW! aims at filling this vacuum, as a global movement that can leverage youth activism and advance, strategically and conclusively, complex policy solutions on several fronts both in democratic and authoritarian regimes. NOW! will do the work that cannot possibly be done today: join forces across borders, political lines, and issues to bring about simultaneous and radical change. As the movement present everywhere in the world, it will leverage volunteer involvement and advanced campaign methods to strategically and conclusively advance common solutions in the form of legislation across the globe. This means that we will be able to solve global challenges together: our long term goal is for humanity to be able to move forward as One thanks to more transnationalism, and to have solved some existential threats together. We know, that's no small task, but we cannot wait for others to do good, we ought to try ourselves.

Does NOW! emanate from Volt?

While Andrea and I are two of the three co-founders of Volt, and the two co-founders of NOW!, this is a different endeavour in form, aims and means. Indeed, Volt is a political party present across Europe, with the aim of reforming the EU and working as one on European issues, by running for elections. And it already had a few victories, including by electing someone to the European Parliament. Volt is thus on track and will continue to go forward.

However, despite the successes of many political parties seeking social, environmental and economic progress, we are no closer than three years ago to

curbing the effects of climate change, taxing appropriately multinational digital companies, guaranteeing and upholding the rights of all humans equally, managing earth's resources in a fair manner or ensuring safe migration. Unfortunately, the list could go on. And time is running out: humankind might become extinct by 2100 because of climate change, and even before in case of nuclear disasters.

And this is exactly why we created NOW!, which on the other hand, is a people's movement that is global: some issues go beyond countries and continents, and can only be solved together. We need to use peaceful means to push forward legislation in countries and continents across the world that are coherent enough to give us a chance to solve global issues, and push the world to act as one.

In brief, just like a national baseball team cannot play in a global league that does not exist, political parties cannot partake in nonexistent global elections to score a homerun. This leaves a vacuum, and a huge one for that matter. And this is where NOW! comes in. Moreover, the non-electoral nature of NOW! will allow for collaboration with political parties, nonprofit groups, business leaders, influencers, etc. NOW! will do the work that cannot possibly be done today: join forces across borders, political lines, and issues to bring about simultaneous and radical change.

What will be your first activities?

On January first, we will launch our 1st global campaign, followed by three others at least in 2020. We will launch those campaigns across continents, testing different methods of mobilization and seeing how they lead to effective

change. We already announced the broad thematic, and more details will be published online at the launch: women's rights, fiscal justice, climate change.

We will at the same time start involving volunteers across the world thanks to our membership system and tech infrastructure, and grow the movement as much as possible!

We decided to do a pre-launch mid-October to sell memberships ahead of the launch and enable us to set up our IT and digital infrastructures (website, design, management software), cover administrative costs (office rent, notary fees, and HR & payroll services), and start hiring. ●

NOW!

NOW! is the global movement pushing for humanity to work as One to solve the biggest challenges of our time.

When contemplating that the next generations will die because of climate change if nothing changes, that we live in societies where wealthy corporations don't pay their fair share of taxes, or that authoritarians and populists are increasingly taking away our rights, you cannot avoid feeling powerless. Can your actions actually change the tide? Can your voice be loud enough?

The answer is yes. Pre-order your membership to NOW!. Don't hope for others to do good; do it yourself.

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Almar: Deploying Water Solutions Globally

2019 has been an important year for Almar Water Solutions. After three intense years of work, in this last year, the company has consolidated its portfolio of projects with the addition of two contract awards in Saudi Arabia and Kenya, an acquisition in Bahrain, a strategic agreement in Egypt and the acquisition of a water treatment company in Chile. More water work is underway to continue Almar Water Solutions' expansion plans in 2020. The Middle East and North Africa (MENA) is the world's most water-scarce region. Water stress in MENA is greater than in any other region of the world and their natural resources, in addition to being the most scarce, are also the most variable and unpredictable.



According to the latest data available from AQUASTAT, the average of water resources worldwide is 7,453 m³ per person per year, while in the Arab region it is just 736 m³. In addition, per capita water scarcity has been increasing and will continue this trend due to population growth and the consequences of climate change, contributing to groundwater depletion, the loss of farmland for agricultural production and the displacement of people due to the lack of water resources.

It is for this reason, and as a result of the location of its parent company, Abdul Latif Jameel, that Almar Water Solutions is focusing its efforts on

developing new water infrastructure in areas such as the Middle East and Africa.

Hosting 6% of the world's population, the MENA region has just 1% of the world's freshwater resources. This means that unconventional water sources (desalination in particular) play a key role in the region's water-supply portfolio. MENA accounts for almost 50% of the world's desalination capacity, and its growth and consolidation have been made possible in part by lower energy prices and technological improvements, which have reduced plant operating costs. Innovations in membranes and renewable energy

supply can even contribute to increased adoption of unconventional sources of supply across the area.

Developed by Almar Water Solutions through Abdul Latif Jameel CDC, the Shuqaiq 3 Desalination Project is perhaps the most significant because of the plant's large capacity, among the largest in the world, and due to how quickly its financing closure was obtained and construction started. With a capacity of 450,000 cubic meters per day of water production, Shuqaiq 3 will supply almost two million people in the region and will be developed under a 25-year PPP model. The project is currently under construction.

Last October, Almar Water Solutions, together with representatives from Abdul Latif Jameel, held the ground-breaking ceremony at the location chosen for the plant's construction, on the shores of the Red Sea, approximately 137 kilometers to the north of Jizan, in Saudi Arabia. That same month, the project received the "Utilities Project of the Year" award at the 2019 Middle East Energy Awards held in Dubai, making it one of the most emblematic projects in the region.

Another one of the projects awarded in 2019 was the first large-capacity desalination plant in Mombasa, Kenya. Located in the North Mainland area of Mombasa County, the project will

provide drinking water to more than one million people. The plant will be managed and operated for 25 years, until it is handed over, and is currently in the financial closure process.

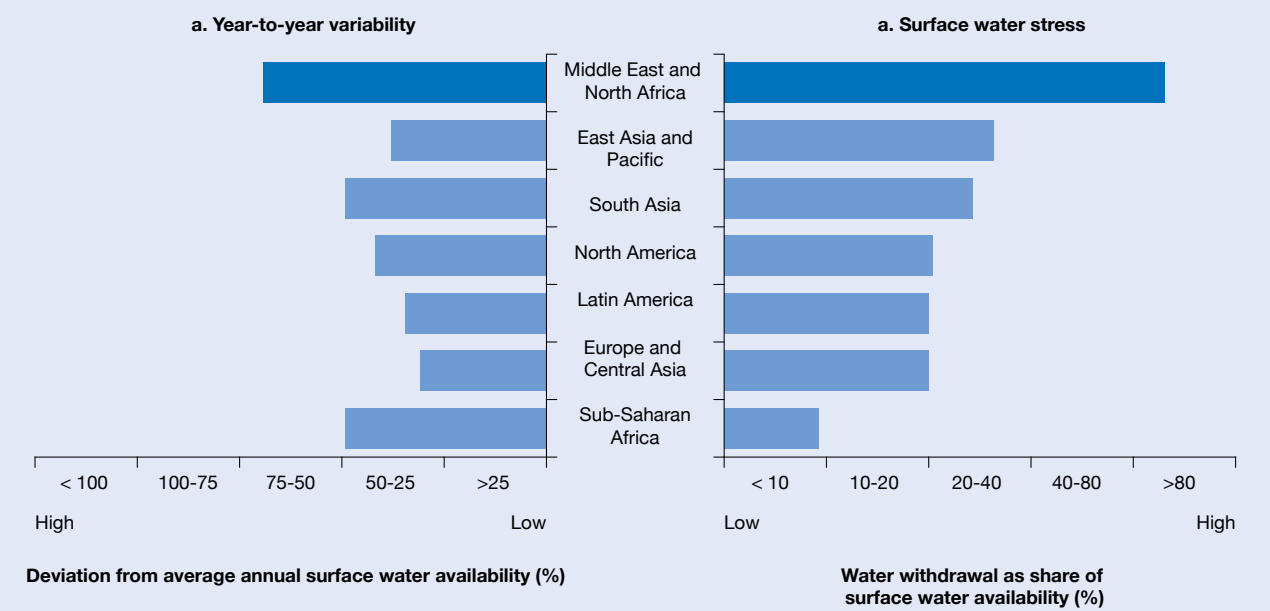
Sub-Saharan Africa is a region that poses significant challenges in the water industry due to its population growth, advances in economic development and the severe effects of climate change. Desalination is an unconventional source of water that will help to alleviate water stress in the region and will contribute to the progress of its community. In particular, the Mombasa desalination project will alleviate the current water crisis in the county, which has been

experiencing interruptions in its drinking water supply for several years.

In 2019, Almar Water Solutions also acquired the stake of Mubadala Infrastructure Partners in the wastewater treatment plant of Muharraq STP Company BSC.

More than half of the wastewater produced in the Middle East and North Africa is not treated, which degrades water quality and increases public health risks in the region. The percentage of wastewater that is treated differs greatly throughout the region, with some countries treating all wastewater and others treating less than 10 percent.

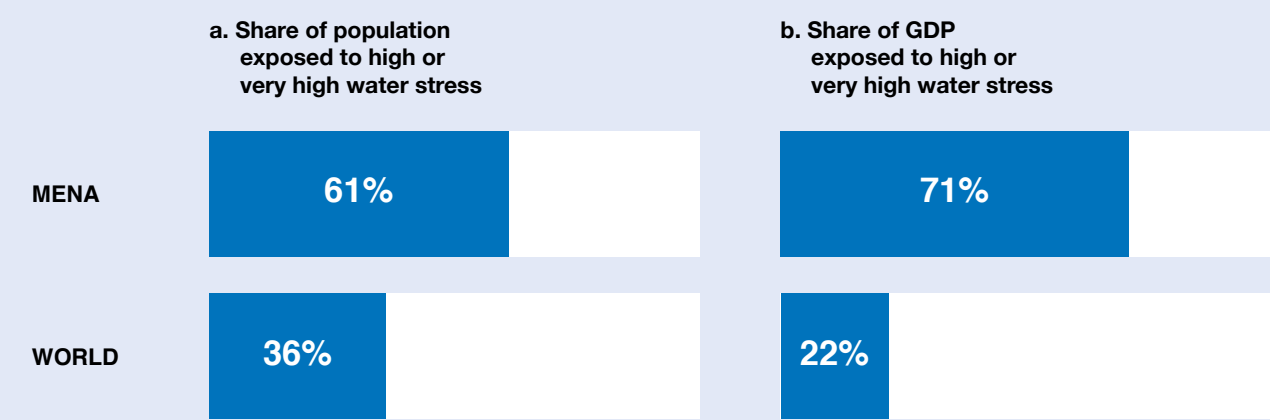
Figure 1: Water stress and year-to-year variability in surface water, by world region



Source: World Resources Institute Aqueduct™ database.

Note: Water stress measures total water withdrawal as a percentage of total surface water availability. It does not account for dependence on transboundary water sources or nonconventional water sources. Year-to-year variability measures the percent deviation from mean annual surface water availability.

Figure 2: Share of GDP produced and population living in areas of high or very high water stress in the Middle East and North Africa compared to world averages



Source: Estimates for the Middle East and North Africa are from World Resources Institute Aqueduct data. World averages are from Veolia Water and IFPRI 2011.

Note: High or very high water stress imply that water withdrawals are 40 percent or more of surface water resources availability.

The Middle East and North Africa accounts for almost 50% of the world's desalination capacity.

WATER SOLUTIONS

Almar Water Solutions, committed to the sustainability and availability of water worldwide, and in MENA in particular, has acquired Muharraq's state-of-the-art wastewater treatment plant, with a capacity of 100,000 cubic meters per day and a wastewater channeling system, in the Kingdom of Bahrain. With this plant, the company confirms its commitment to increase unconventional water sources in the MENA region, with the aim of supplying both the population and the economic and industrial sectors of the region.

Lastly in MENA and particularly in Egypt, the company set up a joint venture with the public services and investment unit of the region's leading construction and engineering group, Hassan Allam Holding (HAH), Hallan Allam Utilities, to develop BOT and BOO water projects in the country and acquire industrial assets and O&M service companies, thus consolidating its leadership throughout the Middle East and Africa region.

According to a World Bank study on water security in MENA, since 1990, the Middle East and North Africa region has had some of the best results worldwide in increasing and improving access to water supply and sewerage services. Technological innovations and private sector support and investment are improving water quality and efficiency in areas where water infrastructure was scarce or simply did not exist.



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1. Cover: Desalination plant, Dubai. For illustration purposes only. Photo: Shao Weiwei.

2. Earthworks at Shuqaiq-3 IWP on the Red Sea coast of Saudi Arabia. Photo: Alma Water Solutions.

3. The Shuqaiq 3 Desalination Project, under construction, will supply almost two million people in the region. Photo: Alma Water Solutions.

4. Water desalination reverse osmosis membrane technology. Photo: Alma Water Solutions.



4

Another geography that presents great challenges due to its geoclimatic and structural conditions is Latin America where, in November 2019, Almar Water Solutions acquired the Chilean water treatment company Osmoflo SpA with the aim of starting its third-party operation and maintenance service activities, reinforcing its portfolio with new references in desalination, potabilization and wastewater treatment, and having access to infrastructure development in the region. Almar Water Solutions, with a highly qualified team and extensive experience in MENA and Latin America, is the ideal partner as a specialist in the development, financing and operation of innovative projects that ensure the supply of water for human, agricultural and industrial consumption. ●

**Hosting 6%
of the world's
population, the
MENA region
has just 1%
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freshwater
resources.**

4. Almar Water Solutions has acquired Muharraq's wastewater treatment plant, in the Kingdom of Bahrain, with a capacity of 100,000 cubic meters per day and a wastewater channeling system. Photo: Alma Water Solutions.



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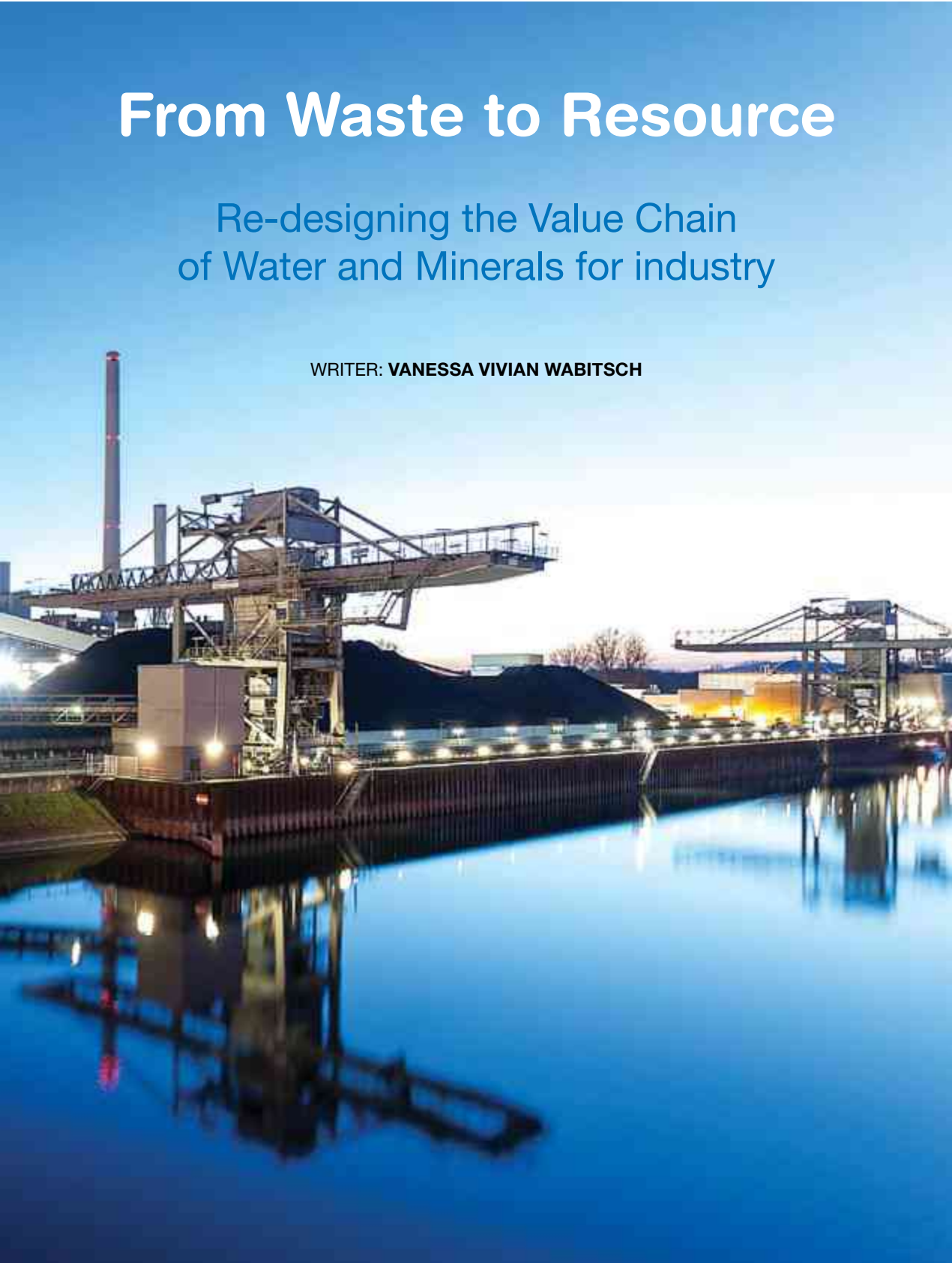


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From Waste to Resource

Re-designing the Value Chain of Water and Minerals for industry

WRITER: VANESSA VIVIAN WABITSCH

A new economy is emerging; one that is always keeping resources at the highest value and making use of all resources – known as circular economy. There is no waste, there is reuse – a concept that nature successfully applies for hundred thousands of years. The innovation project ZERO BRINE is advancing circular business models for process industries by redesigning the value chain of water and minerals.

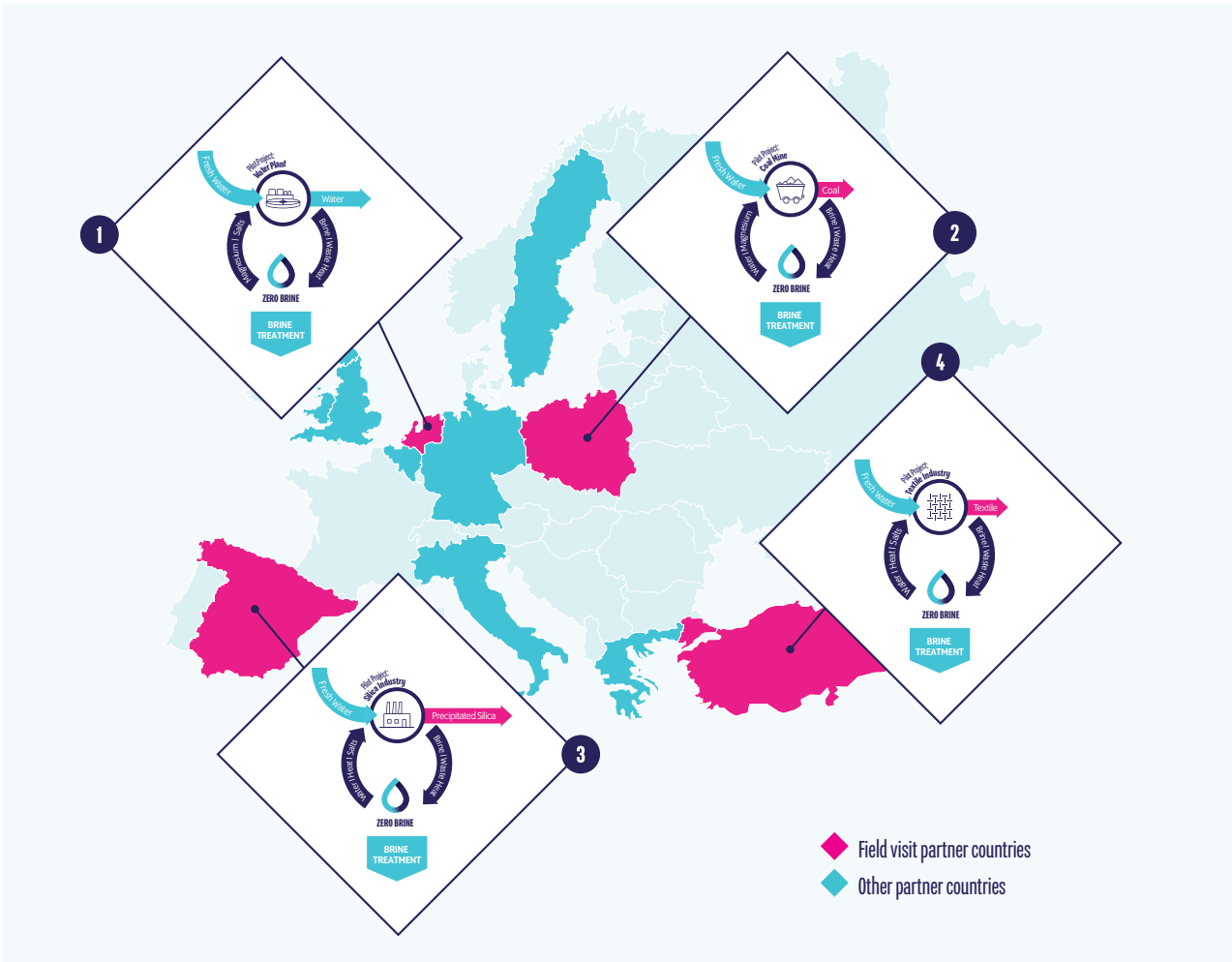
Brine discharge, or complex saline-impaired effluents, are a major threat to the environment. Process industries are a major source of brine discharge,

with the chemical industry alone producing 11.5 million tons of brine every year going along with high costs to manage. The good news is that brine is not just grey wastewater: industrial brine can contain many salts, chemicals, minerals, metals, other organics resulting and water from manufacturing and processing.

The innovation project ZERO BRINE funded by the European Union is developing a circular economy approach for the recovery of all resources from the brine generated by process industries – a disruptive method demonstrating a new way to deal with industrial wastewater. ZERO BRINE is redesigning the value and supply chain of water and minerals by recovering high quality water,

salts, minerals, metals, and even heat for use in the same factory or surrounding industries, thus closing the loop on the vast amounts of resources that are lost in current processing methods. At a time when EU is 100% import dependent on critical raw materials such as magnesium, the ZERO BRINE technology offers many benefits for harvesting second generation materials from wastewater. The ZERO BRINE solution contributes to the competitiveness of European industry whilst being in harmony with the environment.

1. Coal-Fired Power Plant. Photo: Bim
2. Map of the ZERO BRINE pilot plants



Replicating and scaling circular opportunities

ZERO BRINE technology can be replicated and adapted to wastewater from various industries demonstrated at the four demonstration plants across Europe: At the industrial cluster of Rotterdam Port in the Netherlands, the demineralized water supplier Evides Industriewater, at the silica factory IQE in Spain, in a coal mine in Poland operated by the Silesian University of Technology and in a textile factory in Turkey at ZORLU Textile Energy Group. These large-scale demonstration plants provide the potential for immediate replication and uptake of the project results after their successful completion.

Industrial symbiosis will play a key role in cutting down costs but also environmental impacts through waste heat recovery. To facilitate market uptake,

ZERO BRINE developed an Online Brine Platform, a web platform to connect industry, technology providers and end users. This digital platform will advance the industrial cooperation in Europe and worldwide, provide effective brine treatment solutions to process industries and ensure extensive knowledge exchange and dialogue between key stakeholders. In addition, five Brine Excellence Centers integrated in partner organizations in the Netherlands, Italy, Greece, Poland and Spain will provide the opportunity for end-users to test and develop customized and validated brine treatment solutions.

ZERO BRINE is a good practice for circularity in Europe that can increase efficiency and productivity, decrease costs and create jobs in harmony with the environment. With innovative technology, business cases, supportive policy and a mindset for collaboration the circular economy has good potential to become the new mainstream.

Interested in brine stream valorization? Join European frontrunners seeking circular business opportunities!

The Online Brine Portal brings together content from various sources in a single web page and facilitates the use of the Online Brine Platform.

The portal enables consultation and consensus building with the relevant stakeholders, facilitating the exchange of information and data produced by ZERO BRINE project.

obp.uest.gr/portal

Demineralized Water Plant, Evides

ROTTERDAM, NETHERLANDS

At the Demi Water Plant (DWP) of Evides in the Botlek industrial area, ZERO BRINE demonstrates the circular economy approach to treat industrial wastewater through redesigning the current brine treatment process from a linear to a circular model recovering all the resources. A large-scale demonstration plant is tested at PlantOne, a test facility focused on sustainable technology and innovation in the Energy Port and Petrochemical cluster of Rotterdam Port, by using the waste heat from one of the factories in the port. The objective is to recover Ca- and Mg-salts as well as demineralized water from the discharges of the water-softening unit. The quality of the recovered products will be aimed to meet local market specifications.

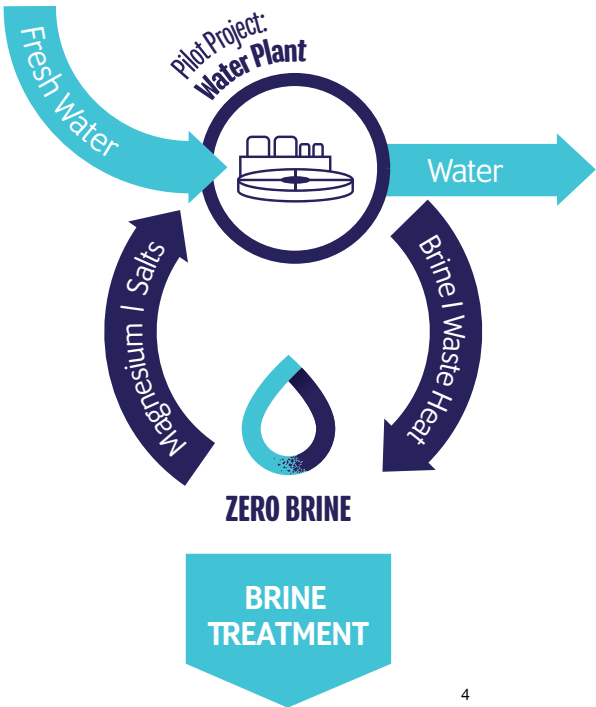


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4

Business opportunities

Industrial saline impaired effluents (brines) are an environmental challenge and an economic opportunity. The following materials with potential commercial value are recovered on the two sites that will be used in the same factory by Evides or in the industrial area Botlek:

- High purity magnesium & calcium
- Clean Water
- NaCl regeneration solution
- Sulphate salts
- NaHCO3
- Clean Water
- NaCl regeneration solution

3. Evides Demineralized Water Plant. Photo: REVOLVE

4. Water plant pilot project concept diagram.

Coal Mine Bolesław Śmiały, Silesian University of Technology

ŁAZISKA GÓRNE, POLAND

Saline wastewaters are a concern of many industries. The coal mining industry is particularly affected: every year Poland discharges around four million tons of sodium chloride (salt) into rivers, coming mainly from coal mines. This causes environmental damage and economic strains due to pollution fees. ZERO BRINE aims at providing a technological solution of the saline wastewater problem for the coal mining industry. The ZERO BRINE technology is expected to decrease the energy consumption in the production of concentrated brine by 50% (target: 22 kWh/m³ of brine treated), compared to the vapour compression technology already used in Czerwionka-Leszczyny. The technology will also allow the recovery of raw materials: evaporated salt or concentrated brine, which both have multiple applications in the chemical industry, as well as magnesium hydroxide, which is a valuable commodity in the refractory materials industry.

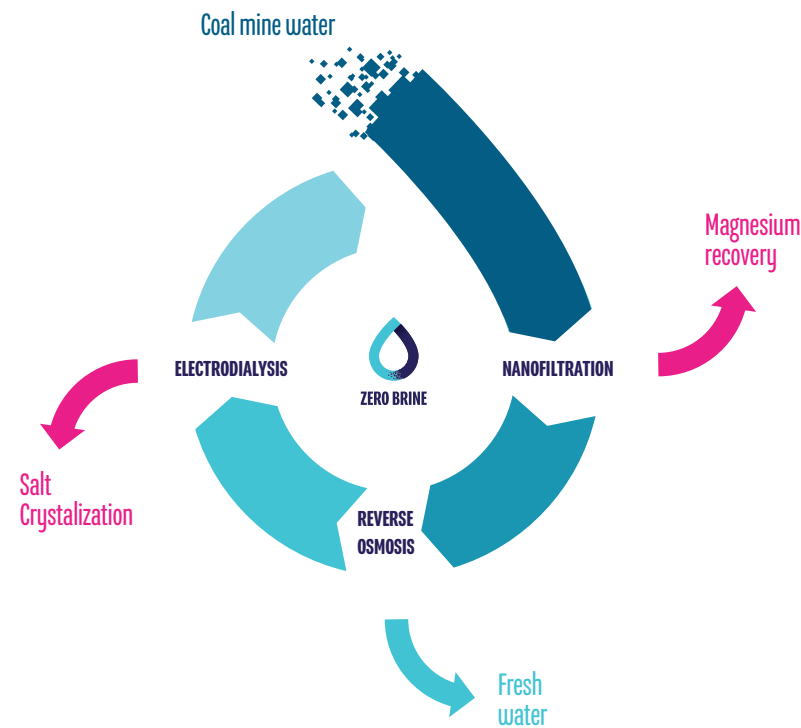
Business opportunities

The problem of saline wastewaters is not unique to only one mine or one company – it has been a systemic issue throughout the whole industry for years. At the moment, 18 hard coal mines are still operational in Poland and might be interested in turning their big environmental problem into a potential source of income. An important business opportunity is the production of salt. The average production in Poland is around 4.3Mt/y, with salt-in-brine accounting for around

two-thirds of production. Some 63% of salt-in-brine produced domestically is consumed in two synthetic soda ash plants (operated by Soda Polska Ciech). Around 21% of salt-in-brine is used in the production of evaporated salt and 16% in chlor-alkali production (by Anwil Nitrogen Plant, PCC Rokita and Organika-Zachem Chemical Works). The magnesium hydroxide is of interest for the refractory materials industry. In 2006, the production of refractories in Poland reached nearly 300,000 tons, around 28% of which were unshaped materials. The main manufacturers in Poland include ZM Ropczyce S.A., PMO Komex (part of Alcerol-Mittal), PCO Z'arów S.A., Vesuvius Skawina.



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Silica factory, IQE

ZARAGOZA, SPAIN

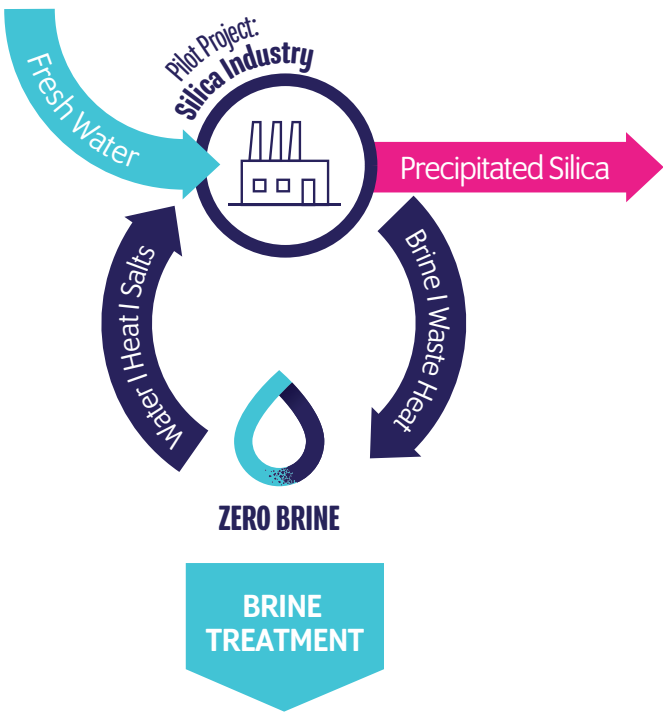
Silica industry produces between 21 to 46 m³ of saline wastewater per ton of silica containing between 13 and 28 mg/L of sodium sulphate and is normally discharged to natural watercourses (rivers, sea) after passing through wastewater treatment plants; a cost-intensive process. The silica industry consumes up to 40m³ water per ton of silica. During drought periods, guaranteeing water supply is a challenge. Difficulties in brine management can hinder a company to increase production. Water recovery enabled by the ZERO BRINE technology aims to ensure water supply and reducing costs associated to the water consumption. Nanofiltration and crystallization pilot plants will be implemented at IQE in order to demonstrate and test these technologies for resource recovery from wastewater. Additionally, heat waste recovery strategies will be evaluated.



7

Business opportunities

The proposed solution will allow up to 70% of quality water recovery that can be reused in the silica production process, thus reducing overall water consumption in the company as well as 0.75 tons of anhydrous sodium sulphate per tonne of silica produced. ZERO BRINE improves the efficient use of resources and reduces the environmental impact of the silica process both enhancing the profitability of silica production.



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- 5. Coal Mine Bolesław Śmiały. Photo: REVOLVE
- 6. Coal mine pilot project concept diagram
- 7. ZERO BRINE technology at silica factory pilot project, Zaragoza, Spain. Photo: ZERO BRINE
- 8. Silica industry pilot project concept diagram

Textile factory, ZORLU Textile – Energy Group

BÜYÜKKARİŞTIRAN- LÜLEBURGAZ, KIRKLARELI, TURKEY

An innovative brine treatment system is being developed for the textile industry with the aim to recover concentrated salt solutions for reuse in the textile dyeing process baths by TUBITAK MRC in cooperation with ZORLU Textile and Energy Groups at Büyükkarıştıran- Lüleburgaz, Kırklareli, Turkey. The methodology involves initial comprehensive physical, chemical characterization studies which are followed by bench scale treatability studies with technology options tested such as nano filtration, oxidation and ion exchange.

Expected Achievements

The developed process scheme will result in 70-75% recovery of salt for dyeing processes or for other purposes within the enterprise. Treated water, permeate of Reverse Osmosis treatment unit alternatively will be re-used within the enterprise for various purposes. Additionally, the evaluation of the environmental benefits, social benefits and the economic feasibility of the innovative ZERO BRINE textile demo case is appraised. The overall

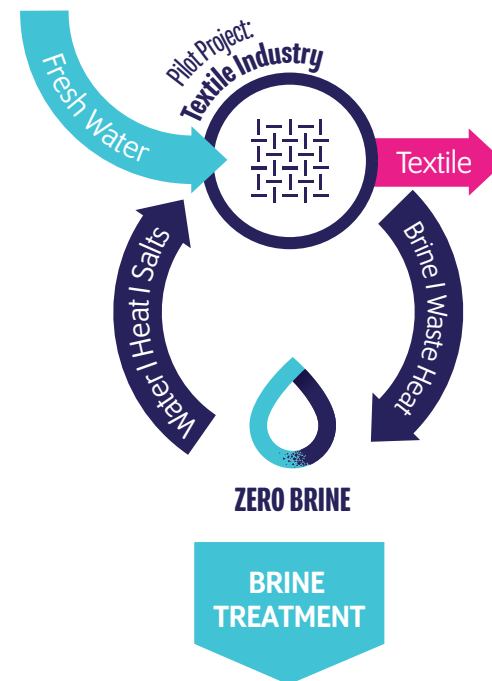
expected results from textile industry brine recovery system is estimated to be 50 kt/year reduction water consumption due to achievement of additional water reuse, recovery of 400 tons NaCl/year for production processes, reduction of 200 t/year CO₂ emissions also due to NaCl recovery. ●

9. Textile industry pilot project concept diagram

ZERO BRINE

Coordinated by [TU DELFT](#), the innovation project ZERO BRINE advances circular economy business model solutions to reduce industrial saline wastewater streams by recovering and reusing the minerals and water from the brine in other industries. Four demonstration projects in the Netherlands, Spain, Poland and Turkey demonstrate innovative technologies to recover water and minerals of sufficient purity and quality for good market value, thus 'closing the loop' and improving the environmental impacts of production. ZERO BRINE is funded by the European Union's H2020 Research and Innovation Program and includes 22 partners from research institutes, SMEs, construction companies, and end-users from 10 countries across Europe.

www.zerobrine.eu [@zero_brine_](#)



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Into The Great Big Blue

WRITER: OLIVER LOEBEL, EUREAU SECRETARY GENERAL

**Everything is changing, and water is in the middle of it all.
New politics, new faces, policies under review... Here's a
glimpse at the different EU directives of the multi-dimensional
water sector: water is in everything.**

Europe is changing. The 2019 European Parliament elections reflected this, with the two traditionally strongest groups – the centre-right Christian Democrats and the centre-left Social Democrats – both losing seats. On the other hand, Greens, pro-EU centrists and liberals and Eurosceptic forces all made gains.

Coupled with this shift, the European Commission is changing, with the president-elect, Ursula von der Leyen, driving an agenda for a more sustainable, ‘zero-pollution’ green deal. This is to be achieved thanks to an inter-departmental strategy that addresses water quality as well as hazardous substances, industrial emissions, amongst others.

EurEau shares this view. And it is timely that the EU institutions are making this commitment as the EU’s water policies are in the midst of being reviewed and revised.

We consider environmental protection paramount to EU law; it is time that the principles of precaution, prevention and polluter-pays are transformed from vague words that are largely ignored into the robust ideals they are.

1. Photo: Christian Wiediger, Thomas Vimare

By keeping harmful pollutants out of our water, we can go a long way to safeguarding our supply, avoid costly treatments and contribute to the Circular Economy and meet the Commission's zero-pollution ambition. Naturally, this zero-pollution ambition will directly affect EU legislation governing the water sector.

The **Drinking Water Directive** is already close to adoption. A number of quality parameters were revised to further protect consumers. A risk-based approach

will be implemented comprising drinking water resources, production and supply, and distribution systems in buildings. Importantly, the new directive will put in place an approval scheme for materials in contact with drinking water. This will guarantee that the products our water operators procure on the market do not release hazardous substances.

The **Regulation on Water Reuse** should also be approved soon. It will set minimum requirements for treated wastewater that is used in agriculture and

introduce risk management plans. The regulation will guarantee that crops irrigated with treated wastewater are safe for human consumption.

Two other highly relevant pieces of legislation are currently in the evaluation process and will probably be revised over the next two years. The **Water Framework Directive** requires that all European water bodies achieve good ecological status by 2027 at the very latest. The Urban Wastewater Treatment Directive sets minimum requirements for the effluent of wastewater treatment plants. Both directives will play an essential part in achieving the zero-pollution ambition. However, both directives legislate 'downstream'.

The drafts for the next **Common Agricultural Policy (CAP)** presented in June 2018 further developed the concept of "greening", i.e. remunerating farmers based on environmental measures – an initiative that has so far been unenforceable. EurEau continues to call on EU policy-makers to keep essential environmental credentials of the Commission proposal in the final text. They include the mandatory use of the **Farm Sustainability Tool for Nutrients** and the obligation to offer well-funded eco-schemes and strengthened "conditionality". This means the CAP must be closely linked to the objectives of the Water Framework Directive and the requirements of the Drinking Water Directive. Farmers play a crucial role in guaranteeing our food, but it must be done in such a way so as to protect environment and health. Hence, payments to farmers should be linked to protection, as proposed by the Commission.

All of these policies will impact on the quality of our water at all stages of the water cycle, and ultimately on the price consumers pay for it.

2. The Regulation on Water Reuse will guarantee that crops irrigated with treated wastewater are safe for human consumption. Photo: Emilio Garcia



It is time that the principles of precaution, prevention and polluter-pays are transformed from vague words into the robust ideals they are.

Implementing the Polluter Pays Principle

Every human, animal and industrial activity impacts on our water as eventually the components, chemicals and fallout from these ends up in our rivers, lakes and seas. Removing these relies of varying levels of treatment. This is why we must avoid a situation in which pollution is tackled through end-of-pipe measures. We are pushing for source-control measures that will prevent the pollution of our environment, and, if this alone is not sufficient, that polluters are responsible for returning the environment to its natural state.

Component materials and how these react in the environment is key. Producers must assume responsibility for the products they design and place on the market. Fewer harmful substances released will also reduce the overall exposure of the population to chemicals and will be a strong driver for product innovation.

This is where **Extended Producer Responsibility (EPR)** can be used to implement the Polluter Pays Principle, as enshrined in the EU Treaty. It works on the reasoning that a producer is responsible for the whole life-cycle of a



3

product and how these break down in the environment.

The EU is increasingly applying the Polluter Pays Principle, for example through the **Single Use Plastics Directive**, as adopted earlier this year.

One area where a lot of progress could be made is in pharmaceuticals. Pharmaceuticals is a group of micro-pollutants that is likely to grow in importance over the next decades as the sheer number of chemicals increases, and as our population ages and depends on more medication. The European Commission's **Strategic Approach to Pharmaceuticals in the Environment** (March 2019)⁴ identifies six action areas the Commission will target to better protect the environment.

1. raising awareness and promoting the more careful use of pharmaceuticals

2. improving training and risk assessment

3. information and monitoring

4. promoting and incentivizing 'green design'

5. reducing emissions from manufacturing

6. reducing waste and improving wastewater treatment



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The actions cover pharmaceuticals for human and veterinary use during their whole life-cycle, from design and production to disposal and waste management.

EurEau is pleased that the proposed strategy is looking at the full life-cycle of pharmaceuticals and that the Commission intends to fill knowledge gaps. We also welcome the fact that the pharmaceutical industry will have to explore how EPR can be used to improve the efficacy of water treatment. This could avoid increased water bills for consumers provided this rather vague wording translates into real obligations.

3. The Single-Use Plastics Directive tackles marine litter directly thanks to ambitious measures like a ban on selected single-use products made of plastic for which alternatives exist on the market: single-use plastic plates, cutlery, straws, balloon sticks and cotton buds will be banned by 2021. Photo: Tunatura

4. https://ec.europa.eu/commission/news/pharmaceuticals-environment-2019-mar-11_en

5. With the Single-Use Plastics Directive, member states have also agreed to achieve a 90% collection target for plastic bottles by 2029, and plastic bottles will have to contain at least 25% of recycled content by 2025 and 30% by 2030. Photo: Mali Maeder

Nevertheless, the Strategic Approach remains weak in a number of respects. There is no mention of improving the way the **Environment Risk Assessment** is taken into account in the authorization process for human pharmaceuticals. The review of the functioning of the interface between the medicinal products legislation and the chemical legislation has disappeared from an advanced version made public by an EU media outlet in 2018. The same goes for the technical and financial obstacles for wastewater treatment that should be overcome.

Fewer harmful substances throughout our water-cycle benefits everyone.

EurEau wants the EU to be more ambitious

The EU is reviewing all of its water legislation. Legislators should take the opportunity to cement the **Control at Source, Polluter Pays and Precautionary Principles** into our directives and regulations. We want the European institutions to:

- adopt a holistic approach to micro-pollutants through making producers responsible for the whole life-cycle of products they place on the market

EU Water-Related Policies



- use the REACH authorization process more frequently, identifying additional substances of concern and using the authorization and restriction processes on persistent, mobile and toxic substances
- make the producer pay for damage to the environment or any measures taken down the supply-chain to avoid the release of pollutants into the environment
- encourage the development of innovative products that are environmentally-friendly and use eco-design and eco-label criteria more extensively to reduce harmful components from later leaching into the environment
- raise awareness among citizens and encourage everyone in society to make more environmentally-conscious decisions

EurEau works with the European institutions to protect consumers and the environment. Fewer harmful substances throughout our water-cycle benefits everyone. The EU and Member States need to act. The legal basis needed to

protect human and environmental health is there. The end-of-pipe (wastewater treatment plant) solution, which is often the default response, is not a sustainable one. Each revision of relevant EU legislation should be used to ensure that our laws are more effective.

Time will tell if the commitments being made in Brussels will be honoured. We will be there to remind our policy-makers of their promise and to ensure they deliver on making our water cleaner and healthier for all. ●

5. Pharmaceuticals is a group of micropollutants likely to grow in importance over the next decades as the sheer number of chemicals increases, and as our population ages and depends on more medication. Photo: Adam Niescioruk

6. Wastewater treatment plants are often the default response, but not a sustainable one. Photo: Annabel



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RE-LIVE WASTE

Repurposing Livestock Waste

WRITER: JOSEP CROUS DURAN

Disclaimer: this project was selected by Stuart Reigeluth, founder of REVOLVE, at the Sparkshow hosted in Brussels at the at the Blue and Green Growth Sparkshow that took place at the Committee of Regions in Brussels on 19 September 2019.

Increasing demand for meat has pushed farmers to farm more intensively in order to speed up and improve production. This process also caused the accumulation of large amounts of animal residues derived from the activity that, if not well managed, were responsible of severe environmental concerns. Following a circular economy approach, **RE-LIVE WASTE** intends to develop and test innovative technologies to turn this livestock waste into an eco-friendly fertilizer. Jordi Domingo Calabuig is a project officer at Fundación Global Nature, one of the project partners and is directly involved in the development of legislative and financial support to promote the use of the resulting product (struvite) as a fertilizer.

Jordi, decades ago, livestock waste was already the main source of fertilization for agricultural lands. The RE-LIVE WASTE project is trying to promote this again. What went wrong during this time that makes us talk today about an innovative solution of what it seems to me an old and traditional practice?

We are convinced that we will have a stable legal framework in the future for struvite and other fertilizers coming from livestock waste.

come from and why do you think we should promote the use of livestock waste instead?

Phosphorus is a key element in agriculture for increasing crop fertility. The present consumption of phosphorus is based on rock phosphorus, a mineral extracted from mines and a finite resource. From the EU perspective, it is strategic

It is basically a problem of volume. The average density of animals per farm has increased dramatically in the last decades. This means larger volumes of waste, as well as larger storage facilities. If a farmer cannot store enough livestock waste until the proper time of the year for spreading it in the field, the waste will end up in the wrong place and at the wrong time.

The main result of the project is the development of an eco-fertilizer from livestock waste called struvite. However, at the moment there is still a need of adding fertilizer to keep nutrients available (namely nitrogen and phosphorus) to maintain the levels of crop production. From where do fertilizers

to find new sources of phosphorus. Recycling it from livestock waste (and other sources) is a perfect option: on the one hand, it reduces the dependence on own or imported rock phosphorus; and on the other hand, it helps to close nutrient loops and reduces the impact that phosphorus has on the environment.





2

With the RE-LIVE WASTE project you are trying to develop an innovative solution considering the point of view of the farmer and of society. Why do think both actors are considered separately?

Farmers are at the end of the line (or at the beginning?). This makes them very vulnerable. For example, when sustainability is introduced in supply chains, most of the responsibilities end up in the farmer's hands as if they were the only ones to change their behaviour. In this case, it is exactly the same. There are plenty of variables to consider before calling the struvite production a definitive solution and they depend on different stakeholders. Of course, farmers will have to adopt the technology and use it properly. But society will have to help pave the way... for example, by the appropriate regulation framework,

by recognizing farmers' commitments, and by promoting biofertilizers.

One of the objectives of the project is to analyze the financial viability of the technologies developed. Several factors can affect this viability. One important factor could be, for example, the size of the farm which can be quite different across Europe: in the Mediterranean basin, they are quite small compared to northern Europe where farms include large areas. Within RE-LIVE WASTE, how are you dealing with these socio-economic differences between European regions? And how can these differences affect the subsequent deployment of the new technologies developed?

The project is not about testing struvite production but about fine-tuning the struvite production at farm level. This



3

entails a lot of work for understanding all the variables that will make the process feasible: farm size, types of waste, preparation of waste, and the added value of the different outputs. RE-LIVE WASTE tests all this in four pilot plants in four Mediterranean countries (Spain, Italy, Bosnia-Herzegovina and Cyprus), and in the transfer activities we try to ensure that the lessons learned are also applicable in other EU countries. It is unlikely that the project will deliver a "single solution" for struvite production at farm level for various reasons: farms are very different even in the same region, the technologies evolve very fast, there are other technologies for phosphorus recovery that can co-exist with this one, and the value of outputs may also change in the future.

The project acts at three different levels: at a local scale, training and convincing farmers; at a regional level, building networks with different actors (farmers, administration, SMEs), and at a European level, trying to update the EU legislation related to the use of fertilizers to include struvite. What are the main difficulties you are facing in each level?

At local level, the main difficulty is making the technology feasible. It is also quite challenging to convince farmers to adopt a new technology when it is not completely ready... a risk no one wants to take. At regional level, the aim is to prepare the ground for technology transfer. Member States and regions have different tools for promoting struvite and other nutrient recovery solutions. We want them prepared to ensure that every single option will be explored for finding solutions for livestock waste management. At the EU level, the objective is to ensure that future regulation will be realistic and applicable in real farms. We are sharing our results and lessons learned with experts and the European Commission, so we all can benefit from a solid legal framework.



4

The new Common Agricultural Policy (CAP) is being developed and the investment on research and innovation will be encouraged so farmers and rural communities can benefit more. How can the RE-LIVE WASTE project and the actors involved take advantage of this?

CAP is enormous and the challenge is understanding at a global scale how to include our solution in the scheme. It is equally important for each Member State (and in most cases at the regional level) to understand and integrate the options for promoting livestock waste solutions like struvite production. This is why the project foresees actions for guiding decision-makers and helping them to include struvite production, as we are convinced it is a win-win option: it reduces an environmental impact, it is directly linked to the compliance of several EU Directives (Nitrates, WFD) and it helps farmers to have new incomes.

The project ends by July 2020 and you asked for an extension of the project until January 2021. How are you planning to keep the objectives of the project and the results obtained alive after that date?

Before the official RE-LIVE WASTE project ends, we want to make sure that we deliver real solutions to farmers. If we manage to reduce livestock waste problems by making struvite production competitive from an economic point of view, then the technology will deploy itself – we are convinced that we will have a stable legal framework in the future for struvite and other fertilizers coming from livestock waste. The consortium comes from previous projects and initiatives... so we expect to keep working on improving struvite performance. Waste is the future! ●

1. For illustration purposes only. Photo: Amber Kipp
2-3. Intereg-Mediterranean ER-LIVE WASTE pilot project facility at the Nicos Armenis & Sons Ltd Farm in Monagroulli, Cyprus, October 2019.
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