



# CONNECTIONS

Spring 2018

Connecting People and Ideas to Water Solutions

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From the latest news about our International Conference on Water Reuse and Recycling to a look at IDA's Internship Program, this issue is filled with information about the many ways IDA members can become more involved and engaged in our community and the global desalination and water reuse community at large.



The Water Reuse Conference in Valencia is shaping up to be an extraordinary event, from provocative panel discussions to informative technical sessions and an exceptional roster of speakers. IDA Connections' focus on the conference includes expanded coverage of water reuse in this issue. Co-chair Domingo Zarzo Martinez explores the depth and breadth of Spain's robust water reuse program, while Gonzalo Delacámara of IMDEA discusses "Pricing Water Security and Enhancing Finance Tools for Water Reuse" in this issue.

Our spotlight on Water Reuse includes a comprehensive article on "Regulation and Planning as a Response to the Insufficient

Reuse of Treated Water" by Carlos Cosín of Almar Water Solutions, which is sponsoring the Evening at the Palace event at our Water Reuse Conference. We also cover the new GUINNESS WORLD RECORDS™ Title for Most Wastewater Recycled into Drinking Water in 24 Hours, set recently by two Orange County, California, agencies.

With articles by Dawid Bosman of the Trans-Caledon Tunnel Authority and IDA President Miguel Angel Sanz, we also take a look at the lessons learned from Cape Town's looming Day Zero and how planning ahead with an approach that involves both desalination and reuse can help communities around the world mitigate the risk of similar crises.

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Mr. Maurice Neo of PUB, Singapore's National Water Agency, provides this month's Utilities Viewpoint with an article that takes a closer look at the island nation's world renowned integrated water management program, the Four National Taps.

Our Corporate Viewpoint features Jonathan Pressdee, Senior Vice President, Drinking Water Market Sector Leader of AECOM, who offers his views on water sustainability. IDA 2<sup>ND</sup> Vice President Mr. Youqing Li, discusses the need to work together in his article, "One World, One Water Community," in our Perspectives from the IDA Board column.

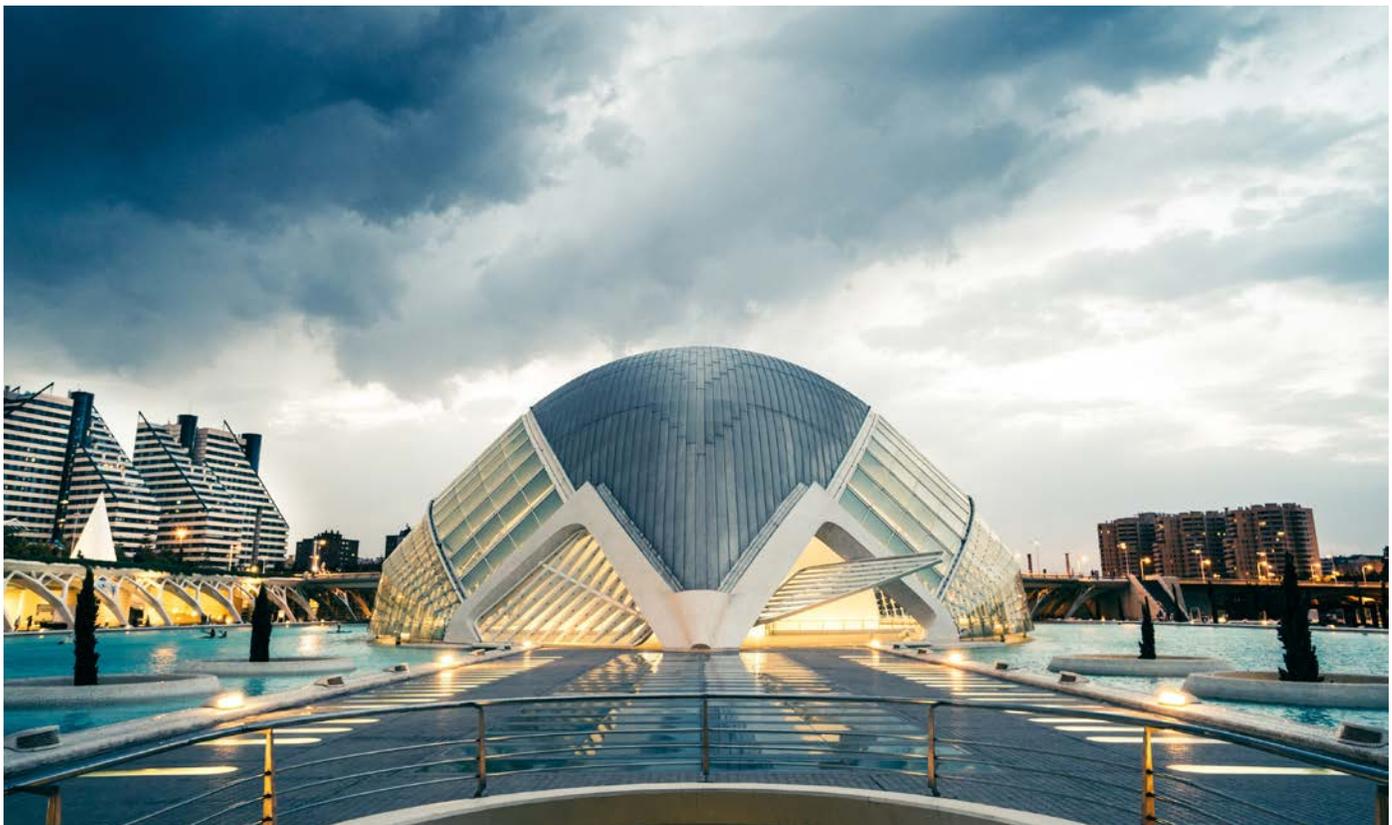
BlueTech research analyst Michael Mickley focuses on brine concentration, and Amane Advisor's Gigi Karmous-Edwards continues to explore the digital transformation that is taking place in our industry.

Looking into the future, Mr. Imad Makhzoumi talks about the 2019 IDA World Congress in Dubai, for which he serves as the Technical Program Chairman. No doubt that this will be a special event, hosted by the Dubai Electricity and Water Authority (DEWA).

We also introduce you to Greeningtheislands.net, an initiative that IDA is pleased to support. Eleanor Allen, CEO of Water For People, discusses how innovative technologies and solutions – for example, membranes – can play a role in meeting the needs of low- and middle-income economies.

Learn more about the North American Membrane Society (NAMS) 2018 Annual Conference: Water to Novel Materials to Advanced Separation Technologies. Then read about the success of the 2018 Membrane Technology Conference and learn about some of our affiliates' upcoming programs.

You'll also see a change in IDA Connections as we transition our newsletter – which has really outgrown that designation – into a magazine complete with advertising opportunities where you can showcase your business. Our next issue will be September – but rest assured that IDA will bring you the latest news about IDA, our programs and developments with our IDA Bulletin. ■





## IDA – A Growing Global Community

By Shannon McCarthy

IDA is actively developing new collaborations and engaging new stakeholders that expand our global reach in order to ensure a valuable network for you. These constituents include policy makers, solution providers, end users as well as international organizations and institutions that are involved in vital aspects of our industry including finance, legal, research, advocacy, and policymaking.

We are also working to create more value for our members and opportunities to engage with you. Here are just a few examples of the myriad of member benefits offered and ways in which members can engage with the community:

- Volunteer to serve on one of IDA's Board Committees and interact with other members from around the world
- Participate in the Governing Board by running for election
- Get involved in our mentoring program and encourage the next generation of water leaders
- Offer internship programs through your company and recruit a new cadre of talent
- Participate in IDA technical conferences as a moderator, session chairperson or speaker
- Learn how to become an IDA subject matter expert
- Access IDA's library of industry information, new technology developments, special reports, and case studies – free to all members
- Apply for an IDA scholarship, fellowship or take advantage of an internship opportunity
- Engage with fellow members and make new contacts through our social media channels, events, and communications
- Join the [IDA Young Leaders Program/YLP](#) (must be 35 years of age or younger)

Starting in September, you can raise your company's profile with advertising opportunities at special IDA member rates in our new **IDA Connections magazine**, which will be available to more than 10,000 readers around the world.

Education and training are the way to ensure a new cadre of water leaders. To this end, we are excited to announce the launch of the [IDA Internship Program](#). If you are a corporate leader and are mindful about the need to support the next generation of industry professionals, we welcome your input and collaboration to make this program a global success.

We hope that you will join us in Valencia, Spain on June 24-27 for the second [IDA International Conference on Water Reuse and Recycling: Making Every Drop Count](#). The conference technical program team has been working hard to round up a roster of impressive speakers. We are honored to conduct this conference under the patronage of the Spanish Ministry of Agriculture, Fisheries, Food, and Environment.

Held in collaboration with our Spanish Affiliate AEDyR, and with support from our European Affiliate EDS, this exciting conference combines plenary, panel and technical sessions focusing on advanced technologies for water reuse and recycling that will make water available to municipal and industrial users. An early registration discount is available through April 25, and [IDA members and affiliate members are also eligible for an additional discount](#). Our article on page [19](#) brings you the latest information about our program and speakers.

I take this opportunity to thank our sponsors for the 2018 WR&R conference in Valencia: Almar Water Solutions, Future Pipe Industries, Besix, ROPV, Acciona Agua, Toray, Valoriza, PWT and Piedmont. In addition to the conference, IDA Academy in partnership with AEDyR will be offering a half day training course titled "State of the Art in Water Reuse: Conventional Tertiary Treatments, Advanced Technologies and Soft Technologies."

IDA's [global affiliate network](#) is one of our strengths. Our regional and association affiliates offer an incredible array of regional events that provide unparalleled opportunities to connect with and exchange insights with colleagues from Asia-Pacific to North America, Latin America and the Caribbean, Europe and the Middle East and Africa. They also play a vital role in the success of IDA's events, from specialty technical conferences to our global events such as the International Water Reuse Conferences and our World Congresses. We invite you to support their programs, some of which are highlighted in this issue.

If you are planning to attend [Singapore International Water Week](#), I hope you will attend the IDA-PUB Desalination and Water Reuse Business Forum on July 10. The Business Forum covers emerging trends,

business opportunities and challenges as well as topics of particular interest to the global water industry.

Invited speakers include leaders from the public sector, specifically DEWA, SWCC, and ADB. IDA is a founding supporter of SIWW, and we are pleased to continue our active involvement. Additionally, IDA Academy in cooperation with Singapore Water Academy is offering a 3-day training course on an array of hot topics in desalination.

These are just highlights of the many exciting developments at IDA, and many more are in the works. I sincerely hope that you will take advantage of your membership in IDA. If you are not yet a member, I hope that you will join and become part of our growing international community. Thanks to you, IDA is a vibrant, dynamic organization that offers outstanding opportunities for members to connect, participate and engage, and promote the value of desalination and water reuse around the world.

On behalf of the IDA Board of Directors, it's my sincere pleasure to thank you for being part of our global community. ■

*Shannon McCarthy is Secretary General of IDA. She can be reached at [smccarthy@idadesal.org](mailto:smccarthy@idadesal.org).*



## One World, One Water Community

**By Mr. Youqing Li,  
2<sup>nd</sup> Vice President**

*Mr. Youqing Li is 2<sup>nd</sup> Vice President of IDA. He founded ROPV and has been its Chief Executive Officer since 1999. In addition, he serves on the Board of the Membrane Industry Association of China (MIAC) as a vice president. He is also vice president of the Chinese Society of Seawater Desalination and Water Reuse and serves on the Standardization Administration of China as a member of the National Technical Committee 382 on Separation Membrane.*



Today, the world is looking to the ocean more and more as a source for fresh water. Delivering fresh water from the ocean, from brackish resources and through water reuse, has improved the availability and reliability of obtaining fresh water through the years.

The desalination and water reuse industry and community are becoming bigger and bigger. Demand for delivering fresh water will continue to increase with the growth of industrialization, urban development and climate change.

To meet the growth in water demand, more eco-friendly technologies are being developed while minimizing the unused by-product. It is an exciting time of the 21st century to be in the water industry.

As industry professionals, we should work together as a team and see the world as one village to deliver the most power-efficient, cost-effective, and eco-friendly technologies and products. This can be difficult to achieve at times with our differences in cultural, religious and political views. IDA has been a great platform to bridge the difference between people on this important subject by gathering expertise worldwide in the desalination and water reuse industry since its founding.

Over the past four decades, IDA has provided expertise through its affiliates in different countries

and has exchanged a wealth of information on new products and technologies through its World Congresses, seminars and conferences. For instance, thousands of Chinese water professionals have attended IDA's conferences to obtain direction and guidance on the latest trends in the water industry ever since the Membrane Industry Association of China (MIAC) became IDA's affiliate in 2012 and through the 2013 IDA World Congress, held in Tianjin.

Due to the droughts that are occurring in many countries, for example South Africa, I believe IDA will continue its great work and continue to strive to have an even greater presence under president Miguel Angel Sanz, the Board of Directors and Secretary General, Shannon McCarthy and the existing and newly joined IDA affiliates and members.

While all IDA events and IDA affiliate events, including CaribDA, InDA, EDS, MIAC and AMTA, are a great way to promote the water community and technologies, IDA's Scholarship, Education and Fellowship programs provide insight into strategies, policies and new developments in desalination and water reuse research. I highly encourage all members take advantage of these programs.

Looking forward to meeting you at our water events. ■



Mr. Maurice Neo is currently the Director of the Water Reclamation Network (WRN) Department in PUB, Singapore's National Water Agency. Since joining the Ministry of Environment in 1994, he has been actively involved in the policy planning, design, development and management of numerous drainage, water and wastewater treatment facilities in Singapore. In his current appointment as Director of the WRN department, he manages the networks for collection of used water, an integral portion of the water cycle in Singapore. He leads a team focused on safeguarding public health and safeguarding Singapore's water resources by preventing any leakages and contamination of the environment or waterways. Mr. Neo has been on the IDA Board since 2015, and has participated actively on the Operations Committee, and co-chaired the Site Selection and Young Leaders Program (YLP) Committee. His experiences, especially with SIWW, have enabled him to contribute valuable learnings on these Committees.

## Singapore – Investing in the Future

By Mr. Maurice Neo

Singapore is a tiny island with about 710 sq km of land. Although blessed with abundant rainfall – about 2.4 m of rain annually – it is ranked in the top 5% globally for water scarcity. It does not have sufficient land to collect and store all the rain that falls, and the challenge of land constraint means that it has to look to technology to secure a reliable water supply and meet growing water demand.

Over the years, an integrated approach to water management and investments in technology have enabled PUB to put in place four diversified sources of water supply. Through technology, it has developed two sources of water supply that are resilient to weather

– NEWater (ultra-clean, high-grade reclaimed water) and desalinated water.

By recycling water, PUB moves water in the system through use and reuse, and avoids the need for huge reservoir storage that requires extensive land. Recycling water is the most sustainable and cost-effective way to increase its water supply. By collecting and reusing 50% of water, PUB is able to double the size of its water inventory. In addition, desalination is a natural option for Singapore as an island nation, especially when membrane technology has made it economically viable.

NEWater and desalination currently make up more than

65% of Singapore's needs, and will eventually meet up to 85% of future water demand by 2060.

Relying on today's reverse osmosis technologies, PUB's energy needs would quadruple and waste generation would double. This is not sustainable. PUB has to leverage new and emerging technologies to meet this projected demand at today's energy and waste footprint.

PUB is working closely with Evoqua to reduce the energy consumption of desalination by about half; it is also working with the universities to study nature like mangrove plants and marine fish to identify new solutions. PUB is also taking steps towards energy self-sufficient wastewater treatment, and the future 800,000m<sup>3</sup>/

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day Tuas Water Reclamation Plant (TWRP), which will be ready by 2025, aims to make this a reality.

The TWRP is built at the terminal end of Phase 2 of the Deep Tunnel Sewerage System project. It is conceived as a compact and energy self-sufficient installation that will be operated with lean manpower. An Integrated Waste Management Facility (IWMF) will be co-located to allow the installations to leverage on the water-energy-waster nexus. For example, IWMF's food waste will be sent to TWRP to be co-digested in its digesters, and the biogas produced at TWRP will then be conveyed to IWMF where it will be used to produce electricity. This electricity will in turn be re-supplied to TWRP to improve its energy self-sufficiency. The tenders will be called from Q2 2018.

PUB is also looking into smart water technologies and the use of data to improve its service delivery. On-line sensors and instrumentation are key in ensuring water safety, and ongoing projects with companies like ZWEEC and Visenti enable PUB to utilize real-time data to monitor water safety. ZWEEC's solution involves the

use of video analytics to monitor the behavior of fish as an indicator of water quality, while Visenti's technology utilizes an array of sensors in the water distribution network and algorithms to detect leaks and provide water quality monitoring.

As PUB pushes the boundary, it also aims to share its experience with others globally. The Singapore International Water Week (SIWW) is a global platform to co-create innovative water solutions, and will be held from the 8 to 12 July 2018. SIWW will feature dedicated sessions introducing the TWRP project and PUB's Smart Water roadmap, and these are complemented by corresponding exhibitions at the Expo Hall for interactions between PUB and solution providers. During SIWW, the Singapore Water Academy will be collaborating with IDA to run a Desalination Masterclass from 12 to 14 July 2018 in Singapore, and will involve industry experts such as Nikolay Voutchkov and Prof. Tony Fane as faculty. Interested parties can get in touch with the IDA Academy at [academy@idadesal.org](mailto:academy@idadesal.org). ■



Water for All: Conserve, Value, Enjoy



*Jonathan Pressdee is Senior Vice President, Drinking Water Market Sector Leader, AECOM. He has worked across the United States, South America, Middle East, Africa, South East Asia, Australia and Europe leading high profile projects solving water challenges ranging from contaminant removal to resolving water scarcity.*

## Water Sustainability

**By Jonathan Pressdee**

We live in a time of tremendous change. Populations are exploding and cities are developing faster, and this growth creates challenges — particularly with our water supply systems as we strive to bring safe, dependable and high quality water to our urban centers. These water management challenges require exactly the type of non-traditional thinking that motivates us at AECOM.

In major urban centers, from ancient Athens and Rome to Hong Kong, Singapore and Los Angeles, clean drinking water has typically been supplied from sources located many miles away, often through impressive engineering structures. Over time, as populations grew and human-influenced impacts on these water systems increased, reliable sources of high quality water became scarce or worse, couldn't meet the demands of dynamic urban centers.

To solve these challenges, we need to look to other water sources and delivery methods. Recovering and reusing water to supplement drinking water supplies — as we're doing with Singapore's Deep Tunnel Sewer System project — is one viable solution. A major feature of Singapore's water planning program is an advanced water reuse facility planned at the Tuas location, which combines treatment from multiple wastewater plants at a single facility. As public opinion shifts toward acceptance of water reuse treatment, this technology, in conjunction with desalination, can sustainably

supplement our existing freshwater drinking supplies.

Speaking of technology, at AECOM we are investing directly and with partners to bring affordable, sustainable technologies to market. In the field of emerging contaminants, our engineers and scientists are developing technology that effectively destroys per- and poly-fluorinated alkyl compounds known as PFAS that have caused widespread contamination of our groundwater aquifers worldwide. We are excited about the potential our DE-FLUORO™ technology offers to rid the environment of this persistent suite of chemicals.

Another technology we've developed, in partnership with Suez, is Membrane Gravity Filtration. Using conventional membrane filtration technology, operating in an alternative method requiring exceptionally low head, our product can provide high quality filtered water that approaches the cost of conventional granular media filtration without the complexity associated with conventional membrane filtration. Operating at a low flux and by gravity alone, we can eliminate the need for pumps and chemical cleaning while reducing backwash frequency. This unique approach also reduces the volume of waste streams and stresses on membrane fibers, thereby extending their usage. Our full-scale demonstration plant, developed in partnership with the Region of Peel, Ontario, is showing very encouraging results.

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Membrane Gravity Filtration as installed at the Lorne Park water treatment plant, Region of Peel, Ontario

While improvements in technologies are always necessary, applying a holistic perspective to our drinking water supplies can also reduce the need for treatment. One easily adoptable approach is to reduce the impact of human activity in our watersheds. Limiting nutrient runoff, application of novel algae treatment techniques and water management best practices contribute greatly in this regard, further easing or deferring the cost of treatment.

By integrating the global capabilities of our engineers, scientists, designers, urban planners, project managers and financial experts, we're delivering holistic solutions that meet our clients' demand for safe, affordable water systems that will sustain generations to come. ■

# AECOM



Eleanor Allen, CEO of [Water For People](#), was an engineer at CH2M/Jacobs and Arcadis for most of her career before she joined Water For People. She participated in various membrane design projects (water, wastewater, and reuse plants) before her consulting career took her around the world on major water/wastewater infrastructure programs and to lead regional and global operations.

Since 2015, Eleanor has led Water For People, which now has many industry partners, including its founding partner, the American Water Works Association (AWWA). Water For People is at a point in its evolution when it is having an impact helping to solve the global water crisis by changing the systems in which water is delivered in Africa, Latin America, and India. As demonstrated in a recent keynote for the Membrane Technology Conference on March 13, she is impassioned and engaged about membranes and how they could present a step-change in safe water delivery.

## Are Membranes a Harbinger for the Future of Global Water?

By Eleanor Allen P.E., BCEE

For me, it is especially rewarding to be able to apply my technical and global business experience from consulting to meet the needs of low- and middle-income economies using innovative technologies and solutions (especially membranes).

To appreciate this perspective, some background on Water For People is in order. Our impact model at Water For People is called “Everyone Forever” – building water infrastructure to reach *Everyone* in a specific area (we work in defined districts with over 4 million people) with water services. *Forever* is about building local and national systems that create and enable water service authorities (e.g., utilities) to provide lasting quality services indefinitely.



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Technology plays a major role in all our programs. To be sustainable, the technologies we use to support our Everyone Forever model must be:

- Locally available and government-approved
- Affordable on a life-cycle costing basis
- Harmless to communities and the environment
- Bereft of unaffordable dependencies
- Compatible with local markets without being subsidized

Membrane systems have the potential to meet these demanding criteria while helping end the global water crisis. More specifically, membranes could leap-frog traditional technologies to make a step-change, becoming a better affordable solution for the [2.1 billion](#) people in the world living still without access to safe water.

Fortunately, we know how to solve this crisis. We have already seen



membrane applications succeed in urban settings at water kiosks using ultrafiltration, reverse osmosis for desalination, and forward osmosis for emergency relief water. Obstacles to scaling are high capital costs – due to lack of local availability of equipment – and greater operations and maintenance expenses (O&M). We can overcome these obstacles by lowering costs through local

manufacturing and reducing energy demands and maintenance requirements.

I wonder, could graphene membrane technology sufficiently reduce energy costs to be affordable? Could passive membranes and biologically-active ion exchange systems become feasible cost-effective options? In the nine countries where Water For People works we are already testing membrane technology for solids/liquids dewatering of fecal sludge in on-site toilet pits, and the results are promising.

The United Nations set the target date of 2030 for all the nations of the world to meet [Sustainable Development Goal 6](#) – *Ensure availability and sustainable management of water and sanitation for all*. I believe that membranes could play a key role in accelerating progress towards that goal. ■





## North American Membrane Society (NAMS) 2018 Annual Conference, Lexington, KY USA, June 9-13, 2018: Water to Novel Materials to Advanced Separation Technologies

**By D. Bhattacharyya and Isabel Escobar  
University of Kentucky, Lexington, KY USA**

Membranes play a very important role in society with wide-ranging applications that include water-energy-food, pharmaceuticals and medical devices. In the water treatment and water reuse area, membranes and hybrid technologies are needed for selective separations to high volume processing and water detoxification.

NAMS annual meetings ([www.membranes.org](http://www.membranes.org)) bring in top scientist, engineers, and students from all over the world to showcase membrane advancement needs to novel applications in the water-

energy-food nexus to bioinspired aspects. Bio-inspired aspects are typically defined in the literature as artificial membranes that incorporate biological phenomena (such as responsive surfaces, protein channels, lipid bilayers) and principles in nature (such as ordered structures, self-assembly).

We plan to have a very exciting program focused on Bioinspired and Synthetic Membrane Advances for Global Benefit while celebrating over 30 years of NAMS. Water treatment and desalination sessions will bring in new advances ranging from antifouling properties

to selectivity and biomimetic approaches.

Besides industrial and academic plenary lecturers each morning, some of the other special sessions include: Large-scale Membrane Applications (User and Manufacturer Interactions), Bioinspired to Stimuli Responsive and Adsorptive Membranes, Joint Session with EMS, AMS and Latin American Membrane Societies. We will have over 20 different technical topics, some with multiple oral sessions. Four different workshops are scheduled for June 9 and 10. The Poster Session (120-

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150 posters) is a highly recognized event at NAMS meetings, and several student poster awards will be given.

NAMS provides highly knowledgeable instructors for the workshops. The NAMS workshops are intended to keep the membrane science and technology community informed about both classic as well as current resources, tools, issues and developments related to membrane processes and technologies.

Four workshops at the NAMS 2018 Annual meeting include Emerging Membrane Materials, Measurement Methods for Membranes, Membranes for Gas Separations, and Polymeric and Inorganic Membrane Materials and Membrane Formation.

To register for the NAMS 2018 workshops and annual meeting, and hotel, please go to <http://www.membranes.org/2018/index.html>. ■



North American Membrane Society

**27<sup>th</sup> Annual Meeting**  
Lexington, Kentucky  
June 9-13, 2018



# Cape Town and Day Zero: Thoughts on Lessons Learned



Dawid Bosman is Senior Manager: Strategic Advisory, Trans-Caledon Tunnel Authority.



Cape Town is one of those rare destination cities that seems to have it all: A ruggedly beautiful coastline, an iconic flat-top mountain in the background, and a vibrant city landscape that attracts discerning visitors and business travelers from all over the globe. So how could this city find itself in a position where it is running out of fresh water, where the taps could well run dry, and a developed, diversified economy grinds to a halt? How could a drought cause such an existential crisis, in an age where we have mastered the science of producing an abundance of fresh water?

While seawater desalination is by no means the only solution to the

## The Cape Town Water Crisis: Success Bites Back

By Dawid Bosman

crisis, it is certainly the most powerful: It is a mature technology that has emphatically proven itself, at a utility scale, as a cost-effective, climate-independent source of potable water. The Cape Water Crisis was not caused by a lack of proven solutions.

Until the day comes that Cape Town has mitigated its water security risk by an ample proportion drawn from the sea, perhaps like Perth WA, it will remain to be vulnerable, for a number of reasons. Unlike other major cities in South Africa, Cape Town's surface water cannot be supplemented through a series of inter-basin transfers, in a time of need; it is essentially isolated from the other basins. Compounding this, the full storage capacity of dams serving Cape Town is a rather modest 236 kl per capita, compared to the major Australian cities: Sydney (480 kl), Brisbane (785 kl), Perth (315 kl), Melbourne (410 kl) and Adelaide (153 kl). The difference, of course, is that the Australian cities listed here have all adopted large-scale desalination over the past decade. And finally, climate models predict increasing water scarcity in the region, which suggests that prolonged droughts are likely to increase in frequency. All considered, Cape Town has only a modest capacity to withstand prolonged drought conditions.

Over the past 18 years, Cape Town has become remarkably successful in water conservation and demand management. Despite the population growing at about 2.6% per annum, potable water consumption levelled off at around 300 Gl/a in 2000, and

this has dropped to much lower levels since the advent of the water crisis and severe restrictions being imposed.

But, the water crisis has revealed the limitations and risks of following this singular strategy. A recent report by Moody's Investor Services states, *"Although the lack of diversification in its water supply has been identified as an issue for a decade or more, the city has been more focused on demand management, despite a rapidly growing population."* With much less water being dispensed, the revenue stream to the City diminishes: Moody's expects an overall operating revenue drop of 5% in 2018. This poses a significant challenge, especially since the City will need to incur capital expenditure in the range of (US) \$672m to \$1,067m over the next five years, in order to avert future supply outages. In this regard, Cape Town has been the victim of its own success.

Looking to the immediate future, all efforts are aimed at averting a run-out situation. But in the aftermath, there will need to be a reflection on the planning processes, assumptions and paradigms that allowed this crisis to develop. The full economic opportunity cost of water scarcity, and the damage caused by the specter of running out, on the agricultural and tourism sectors especially, will need to be assessed, and compared with the cost of providing an assured water supply. And hopefully, the realization will take root that it is within our means to reposition water, at least within the urban context, from a scarce natural resource into a renewable economic commodity. ■



*Miguel Angel Sanz is president of the International Desalination Association.*

It is not necessary to do a survey to know which city has been the “water star” in the first quarter of 2018. Cape Town has been the protagonist in thousands of news stories worldwide, and actually the majority of the world has been updated in what “Day Zero” means, becoming an iconic example of climate change effects.

Cape Town is a beautiful and wonderful city, well known by those who like wine and tourism. Today, after three years of persistent drought, CCT (City of Cape Town) is exhausting its water reserves despite the strong consumption restrictions made in January by city authorities: less than 50 liters per person and day and no more water for agriculture and industries.

Even if this winter becomes a normal rain year, the restrictions should be kept for a long period to avoid the “Day Zero” in the following year. It will

## Lessons Learned from the Cape Town Water Crisis

**By Miguel Angel Sanz**

be an additional strong experience for the over 4 million people living in the metropolitan area, who have already changed their traditional habits in the last six months. Minimized toilet flushing, sanitizing hands without water, recycling clothes to reduce washing or having one or two very short showers per week are examples of how the local population is experimenting with ways to cope with the challenge of keeping to the targeted low consumption imposed by local authorities.

But these restrictions are for the fortunate because there’s an important part of the population without water at home, and they need to wait in long queues for collecting water in public taps. That was explained to me by several local citizens, and even I had the opportunity to see it personally in my last visit to the city.

It has been a good test to demonstrate that Cape Town is perhaps not a “Resilient City”, but the city has a “Resilient Population”.

Only two years ago, the average city daily needs were around 1000 MLD, with peaks of 1200 MLD. Today the supply is only 500 MLD with a target of reduction at 450 MLD. Under the intensity of restrictions, the economy starts to be drastically impacted, with predictions of -5 to -10% at the end of the year and incorporating an important loss of jobs.

Local industries, several resorts and even the Koeberg Nuclear Power Plant have procured small seawater desalination plants to compensate for

the lack of supply. That is an example of how these restrictions are impacting the different sectors.

One of the more important economic activities of Western Cape province is agriculture and vineyards. Boreholes are being drilled to use the groundwater for irrigation to save the production crop of 2018. Even the CCT government’s plans are increasing the use of aquifer reserves to complement the water supply.

Before the restrictions, in a normal rainy year, the water used for irrigation was a third of the annual water supply (over 130 million cubic meters). But official studies advise a limitation of 80 to 100 MLD in the water withdrawal to avoid aquifer depletion or even the salinization of ground water. Ground water is only a partial temporary solution.

Treated and reused wastewater could be a good complement for agriculture and wineries when the wastewater treatment plants are upgraded with adapted tertiary treatment and the distribution pipes are supplied. This water reuse could preserve an important part of dam waters for domestic supply.

Direct potable water reuse, as some decision makers are proposing, requires deep studies, a very strict regulatory framework of national authorities, robust membrane multi-barrier treatment lines with AOP, and long public awareness measures to improve and get the social acceptance. Therefore, it is not a solution that can be fast tracked.

# Cape Town and Day Zero: Thoughts on Lessons Learned

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Population has doubled in the last 25 years, but the water infrastructure has not grown in the same ratio (only a new dam has increased the storage in a 15% in 2009) and the water resources have diminished. With actual population growth of 2.6 % per year, and despite all efforts to preserve the natural resources and reduce water leaks in the water distribution networks, the water demand will increase in the Western Cape area if the region's economic activity keeps growing.

As several feasibility studies recommended to the authorities, the Cape Town metropolitan area needs seawater desalination to ensure a minimum water supply when the rain is not filling the dams. Desalination will also be essential to keep the normal production when natural resources are not able to meet all the water needs of the region in average rainy years, allowing the levels of dams to recover to customary levels.

Several studies were demanded to advisors by local authorities, even one to the World Bank. Some of the studies recommended producing up to 450 MLD from seawater if the city wants to keep a sustainable growth.

In the last year, several misconceptions were heard about seawater desalination in South Africa, probably due to the relatively low local experience and based on the small size of the plants: high energy consumption, strong environmental impact of intake and discharge, high capex, more difficult because of the

low seawater temperature in the Cape, etc. But the main concept used was:

**"We don't need it - desalination is very expensive!"**

From January 2018 the tariffs applied for domestic drinking water supply by Water and Sanitation Department of CCT (Water Level 6 Reduction) are:

0 to 6 m <sup>3</sup>	2.5 USD/m <sup>3</sup>
6 to 10 m <sup>3</sup>	4.3 USD/m <sup>3</sup>
10 to 20 m <sup>3</sup>	9.5 USD/m <sup>3</sup>
20 to 35 m <sup>3</sup>	28.5 USD/m <sup>3</sup>
Over 35 m <sup>3</sup>	76.0 USD/m <sup>3</sup>
Industrial use	5.0 USD/m <sup>3</sup>

Comparing these water tariffs with an average desalinated water price, under PPP's procurement, between 0.8 and 1.2 USD/m<sup>3</sup>, desalinated water doesn't seem expensive, especially when the target is to supply additional resources to complement natural resources from dams or aquifers, and always in combination with wastewater reuse for irrigation or aquifer recharge.

It seems that after a water crisis and in regards to persistence of the drought, CCT is finally considering that seawater desalination is a solution to consider to avoid another situation such as they have today.

This conclusion was previously arrived at in other world regions with similar climate conditions and drought periods becoming more and more frequent, such as the Mediterranean

coast and islands of Spain, Algeria Coast, South of Morocco, the five main cities of Australia or Southern California.

Disseminating knowledge, training, sharing international experiences, evaluating risks and giving solutions, promoting good practices, addressing (and preventing) misconceptions, exchanging real figures and costs, protecting the environment, showing innovations and new technologies, presenting examples of integrated water management, debating about regulations, promoting international collaborations, technology transfer, etc. are usually the targets of professional associations such as IDA.

I don't know if the water crisis in Cape Town could have been avoided if two years ago CCT had hosted an International Conference in Water Reuse and Desalination, having deep exchanges between similar cases studies, international and local experts and authorities, and showing the good practices and innovations in the field. But I am almost sure that at least the time to arrive at a final, good and pragmatic solution for the water supply for the population of Cape Town would have been shorter and the impact of the water crisis would be less.

The other lesson learned that we could conclude from this case is: **Desalination is not expensive; what is really expensive is the lack of water!**



*Imad Makhzoumi is currently the Chairman and CEO of ENOIA ([www.enoia.com](http://www.enoia.com)), and serves as a Non-Executive Director on the Board of Future Pipe Group. He is a member of the American Business Council in Dubai, a founding member of the Dubai Capital Club and he currently serves as Board member of the International Desalination Association (IDA). He is also Past President of IDA and has served on numerous IDA committees, and is a long-standing member of the Association.*

## 2019 IDA WORLD CONGRESS: Crossroads to Sustainability - Connecting People and Innovative Ideas to Water Solutions

### We Are Getting Ready, Are You?

**By Imad Makhzoumi**

My dearest friends, colleagues and members, as we are waiting for the biennial IDA International Conference on Water Reuse and Recycling in Valencia to happen this June, it is with great excitement and anticipation that we are getting ready for the 2019 IDA World Congress, to be held in Dubai and hosted by the Dubai Electricity & Water Authority (DEWA), a globally recognized sustainable, innovative and world-class utility.

The countdown has started – at the time that I write this, almost 470 days to go!

The ultra-modern landscape of Dubai, the city of the future, always stepping ahead of the innovation curve through its latest ground-breaking solutions and infrastructures, moving from water homes and floating restaurants to passenger drones<sup>1</sup> is the perfect location for IDA 2019 World Congress.

In Dubai, innovation is not a solution but a way of thinking, a mind-set, enabling the vision of the future to become the present, and the present to be the perfect pathway to sustainability.

As a part of Dubai's Expo 2020, the emirate announced its Smart City project, with the aim to be one of the world's most connected and sustainable cities developing smart infrastructure across life, society, mobility, energy, environment and economy.

In this framework is rooted DEWA's commitment to sustainability and raising awareness about the importance of rationalizing water consumption, protecting the environment and conserving natural resources. Water sustainability is an important aspect of the IDA World Congress, providing an ideal forum to help advance these goals not only for the benefit of the industry but, more importantly, for the prosperity of communities, nations and future generations<sup>2</sup>.

DEWA is one of the best promoters of the Dubai Energy Strategy 2050, which sets a target of 75% usage of clean energy within the total Dubai's energy mix by 2050. Actions and achievements towards this goal are the adoption of the Independent Power Producer (IPP) business model to enhance public-private partnerships, the promotion of renewable energy projects, and the decoupling of power and water production.

Let me share with you only a few of the latest achievements of our host DEWA, such as the lowest Customer Minutes Lost per year worldwide at 2.6 minutes, and the reduction of water line losses from 42% to 8%.

IDA 2019 World Congress couldn't have found a better home or a better partner!

<sup>1</sup> Passengers drones in Dubai are expected to be functional by July 2018.

<sup>2</sup> <https://www.zayed.ae/en/year-of-zayed/values/>

# 2019 IDA World Congress: We Are Getting Ready

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I am excited by the high potential that can be unlocked by such an encounter of minds and people, as the IDA World Congress, aiming to create innovative, sustainable and inclusive ideas to water solutions, is perfectly in line with IDA's aim to promote the maximum practical use of non-polluting renewable energy sources to power desalination and water processing for reuse.

Indeed, it is IDA's mission to expand strategic relationships, providing knowledge and value to the communities it serves through the engagement not only of technology providers, but also of government policy-makers, technology users, the international finance community, global think tanks and NGOs.

Inspired, influenced and empowered by the spirit and vision of Dubai's leadership, I am proud to lead with the co-chairs, a World Congress 2019

Technical Program Committee that reflects the composition of our industry - men and women from around the world, comprising industry luminaries as well as the next generation of innovators whose perspectives and areas of expertise form the framework for a groundbreaking agenda. This committee – highly focused on human capital empowerment, efficiency and excellence – is already working together to making our 2019 IDA World Congress unique.

I look forward to welcoming you to the 2019 IDA World Congress, here in Dubai, the city of the future, for an unforgettable experience. I thank you for all the innovative ideas, suggestions and challenges you will bring to the gathering.

***We are getting ready, are you?***

## Call for Papers for IDA World Congress Coming Soon!

IDA will soon issue a Call for Papers for the 2019 IDA World Congress. Watch for information in a forthcoming bulletin and be sure to check the World Congress website, [wc.idasal.org](http://wc.idasal.org), for updates.



# IDA International Conference on Water Reuse and Recycling

## IDA Announces Program and Speaker Updates for International Conference on Water Reuse and Recycling



IDA is pleased to announce the latest program and speaker roster for our upcoming International Water Reuse and Recycling Conference, June 24-27, 2018, in Valencia, Spain.

This landmark conference, which includes plenary, panel and technical sessions on advanced technologies for water reuse and recycling in industrial and municipal applications, is presented in collaboration with our Spanish Affiliate AEDyR with support from our European Affiliate EDS. We are honored that it will be conducted under the patronage of the Spanish Ministry of Agriculture, Fisheries, Food, and Environment.

### Opening Session Keynote Speakers

**Her Excellency Dr. María García Rodríguez**, Secretary of State for the Environment, Spain

**Dr. Liana Ardiles**, **Water Director**, General Directorate for Water, Spain

**Honorable Vicent Sarria**, 8th Deputy Mayor of the City of Valencia, Spain

**Mr. Miguel Angel Sanz**, President of IDA, France

**Dr. Domingo Zarzo**, President of AEDyR, Spain

**Prof. Rafael Mujeriego**, Professor Emeritus Environmental Engineering, Universidad Politécnica de Catalunya (UPC), Spain

continues on page 20

## Panel 1. The Big Debate: Water Reuse Regulations in Europe, USA and Asia

### Moderator:

**Mr. Carlos Cosín Fernández**, CEO of Almar Water Solutions, IDA Director

### Panelists:

**Mrs. Conchita Marcuello**, CEDEX engineer from Centro de Estudios Hidrográficos at the Directorate General of Water, Spanish Ministry for Agriculture, Fisheries, Food and Environment

**Mr. Mehul V. Patel**, Director of Water Production, Orange County Water District

**Mr. Maurice Neo**, Director, Water Reclamation (Network), Singapore Public Utilities Board (PUB), Singapore's national water agency.

This panel will discuss the big debate on water reuse regulations in Europe, USA and Asia. Panelists have been directly involved in the development of these regulations offering an experienced viewpoint. These regulations define and cover the various uses, requirements and advantages in using water reuse technology to meet growing water needs for agriculture, industry and urban uses, as well as aquifer recharge, to offset water needs. The regulations represent a fundamental foundation for many countries and government regulatory bodies to establish their local directives and allow expansion of the reuse market.

## Panel 2. Pricing Water Security and Enhancing Practical Financing Tools for Reclaimed Wastewater Reuse

### Moderators:

**Dr. Gonzalo Delacámara**, Senior Research Fellow and Coordinator of Water Economics at IMDEA Water Research Foundation and **Dr. Eduardo Orteu** from the Spanish Ministry for Agriculture, Fisheries, Food and Environment.

### Panelists:

**World Bank, FAO, OECD, CAF Development Bank for Latin America.**

Panelists will discuss specific approaches to pricing water security through the diversification of water supplies and specifically tools they use to finance and develop water-reuse infrastructure projects to meet irrigation and urban needs, and other water requirements. The discussion will focus on policy priorities by use and region. In addition,

panelists will reflect on international financial tools available to expand the necessary infrastructure to equip existing facilities to new demands and uses.

## Panel 3. Research and Market Trends: Thematic Shifts and Macro Level Drivers

### Panel Keynotes:

**Jeff Mosher**, Carollo Engineers, Inc., USA

**Paul O'Callaghan**, CEO, BlueTech Research, Europe and North America

**Rob Renner**, PE, BCEE, Chief Executive Officer, Water Research Foundation, USA

This Plenary Session will discuss the role of decentralized water and the impacts associated with rolling out the Internet of Things and the Digital Economy on the value chain and technology landscape.

Alongside the thematic shifts in research, this panel will cover the future role of a water utility in a hot, flat and decentralized world. This inevitably will change the market drivers for certain products and resources, and this will occur at a much faster rate than we have previously seen in the water industry.

The impact of the democratization of water quality testing and increased prevalence of big data usage is set to quickly disrupt the water world, including water reuse and recycling. Innovation will play a much more impactful role than we have ever before seen in municipal and industrial settings.

## Technical Sessions and Keynote Speakers

### Cutting-edge technologies

#### **Mr. Patrick Buchta**

Head of Application at Technology, BASF, Germany  
Coating - A Dramatic Change in Ultrafiltration of Secondary Effluent

### Direct and indirect potable reuse

#### **Dr. Gil Crozes**

Partner at Carollo Engineers, USA

The State of Potable Water Reuse in Southern CA

## Non-potable and agricultural re-use

### Ms. Nathalie Dorflinger

Head of Water at Environment and Ecotechnologies Division, France Managed Aquifer Recharge from WWTP (IPR) and Surface Waters.

## Water quality monitoring and control

### Mr. Martin John Pryor

Process Manager at Prentec (Pty) Ltd, South Africa  
The State of Water Reuse in South Africa.

### Dr. Cedric Robilot

Managing Director of Headstart Development Pty Ltd at Australian Water Recycling Centre of Excellence, Australia. WaterVal - Implementing a Water Treatment Technology Validation Framework in Australia.

## Advanced technologies for joint desalination and water reuse

### Mr. Leon Awerbuch

President at International Desalination Consultancy Associates LLC/LET, USA  
Novel Hybrid of Advanced Water Reuse with Thermal Desalination

## Industrial water reuse and recycling

### Ms. Kimberly Kupiecki

Global Leader, Sustainability, Advocacy and Communications at Dow Water & Process Solutions, USA  
The Circular Economy.

### Mr. Dan Brothwell

Freudenberg Filtration Technologies at Aquabio Ltd. UK  
Guidance for Successful Industrial Reuse Projects.

## Best practices in reuse

### Mr. Rolf Richard Keil

Project Development Manager at BESIX, UAE  
Ceramic UF Membrane Usage - Techno-Economic Best Practice.

## Health concerns in water reuse

### Mr. Greg Wetterau

Vice President at CDM Smith, USA  
Alternative Treatment Technologies for potable reuse

Early registration discount is available through April 25. To register now, [click here](#).



Program updates will be posted frequently on the IDA website, [www.idadesal.org](http://www.idadesal.org)

## Thank You to Our Supporters!

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# Spain – A Leading Role in Water Reuse



*Co-chairman of the 2018 IDA Conference on Water Reuse and Recycling, Domingo Zarzo Martínez is a Director of IDA, President of AEDyR, and Technical and Innovation Manager for Sacyr Water Services.*

Spain has a long track record in water reuse. Due to water stress and recurring droughts, wastewater reuse has turned into a matter of necessity, and it has been incorporated into hydrological planning for a long time beside other water resources such as desalination, groundwater, superficial water and transfers.

With 400-550 Hm<sup>3</sup>/year (10%-13%) of wastewater reused (very variable data depending on the source), Spain accounts for about a third/half of the total volume in the European Union.

Water reclamation is concentrated (95%) in the Mediterranean Regions, the Canary and Balearic Islands, and major cities such as Madrid or Barcelona, with percentages between 60-95% if we consider direct and indirect reuse.

Regarding the different uses, agriculture irrigation is the most important application (41%), followed by urban and recreational uses (31%), industry (12%), and others (16%) (data from 2016).

Since the beginning of wastewater reuse in Spain, technological advances have been quickly incorporated due to

## Spain – A Leading Role in Water Reuse

**By Dr. Domingo Zarzo Martínez**

the increase of water quality demands facing problems such as high salinity, emerging pollutants, etc.

Most of the tertiary treatments in Spain are based on a physical-chemical treatment followed by any kind of filtration and disinfection (so called conventional), but membranes have been installed extensively in large-scale plants that have been built in recent years, including UF / MF as tertiary treatment after secondary treatment, MBR (Membrane Biological Reactors) and desalination technologies for salinity reduction (RO, NF, EDR). There are also remarkable installations based on advanced oxidation and incipient “soft” technologies.

Spain has had legislation regulating reuse since 2007 (Royal Decree 1620/2007), which was a pioneering development in Europe, and it was based on different international standards (WHO recommendations, California regulation, etc.). Although there is a consensus about the need of an update and potential improvements, it has been a very important tool for the regulation of this application, with no recorded cases

*continues on page 23*

affecting health risks. On the other hand, it draws attention to the fact that direct potable reuse is forbidden by law except in emergency cases (which contradicts what happens in some superficial watercourses where this happens de facto with wastewater plants discharging close to the intake of drinking water plants).

Member States (guidelines, mandatory legislation?) and the growing concern about emerging pollutants (listing, characterization, detection, control and treatment). Curiously EU only aims to regulate the agricultural uses and aquifer recharge, leaving in a legal “limbo” other applications such as industry, environmental or recreational uses.

successful IDA World Congress held in Madrid.

IDA, in collaboration with AEDyR, and with support from the European Desalination Society (EDS), will host the second IDA International Conference Water Reuse and Recycling “Making Every Drop Count” on June 24-27, 2018, in Valencia, Spain.

The two-day conference will be a combination of plenary, panel and technical sessions focusing on advanced technologies for water reuse and recycling that will make water available to municipal and industrial users, thus becoming one of the most important events about reuse this year (<http://idadesal.org/water-reuse-conference-2018/>).

Similarly, AEDyR will held its XII International Congress in Toledo (Spain) next October, where we will also celebrate our 20th anniversary (<http://congresoaedyr.com/en/>).

I would like to encourage you to participate in these important events where all of you will be welcome! ■



The experience gained in these years makes for more confident dealing with future challenges, although the economic and financial crisis has caused a significant deceleration of infrastructure investment, keeping the past objective of achieving more than 1,000 Hm<sup>3</sup>/year of reused water away and unreachable in short term.

A current challenge is the new upcoming European Regulation and how it will be applied to the

Spain has also a very strong water industry with successes worldwide in desalination and water reuse including a large number of companies, suppliers, consultant companies and world class scientific and research centers.

AEDyR is the Spanish Desalination and Reuse Association, which includes among its members the most important players in this field, founded in 1998 as an IDA affiliate during the

# Pricing Water Security and Enhancing Financing Tools for Water Reuse



Head of the Water Economics Department at IMDEA Water Research Foundation, Gonzalo Delacámara is a water policy advisor to the European Commission (through its Clean Water Unit), the European Parliament (on climate change), as well as an international consultant to different agencies and programs of the UN (UN Water, UNESCO, FAO, WHO-PAHO, UNDP, etc.), the World Bank Group (World Bank, IFC, 2030 Water Resources Group), and a member of the OECD Water Governance Initiative. Gonzalo is the Academic Director of the Water Economics Forum, an initiative with Nobel Prize Laureates. He is also the Cluster Leader on the value of water for the EU Water Supply & Sanitation Technology Platform (WssTP).

He has developed a number of studies on the link between water policy & management and macroeconomic performance in the EU or to maximize reclaimed wastewater reuse in the EU, as well as research projects on the use of economic policy instruments for sustainable water management. He is the author of recent books and book chapters on the use of economic incentives for water management or water trading schemes.

## Pricing Water Security and Enhancing Financing Tools for Water Reuse

**By Gonzalo Delacámara, IMDEA**

Capital expenditure on desalination and water reuse facilities is set to increase globally at an unprecedented rate by over 60% in 2022, as compared to 2013 (GWI DesalData, 2017). Currently, the total annual contracted reuse capacity already hits more than twice that of seawater and brackish water desalination altogether.

Yet, the share of water reuse in a number of countries, either subject to recurring or structural water scarcity or with a clear opportunity to enhance water use efficiency anyway, is still far from being relevant: there is significant leeway for the expansion of water reuse installed capacity worldwide. Technological barriers do not seem a major concern anymore. Advanced tertiary or triple-barrier technology – combining ultrafiltration or microfiltration with reverse osmosis (RO) and more advanced disinfection such

*continues on page 25*

as ultraviolet radiation (UV) or ozonation – have overcome most technological challenges. Wider governance (including chronically lacking investment in institutional development and human capital) and financing remain major areas of concern.

It is not just a financing gap that explains much of the untapped potential – the lack of sound economic assessments and the bias of prevailing financial appraisals also hamper the development of more ambitious investments in water reuse. New financing tools should put in place clearly agreed cost-, risk-, and benefit-sharing mechanisms, either through public-private partnerships or other formulas. Hence, it is essential to move away from conventional financial cost-recovery pricing schemes towards pricing water security and delivering the right incentives for reclaimed wastewater reuse; in other words, from backward- to future-looking pricing.

Further, a discussion on the critical difference between financing and funding, which is far from being merely a pedantic one, and also on the links between one and the other, should gather momentum in the discussions about water reuse. Both the public and the private sector raise debt and equity to finance water reuse facilities. However, funding those projects is a question of who ultimately pays for them over the long term: end users, taxpayers, etc. This leads to a (somewhat) basic yet often overlooked issue: how to repay for the finance that is provided as part of the investments in water reuse?

It seems relevant to understand synergies and trade-offs between different instruments of national public funding, such as central government budget, bonds, State Revolving Funds or alike, and end-user fees. Besides,



it is of paramount importance to address crowding out effects of different financial sources (public, private, Official Development Assistance [ODA]) and to ascertain the optimal role to be played by each one of them. The design of tariffs for recycled water, tariffs for wastewater reclamation and treatment, cross-subsidies from freshwater supply to water reuse is as important as the different resource pathways: grants, loans, tax rebates and credits. This is also the case of different revenue streams, based on the recovery of nutrients (mainly phosphorous and nitrogen); energy (biogas), which in turn also targets carbon credits; and other useful by-products.

This collective reflection to make the most of water reuse demands high attention from multilateral development banks (such as the WB, EIB, IsDB, ADB, EBRD, CAF, IDB, AfDB, AIIB, IFAD, etc.) but also from other international organizations dealing with policy making worldwide, including compliance with the 2030 Agenda for Sustainable Development, such as the UN or the OECD, to name but a few. ■



*Carlos Cosín Fernández is CEO of Almar Water Solutions. He also serves as Treasurer of the International Desalination Association.*

## Regulation and Planning as a Response to the Insufficient Reuse of Treated Water

**By Carlos Cosín, Almar Water Solutions**

Although water reuse processes have a long history - there are signs of their use in agriculture more than 5,000 years ago - today, thanks to advances during the last quarter of the 20th century with pioneering efforts in California, Spain, Tunisia, Israel and Singapore, we can state with confidence that for the first time there are real indications that we understand the problem and have the option of implementing solutions from both the private and public sectors. Governments, agencies, multilateral organizations, private engineering and construction companies, technology suppliers, research centers and universities have been working to solve the problem of water scarcity and pollution while putting mechanisms in place to mitigate climate change.

One salient fact in all the reports published on the worldwide consumption of water is that 90% of all water consumed is for non-potable use: 75-80% for a wide range of irrigation methods and 10-15% for industrial use. In arid and semi-arid regions, this fact has been driving us to find solutions that employ new resources to manage the scarcity of water for various uses.

In the early 60s, a pioneering initiative was implemented in California by a then young - but very advanced for the time - water agency: the Irvine Ranch Water District (IRWD). Its aim was to encourage the use of treated wastewater to supply irrigation and domestic water for the metropolitan community. The community was forced

to turn to new resources to prevent the scarcity from stunting its potential growth in an arid zone that lacked other alternative water sources. In 1963, the Board of the IRWD decided to treat and supply wastewater as an alternative to depleting its drinking water reserves. Today, they supply treated wastewater through a dual network of more than 300 km to irrigate fruit and vegetable crops and nurseries, parks and gardens, golf courses, schools and for other urban and industrial uses.

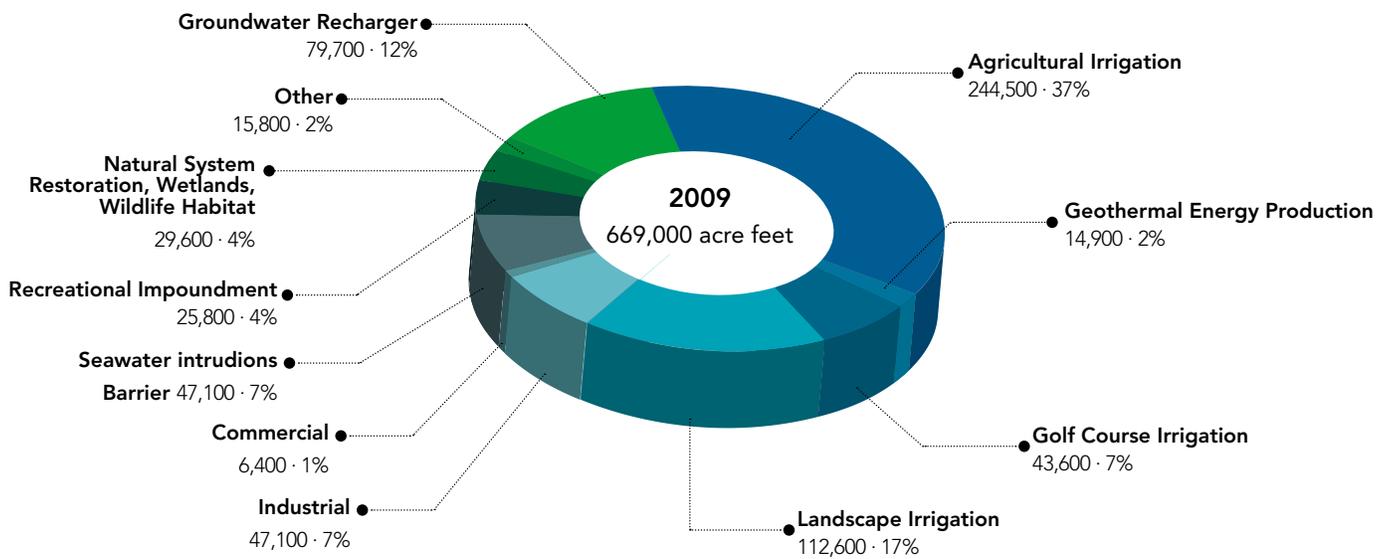
Later, in the 70s, they introduced the concept of "total water management" in their new master plan, broadening their scope to include recharging aquifers and surface water and expanding the supply to the communities of Santiago Creek/Irving Lake.

Their neighbors in Orange County were working simultaneously through their agency OCWD on two different lines of activity. The severe drought of the 1950s had caused a drop in the aquifer levels, placing them in danger of salination due to invasion by seawater from the Pacific Ocean. This threat drove them to adopt innovative methods and solutions that did not depend on their scant reserves or the potentially unreliable importation of water. The OCWD implemented two recharging programs as part of their ground water management plan that proved to be exceptionally successful and globally pioneering: Water Factory 21 and Orange County Forebay. The first is an advanced wastewater

*continues on page 27*

treatment system that directly injects water into coastal aquifers to create a barrier that prevents saltwater intrusion while increasing the drinking water reserves. Implementation started in 1963 and it took nearly 20 years, but it has now been fully operative and performing at maximum capacity since the 80s. Its capacity and scope have been extended with the addition of better technological solutions. The second scheme uses the natural catchment area of the Santa Ana river and applies specialized methods that favor percolation through a series of holding reservoirs.

All these initiatives have favored the development of local regulations, especially California's Title 22 (Code of Regulations of the State Department of Health Services) that established a clear regulatory framework for water uses and the quality standards required for each category. California's Title 22 has been used all over the world as a basis to implement and adapt the local regulatory framework to the different scenarios of each region.



Uses of recycled water in Calif. (SWRCB 2011)



# Spotlight on Water Reuse

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## Recycled Water Uses\* Allowed in California

This summary is prepared by WaterReuse Association of California, from the December 2, 2000. Title 22 adopted Water Recycling Criteria, and supersedes all earlier versions.

Recycled Water Use	Treatment Level			
	Desinfected Tertiary Recycled Water	Desinfected Secondary 2.2 Recycled Water	Desinfected Secondary 2.23 Recycled Water	Undesinfected Secondary Recycled Water
<b>Irrigation for:</b>				
Food crops where recycled water contacts the edible portion of the crop, including all root crops Parks and playgrounds School grounds Residential landscaping Unrestricted-access golf courses Any other irrigation uses not specifically prohibited by other provisions of the <b>California Code of Regulations</b>	ALLOWED	NOT ALLOWED	NOT ALLOWED	NOT ALLOWED
Food crops, surface-irrigated, above-ground edible portion, not contacted by recycled water		ALLOWED		
Cementaries Freeway landscaping Restricted-access golf courses Ornamental nursery stock and sod farms with unrestricted public access Pasture for milk animals for human consumption Nonedible vegetation with access control to prevent use as a park, playground or school grounds			ALLOWED	
Orchards with no contact between edible portion and recycled water Vineyards with no contact between edible portion and recycled water Non food-bearing trees, including Christmas trees not irrigated less than 14 days before harvest. Fodder and fiber crops and pasture for animals not producing milk for human consumption Seed crops not eaten by humans Food crops undergoing commercial pathogen-destroying processing before consumption by humans Ornamental nursery stock, sod farms not irrigated less than 14 days before harvest				ALLOWED

continues on page 29

Recycled Water Use	Treatment Level			
	Desinfected Tertiary Recycled Water	Desinfected Secondary 2.2 Recycled Water	Desinfected Secondary 2.23 Recycled Water	Undesinfected Secondary Recycled Water
<b>Supply for impoundment:</b>				
Nonrestricted recreational impoundments, with supplemental monitoring for pathogenic organisms	ALLOWED <sup>2</sup>	NOT ALLOWED	NOT ALLOWED	NOT ALLOWED
Restricted recreational impoundments and publicly accessible fish hatcheries	ALLOWED	ALLOWED	NOT ALLOWED	NOT ALLOWED
Landscape impoundments without decorative fountains			ALLOWED	NOT ALLOWED
<b>Supply for cooling or air conditioning:</b>				
Industrial or commercial cooling or air conditioning involving cooling tower, evaporative condenser, or spraying that creates a mist	ALLOWED <sup>3</sup>	NOT ALLOWED	NOT ALLOWED	NOT ALLOWED
Industrial or commercial cooling or air conditioning not involving cooling tower, evaporative condenser, or spraying that creates a mist	ALLOWED	ALLOWED	ALLOWED	NOT ALLOWED
<b>Other Uses:</b>				
<b>Groundwater Recharge</b>	ALLOWED under special case-by-case permits by the RWQCB <sup>4</sup>			
Flushing toilets and urinals	ALLOWED	NOT ALLOWED	NOT ALLOWED	NOT ALLOWED
Priming drain traps		NOT ALLOWED	NOT ALLOWED	NOT ALLOWED
Industrial process water that may contact workers		NOT ALLOWED	NOT ALLOWED	NOT ALLOWED
Structural fire fighting		NOT ALLOWED	NOT ALLOWED	NOT ALLOWED
Decorative fountains		NOT ALLOWED	NOT ALLOWED	NOT ALLOWED
Commercial laundries		NOT ALLOWED	NOT ALLOWED	NOT ALLOWED
Consolidation of backfill material around potable water pipelines		NOT ALLOWED	NOT ALLOWED	NOT ALLOWED
Artificial snow making for commercial outdoor use		NOT ALLOWED	NOT ALLOWED	NOT ALLOWED
Commercial car washes, not heating the water excluding the general public from the washing process		NOT ALLOWED	NOT ALLOWED	NOT ALLOWED
Industrial process water that will not come into contact with workers		ALLOWED	ALLOWED	NOT ALLOWED
Industrial boiler feed		ALLOWED	ALLOWED	NOT ALLOWED
Nonstructural fire fighting		ALLOWED	ALLOWED	NOT ALLOWED
Backfill consolidation around nonpotable piping		ALLOWED	ALLOWED	NOT ALLOWED
Soil compaction		ALLOWED	ALLOWED	NOT ALLOWED
Mixing concrete		ALLOWED	ALLOWED	NOT ALLOWED
Dust control on roads and streets		ALLOWED	ALLOWED	NOT ALLOWED
Cleaning roads, sidewalks and outdoor work areas		ALLOWED	ALLOWED	NOT ALLOWED
Flushing sanitary sewers				ALLOWED

Source: Water Reuse Association of California

\*Refer to the full text of the December 2, 2000 version Title 22: California Water recycling Criteria. This chart is only an informal summary of the uses allowed in this version. Adapted for use in Site Supervisor Training Workshops by South Bay Water Recycling, San Jose, California. October 29, 2002. Jerry Brown, Coordinator, Site Supervisor Training. The complete and final 12/02/2000 version of the adopted criteria can be downloaded from: [http://dhs.ca.gov/ps/ddwenm/publications/regulations/recycleregs\\_index.htm](http://dhs.ca.gov/ps/ddwenm/publications/regulations/recycleregs_index.htm)

2 With Conventional tertiary treatment. Additional monitoring for two years or more is necessary with direct filtration. 3 Drift eliminators and/or biocides are required if public or employees can be exposed to mist. 4 Refer Groundwater Recharge Guidelines, available from the California Department of Health Services.

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# Spotlight on Water Reuse

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Wastewater treatment is integral to water planning management in many geographical areas with scarce natural resources, where this asset is assigned the role of substituting a series of uses that, until now, have been covered with drinking water. The technological barriers that formerly impeded the achievement of adequate levels of quality and healthiness have been overcome with the elimination of pathogens, color and odor. Effective continuous monitoring has been introduced, so there is no longer any excuse for not employing treated wastewater for any of the aforesaid uses.

Using this system, we could conserve our natural resources of potable water and maintain reserves for future generations. This strategic pillar should be the foundation of all management plans and should be integrated into all local or state agencies' water-related master plans.

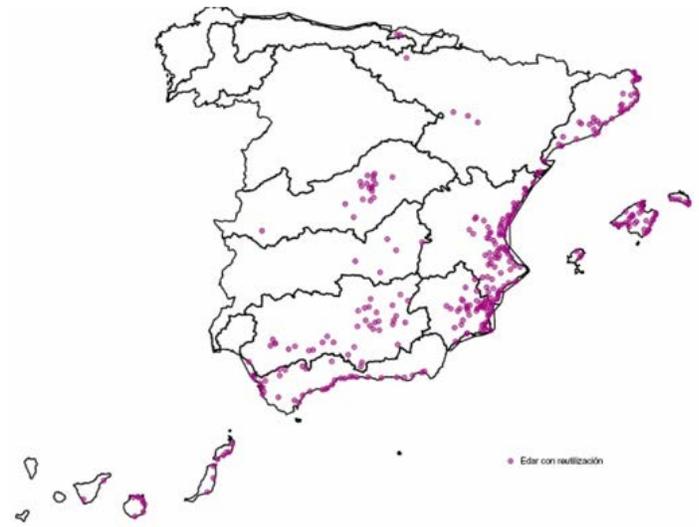
In Europe, the wide north-south gap in terms of the vision of reused water has meant that achieving a clear approach to the problem has taken longer than it should have. However, Council Directive 91/271/EEC, the Urban Waste Water Treatment Directive, was a turning point in the attention given to South European countries with scarce resources. It was transposed into Spanish Law by Royal Decree Law 11/1995 and others subsequent laws (509/1996), which establish the standards applicable to treatment under the provisions of the Spanish Sewage and Wastewater Treatment Plan adopted in 1995 and in the 2007-2015 National Water Quality and Treatment Plan. However, reuse was not considered as a complementary measure until the adoption of Directive 2000/60/EC in 2000. This Directive responds to the need to protect continental, coastal and subterranean waters and to reduce pollution, protect the environment and prevent the effects of droughts and floods within the European Community.

Spain is the leader in encouraging water management among countries with scarce water resources within the European Union. Approval of Royal Decree 1620/2007 of 7 December, which sets the legal foundation for the reuse of treated water, is a milestone in the regulatory framework for water reuse in Spain. Since its entry into force, the development of water reuse in Spain has taken a significant step forward. This legislation enables the integration of reuse into water resource planning while ensuring proper protection of human health and the environment.

For this reason, the Ministry of the Environment, Rural Affairs and Fisheries drew up the National Water Reuse Plan aimed

at creating new water sources, thus releasing higher quality water for more demanding uses and improving the general condition of water in Spain.

The National Water Reuse Plan in its current form represents a new management tool with the capacity to enhance supply security for already consolidated uses and improve harnessing of the resource by replacing pre-potable water with reused wastewater. It will also enable the extension of the net availability of water resources in coastal areas.



Distribution of the number of reuse systems (322). Source: CEDEX

The National Water Reuse Plan envisaged an increase of up to 250 hm<sup>3</sup> for agricultural, environmental, industrial, recreational and urban uses until 2015 and another 397 hm<sup>3</sup> thereafter. Spain currently reuses around 11% of its wastewater, although in areas such as the Canary Islands this figure reaches 25%. The Mediterranean region of Murcia and the schemes implemented in Madrid (66 hm<sup>3</sup>/year) and Catalonia (2,014 hm<sup>3</sup>/year) use much higher percentages of wastewater than the national average.

A new European Framework Directive is currently being developed that aims to establish common quality objectives for different uses. It only deals with irrigation and establishes four quality levels: A, B, C and D from higher to lower quality requirements for uses depending on the type of crop.

These uses exclude non-agricultural irrigation (golf courses, gardens, urban uses and other irrigation) and does not deal with recharge of aquifers, which are left in the hands of the risk management plans associated with these resources.

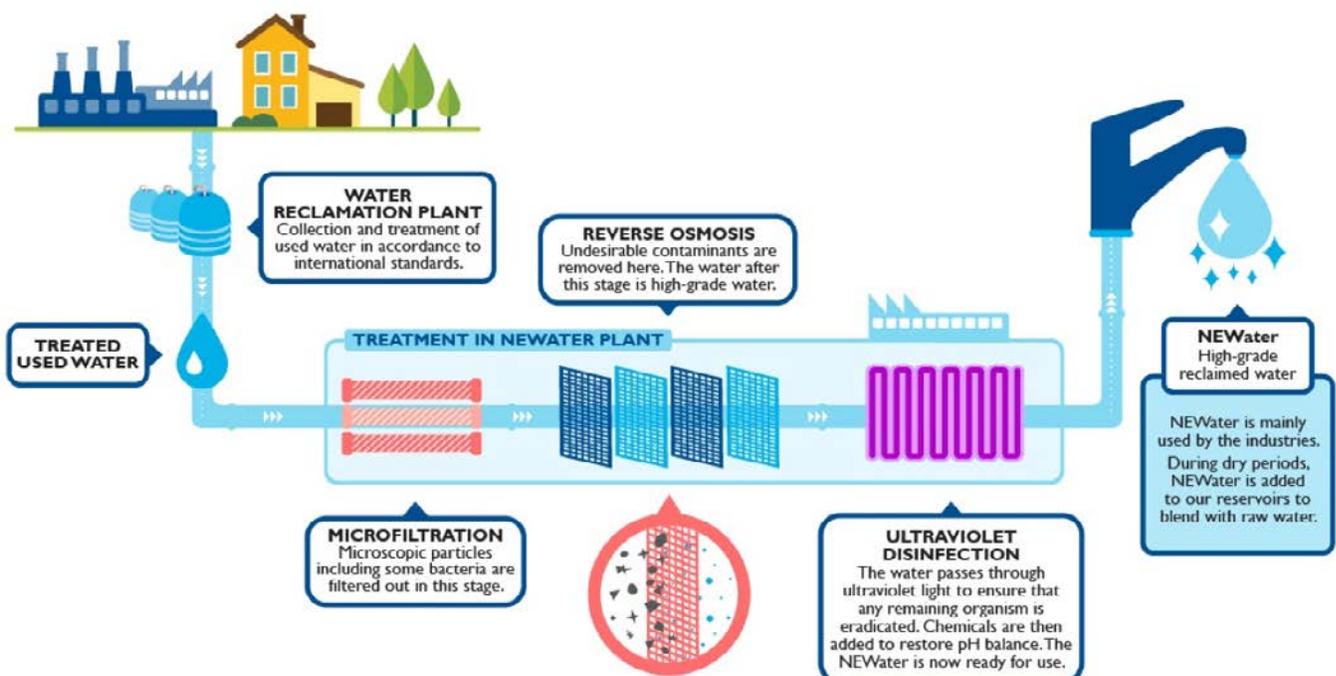
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Progress of the type described in California or Spain is enabling countries in North Africa and the Middle East to implement similar regulations as a first step to dealing with long-term planning and specific financing plans for promoting reuse as a key factor in their development.

However, reuse as a management tool should not be considered only in arid areas. One example that I find particularly interesting is the case of Singapore. Singapore is a humid country with an annual average of more than 180 days of rain and a mean annual rainfall of 2,350 mm per year, in stark contrast to southern California with 380 mm or Spain with its national average of 630 mm.

The first use (DNP) is mostly for industry (energy, petrochemicals, air conditioning in public buildings, etc.). The second, IPW, with far higher quality standards than drinking water, is mixed with rainwater and conducted to reservoirs where it is stored before being treated for the drinking water supply. The quality parameters of this reused water are stricter than the WHO recommendations for drinking water (WHO 2011) and the US EPA National Primary Drinking Water Regulations (USEPA 2019).

The country's great achievement is that it has obtained reused water that is recognized by the population as a resource and that users willingly pay its rates – a very



PUB NEWater: Step Treatment at NEWater Plants

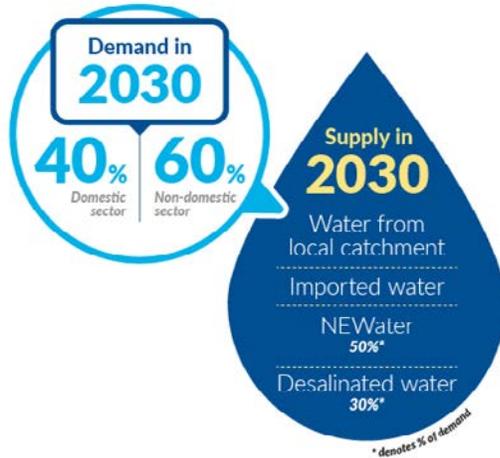
Singapore is a densely populated country with more than 5.5 million inhabitants living in 718 km<sup>2</sup>. The severe constraint of available land makes it extremely dependent on importing water from Johor and Malaysia to supply its demand of 1.82 Mm<sup>3</sup>/d. Today, water reuse accounts for 30% of the country's total resources. This has been achieved by taking two different approaches: the first is a less sophisticated scheme for industrial use that has been in production since 1966 and the second a plan implemented in 2003 with the introduction of the concept of NEWater for the supply of direct non-potable (DNP) and indirect potable (IPW) water.

controversial issue in many parts of the world – at prices of 0.65 and 1.22 SG\$/m<sup>3</sup> respectively.

The example of Singapore in harnessing reused water is exemplary due to the ease with which it has achieved public approval, due to a well-planned citizen-awareness campaign with clear government support and a rigorous water quality management and monitoring plan. Initiatives such as experts panels that have advised NEWater from numerous perspectives, the visitor center and changes in terminology are key factors of this great achievement.

# Spotlight on Water Reuse

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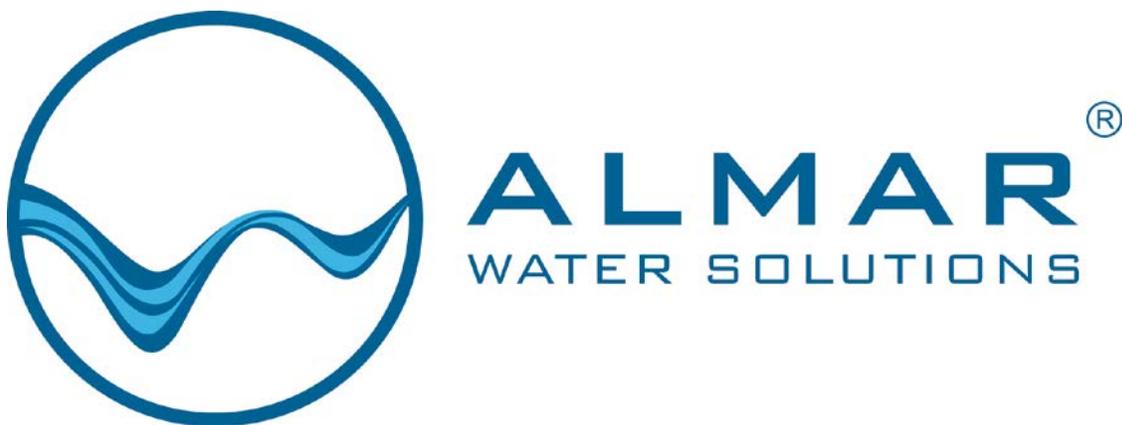


Source: PUB NEWater

After many years working to find solutions to water shortage, I put forward these pioneering examples to highlight the importance of developing legal and regulatory frameworks that enable execution of reasonable initiatives and developments in urban and agricultural areas that are restricted by the critical economic constraint of water as a scarce resource.

Addressing this lack of framework is the purpose of the International Desalination Association (IDA) in organizing the International Conference on Water Reuse and Recycling in Valencia from 24 to 27 June in which we have prepared a session called: The Big Debate: Water Reuse Regulations in Europe, USA and Asia. The following speakers are on the panel: Conchita Marcuello, engineer at the Center for Hydrographic Studies (CEDEX) of the General Directorate of Water, Ministry of Agriculture, Fisheries, Food and the Environment, Mehul V. Patel, Director of Water Production at the Orange County Water District and Maurice Neo, Director of the Recycled Water Network of the Singapore Public Utilities Board.

I urge you to attend this innovative and crucial debate on the future of water. For more information, visit <http://idadesal.org/water-reuse-conference-2018/> ■



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## Orange County Agencies Set GUINNESS WORLD RECORDS™ Title for Most Wastewater Recycled into Drinking Water in 24 Hours

In February, the Orange County Water District (OCWD) and [Orange County Sanitation District \(OCSD\)](#), both in California, USA, succeeded in the attempt to set a GUINNESS WORLD RECORDS™ title for the “Most wastewater recycled to drinking water in 24 hours”.

The GUINNESS WORLD RECORDS title was achieved by the [Groundwater Replenishment System \(GWRS\)](#), which is the world's largest water purification facility of its kind. This achievement commemorated the 10th anniversary of the facility, a collaboration between the two districts.

“Recycling wastewater is critical to protecting and effectively managing our local water supplies at a time when we are facing extreme weather and droughts,” said OCWD President Denis Bilodeau. “We hope this achievement will raise awareness and better understanding of the importance of facilities like the GRWS because the potential of water recycling in California, and around the world, is tremendous.”

“This is a time to celebrate and learn about this proven technology that is so vital to sustaining our communities and our natural environment,” said OCSD Board Chairman and GWRS Steering Committee Vice-Chair Greg Sebourm. “We have the technology now to produce safe drinking water that ensures long-term reliability of local supplies.”

The GUINNESS WORLD RECORDS title attempt to produce the most wastewater recycled into drinking water in 24 hours started at 3:30 p.m. on Thursday, Feb. 15. The successful completion of the GUINNESS WORLD RECORDS title attempt was announced Friday, Feb. 16, during the Winter Fest, a public event that was held at the GWRS facility. The celebration included a community toast with recycled water from the facility.

“This was an incredible attempt that impacted the local community and environment. It provided perspective on the process of making water safe for consumption,” said Philip Robertson, official GUINNESS WORLD RECORDS adjudicator. “We congratulate the efforts of Orange County Water District and Orange County Sanitation District and welcome them into the Guinness World Records family.”

Currently, regulations limit the use of advanced purified water to replenish groundwater basins even though the GWRS facility creates water that exceeds state and federal drinking water standards. California law AB 2022, adopted in 2016, seeks to expand the public's awareness of water treatment advancements by allowing agencies such as OCWD to bottle highly purified recycled water to be handed out for free as an educational tool. The water is so pure, it is near distilled in quality. The awareness effort is occurring as the state marches toward direct potable reuse of this water.

Around the world there are facilities similar to the GWRS, but the Orange County facility is considered the largest of its kind. The GWRS currently produces 100 million gallons a day of highly purified recycled water to inject into the Orange County Groundwater Basin, managed by OCWD, to increase local drinking water supplies and to prevent seawater intrusion. Work will soon be under way to expand its capacity to produce 130 million gallons a day of purified recycled water—enough for 1 million people.

“For more than a century, California has relied on rivers like the Colorado and Sacramento for our water. Today, we demonstrated we have new rivers to utilize,” said renowned climate expert and scientist Bill Patzert, who emceed the celebration program. “It makes perfect sense to use the technology we have today to use the water we have right in our backyard and recycle it for drinking water.”

The Orange County Water District is committed to enhancing Orange County's groundwater quality and reliability in an environmentally friendly and economical manner. The following cities utilize the groundwater basin managed by OCWD and receive approximately 75 percent of their water supply from it: Anaheim, Buena Park, Costa Mesa, Cypress, Fountain Valley, Fullerton, Garden Grove, Huntington Beach, Irvine, La Palma, Los Alamitos, Newport Beach, Orange, Placentia, Santa Ana, Seal Beach, Stanton, Tustin, Villa Park, Westminster, and Yorba Linda.

The Orange County Sanitation District is a public agency that provides wastewater collection, treatment, and recycling for approximately 2.6 million people in central and northwest Orange County. ■



Michael Mickley is a Technology Assessment Group expert at [BlueTech Research](#). BlueTech's Insight Report Update: Brine Management and ZLD, features a detailed commercial and technical cross-comparison of 15 most innovative companies offering brine management solutions, and is available at [inside.bluetechresearch.com](#).

## From Boom to Bust to (RO) Recovery: The Evolution of Brine Management Technology

By Michael Mickley

High salinity wastewater treatment is an increasing concern for many industries. The reasons include regulatory pressures (e.g., elimination of evaporator ponds in Australia), the growing lack of disposal options, and the need to maximize water resources by reusing the wastewater.

Facilities facing a brine management challenge have three options:

- Disposal (with optional limited prior treatment) – which is increasingly limited by environmental regulations.
- Beneficial use – which is rarely available and often does not represent a final fate solution.
- Further treatment – i.e., situations that require salinity reduction and a more concentrated brine or solids residual for disposal and/or resource recovery.

Over the last three years, the technology progress was centered on cost reduction and finding market niches other than unconventional oil and gas applications.

Several companies now have 1-10 commercial units in place, and BlueTech expects Zero Liquid Discharge (ZLD) and Minimal Liquid Discharge (MLD) markets to grow faster, driven primarily by the increase in industrial water reuse.

### Market Drivers

Of over 230 companies targeting the unconventional fossil fuel market that were profiled in BlueTech's innovation Tracker, 42 (~20%) were offering brine treatment, with the primary focus on cost reduction. However, many of these have gone out of business or shifted focus due to the market developing slower than anticipated.

In general, the MLD and ZLD market demonstrated slow but steady growth, averaging 10-20 medium to large projects per year. However, due to growing water scarcity, industrial water reuse is expected to become a major market.

Other drivers include increased enforcement in India and China and growing applications in unconventional oil/gas.

High equipment costs define the primary market as industrial, including treatment of cooling tower blowdown and flue gas desulfurization wastewater from the power sector, coal-to-chemical plant wastewater in China, SAGD produced water in the Alberta oil sands, and oil/gas produced water.

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## Challenges

Due to the complexity of ZLD/MLD, market entry presents a significant challenge.

The range of feedwater qualities and salinities is very large (from 60,000mg/L up to over 200,000mg/L) and typically requires multiple technologies to provide a treatment solution, while clients often seek a “one-stop-shop” solution.

The development progress is slowed by the use of alternatives to ZLD, i.e., recycling of high salinity brine (Marcellus Shale) and temporary storage in holding ponds (Australian coal seam gas), as well as low oil/gas prices and the 2008 downturn.

Evaporation technologies, in particular, have high energy requirements. While linkage with waste heat may be possible, it represents a limited possibility in many applications.

## BlueTech's Outlook

**RO-EDR solutions are most likely to have an impact earlier on.** Various methods of increasing RO recovery have been successful, meaning that the market for large conventional thermal systems will likely have limited growth, despite ongoing cost reduction.

**Recovery of salt and other resources is receiving increased attention.** Examples include the large demonstration mineral recovery effort at the El Paso municipal desalination facility and a Masdar competition technology looking into lithium recovery from a groundwater in Chile. Another company, BDL, is focusing on salt recovery from various O&G operations. ■





*Gigi Karmous-Edwards is Digital Business Lead at Amane Advisors, an advisory services firm dedicated to the water industry. Amane brings a suite of services to companies who want to grow, transform, and innovate in the water industry: strategy consulting, market intelligence, mergers & acquisitions, fund raising, PPP advisory, and Digital Transformation.*

## **The Long Awaited Digital Transformation of the Water Sector Is in Its Infancy:**

### **The Role of Disruptive Technologies such as Blockchain**

**By Gigi Karmous-Edwards**

The year 2018 shows clear signs that the water sector's digital transformation is underway. Climate change, urban population growth, tightened regulations, aging infrastructure, and water scarcity are some of the many global challenges water utilities are forced to address in creative and cost-effective ways. Amane Advisor's original research on digital technology adoption in the water sector shows that utilities that create a culture of innovation usually have staff looking outside their comfort zone for novel solutions to address such challenges.

There is an array of available disruptive technologies, which significantly alter the way water utilities run their operations and engage with their customers, that help solve some of these global challenges. These include blockchain, machine learning, IoT, drones, virtual reality, and new business models surrounding XaaS (anything as a service). The application of these technologies in the water sector has helped to transform some utilities from a data-rich environment to an increasingly knowledge-rich environment.

Utilities implementing leading edge technologies find ways to share their experiences with other utilities, often leading to further implementations. One observation from Amane's research is that more and more utilities are interested in collaborating with one another and learning through peer networks to help accelerate their digital journey. Fig 1 shows that utilities find that they gain significantly when working together and sharing best practices, and many are interested in sharing pilot results to reduce implementation time of novel technologies.

### **The Changing Role of Customer Engagement and the Potential of Blockchain**

One technology that has the potential to disrupt the business models in the water sector is blockchain technology. Utilities' top priority are their customers. Improving overall customer experience involves both transparent engagement and the delivery of cost-efficient, reliable services. Sharing data and data insights via machine learning with customers could help to build trust even if the utilities share information not favorable to utility operations such as outages or water quality issues. Utilities have been reluctant to share data with other utilities, cities, and customers (specifically about water quality) and may need the help of blockchain technology to do just that. Blockchain technology has the potential to expedite the transfer of data between parties via open exchanges in some cases directly from the sensors themselves.

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## A Blockchain Analogy

Blockchain technology by definition provides a mechanism for decentralized ledgers (records) that are chained and securely encrypted to help trustless parties interact. Blockchain has the potential to disrupt the water industry. Uber and Airbnb disrupted the hotel and taxi business by taking away centralized organizations and opening up the market to anyone that can drive or provide a bed via the platform revolution. Although platform technology significantly disrupted the market for traditional hotels and taxis, there still existed a "trusted middle entity" (Uber and Airbnb) that received a fee for each transaction. What if there was a way to remove the middle entity and instead form a set of distributed validating servers for every transaction while recording every transaction on these servers as well. That will eliminate the need for a trusted single middle entity and allow trustless-parties to securely interact. That is what blockchain startups, such as San Francisco based Origin Platform, are now trying to do with Airbnb and Uber like markets.

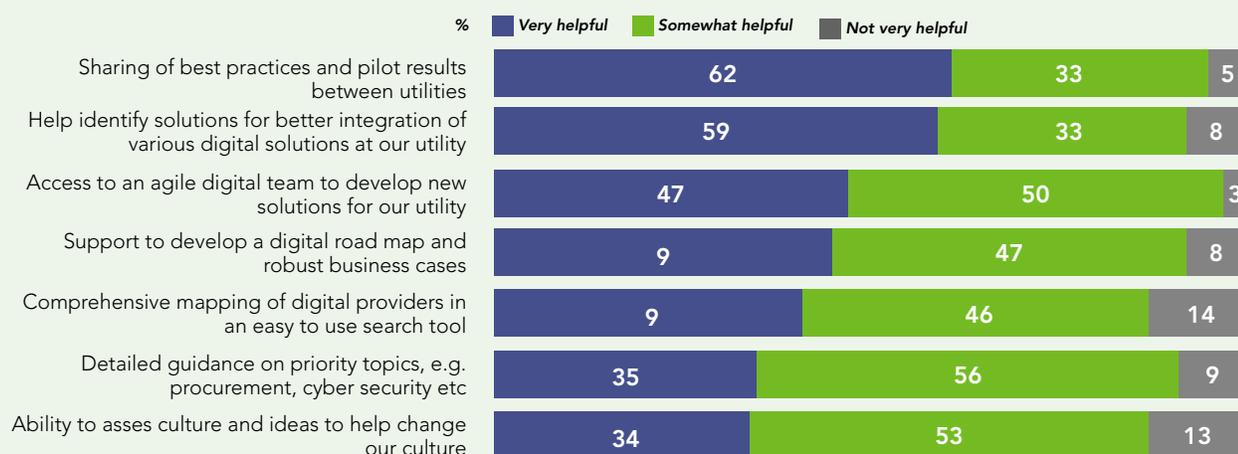
## Utilities Piloting with Blockchain Technology

Data shared between utilities will provide beneficial insights for all utilities, as well as cities and their citizens. Blockchain technology may be used to mitigate the lack of trust when sharing data. Recently, the Australian government announced an award of \$8M for a project involving the city of Fremantle that accumulates data from both water and energy. The project will use Power Ledger, a global P2P blockchain full stack technology company, to provide a transactional layer for renewable assets. Other examples exist where blockchain is being used for water rights and other water related transactions on pilot scales.

Blockchain is just one technology that can potentially change the water sector and the business of water. The digital transformation of the water sector will continue to challenge and improve the way utilities operate and engage with customers. ■

Utilities are open to collaborate with other utilities on their digital journey, and appreciate support with integration of solutions

### MOST HELPFUL SOLUTIONS ON UTILITIES' DIGITAL JOURNEY



Source: Amane Digital survey with n=81 utilities

# Young Leaders Program Spotlight



## Sponsor the IDA Young Leaders Program!

We invite you to support the IDA YLP program, designed to help young professionals and students advance their careers in desalination and water reuse through networking opportunities, university connections, and opportunities to participate in (to apply for participation in) scholarship, fellowship, and mentorship programs. Your support will help IDA YLP members partake in IDA and affiliate regional conferences as well as professional networking platforms, fund our educational programs, and much more.

IDA YLP's mission is to create opportunities for emerging leaders in desalination and water reuse to connect, participate in career-building programs, and promote interest in advanced water treatment solutions. Our aim is to encourage the next generation of water leaders who are passionate about the industry.

## Available Sponsorship Packages

### Platinum (\$5000+)

- One complimentary individual membership in IDA (which includes IDA YLP membership, if applicable)
- Advertisement at an IDA YLP Social Event of the sponsor's choice (World Congress or other regional IDA affiliate event)
- All items in Gold, Silver and Bronze packages

### Gold (\$3500)

- A half-page company profile in IDA Connections, IDA's publication that is distributed to more than 10,000 contacts in IDA's database, including all members
- All items in Silver and Bronze packages

### Silver (\$2500)

- Announcement of sponsorship in IDA's digital Bulletin, distributed to the entire IDA database
- All items in Bronze package

### Bronze (\$1000)

- Announcement of sponsorship in YLP Bulletin
- Company logo on YLP website

IDA's Young Leader's Program is open to all IDA members 35 years of age or younger. The goals of the YLP are to:

- Promote working in advanced water treatment solutions as a career choice
- Promote career opportunities and advancement in the industry
- Provide a forum for communication and exchange of ideas among young professionals and the industry at large.



## 2018 Membrane Technology Conference A Success

This year's Membrane Technology Conference and Exposition MTC18 2018 was held in partnership with AWWA, AMTA, Water Environment Federation and WaterReuse Association in West Palm Beach, Florida. Attended by 1,031 people, the Conference had four concurrent Technical Sessions with 106 presentations as well as a Poster Session. The Experts in the Round was one of the highlights of the program. The popular Exposition featured over 75 exhibitors in the Exhibit Hall.

Three individuals were inducted into the AMTA Hall of Fame during the event, two with strong ties to IDA: Randy Truby, Jim Birkett and Clint Kopp.

MTC19 will be held in New Orleans, Louisiana in February 2019. The next AMTA Technology Transfer Workshops will be in El Paso, Texas in April, Spokane, Washington in July, State College, Pennsylvania in October and Keystone, Colorado in December.

IDA's North American affiliate, AMTA has recently produced podcasts from all the Chats with Pioneers video series. The videos and podcasts can be found on AMTA's website [www.amtaorg.com](http://www.amtaorg.com) ■



Networking is an important part of MTC. (Photos courtesy of AMTA)



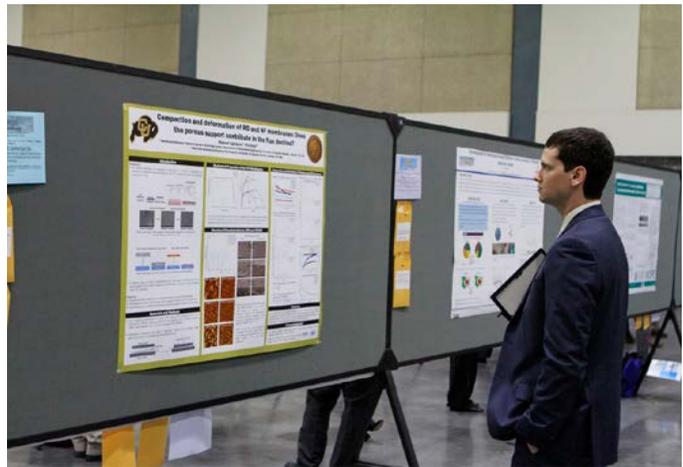
Ilan Watson introduced AMTA Hall of Fame Inductee Jim Birkett. Ilan was also awarded the AMTA Lifetime Service Award.

# Affiliate Spotlight

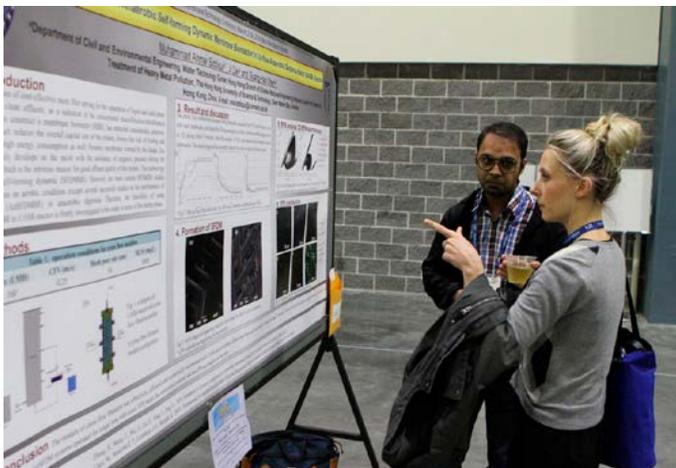
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Presentations from peer reviewed abstracts make the MTC valuable to all that attend.



Poster Sessions are an important part of MTC and allow for a longer time to consider the message.



Poster Sessions are an important part of MTC and allow for a longer time to consider the message.



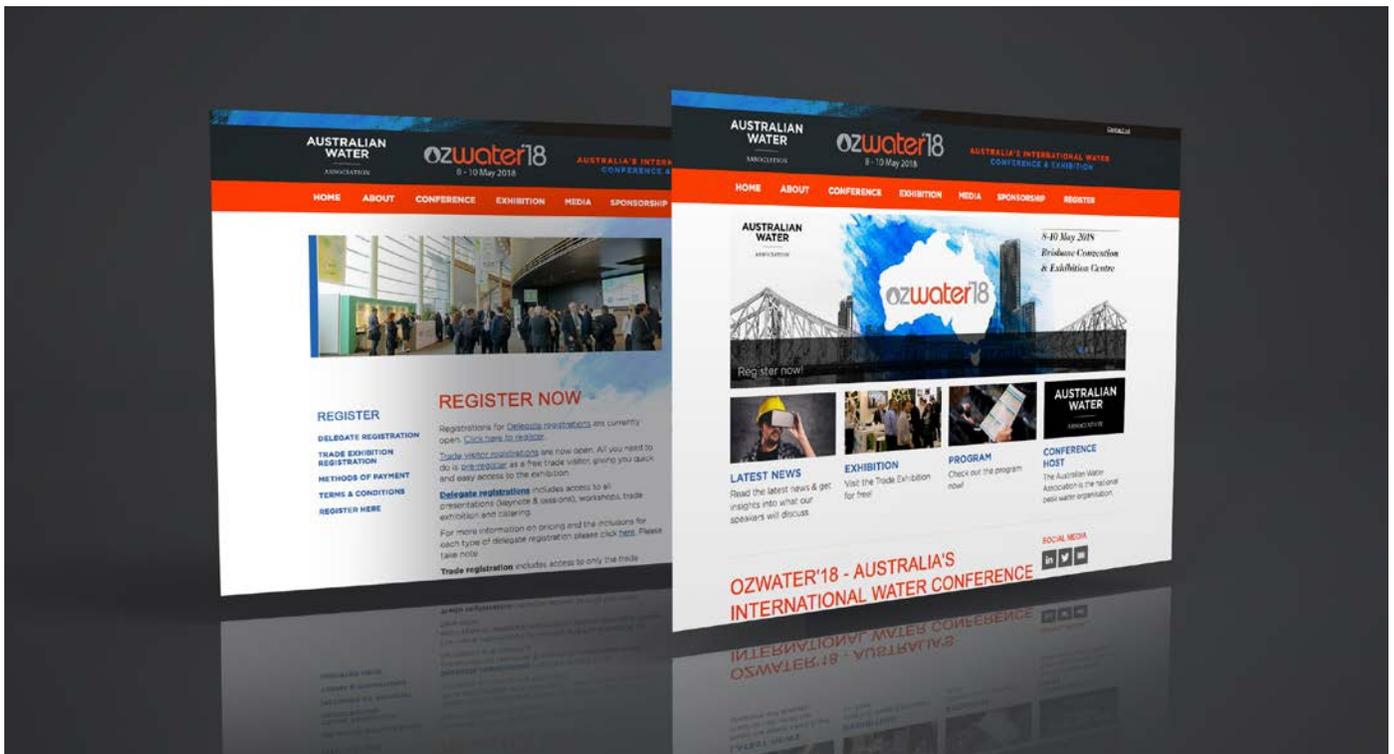
MTC includes a robust Exhibit area.



Eleanor Allen, CEO Water For People, was the MTC Keynote Speaker.



The Awards Lunch is always an anticipated event.



## Australian Water Association Presents Ozwater '18

Ozwater is Australia's international water conference and trade exhibition, run annually by the Australian Water Association. This year's edition takes place May 8-10 at the Brisbane Convention & Exhibition Centre.

The Ozwater'18 Conference will feature inspirational international and national keynote speakers, numerous invited speakers, scientific and technical papers, case studies, workshops, panel and poster sessions. This will be an opportunity like no other to network and engage with industry leaders and experts from all over Australia.

As well as an international standard 3-day conference, a major component of the event will be the comprehensive and extensive Ozwater'18 Trade Exhibition that will showcase the best of what the industry has to offer. Leading exhibitors from around the world will display products, services and innovations in this world standard exhibition. In addition to Ozwater'18 delegates, it is anticipated that thousands of trade visitors will attend the free exhibition. The exciting

floor plan layout will ensure the maximum interaction of exhibitors, delegates and trade visitors. For more information, visit <http://www.ozwater.org/>

IDA's affiliate the [Australian Water Association](#) is an independent, not-for-profit association for water professionals and organizations, providing leadership in the water sector through collaboration, advocacy and professional development. As Australia's peak water industry body, the Australian Water Association has the largest and most broadly based membership, with 600+ corporate members and more than 4,500 individual members representing the diversity and breadth of the water industry.

Formed in 1962, the Association has provided organizations with tools and opportunities to showcase their products and services, support and representation in the water industry for decades, and continues to evolve to face the challenges of an ever-changing and dynamic sector. ■

# Affiliate Spotlight

## EDS



IDA's European affiliate, the European Desalination Society (EDS) is a Europe-wide organization for individuals and corporate members including universities, companies, research institutes, government

agencies and all concerned with and interested in desalination and membrane technologies for water.

It is a society uniting all interested in promoting desalination, water reuse and water technology. All processes are covered and the wide range of roles and activities involved in the desalination field are included:

research, applications, consulting, contracting, operation and maintenance, manufacturing, marketing, economics, legislation. Members are welcome from other regions outside Europe.

EDS's conference Desalination for the Environment: Clean Water and Energy takes place September 3-6, 2018 in Athens, Greece. For more information, visit <http://www.desline.com/congress/Athens2018/home.html>

In addition, EDS has been organizing Master Courses since 2003. For information visit <http://www.edsoc.com/>

## AEDyR



The Asociación Española de Desalación y Reutilización (AEDyR) was created in 1998 following the successful IDA World Congress held in Madrid in 1997. AEDyR intends to gather all individuals, companies and organizations dealing with desalination and water reuse in Spain.

AEDyR became an affiliate of IDA in recognition of its technological development and its desalination track

record. Importantly, AEDyR is one of the world's few non-regional, country-specific desalination associations.

Spain's large engineering companies performed an outstanding role at that point, and with the collaboration of a number of individuals, they helped the association take its first steps forward.

At the beginning, the Board of Directors comprised only nine members, this number rose to 11, reaching 15 members in 2007 as the result of the increase of associate memberships. The Events Committee is responsible for all events developed by AEDyR, such as the biennial Congress, seminars, conferences, etc.

The association will hold XII Congreso AEDyR on October 23-25, 2018 at the Palacio de Congresos El Greco in Toledo, Spain. For information visit <http://congresoaedyr.com/>



## IDA Announces Internship Program for Members of Young Leaders Program and Corporate Members

IDA is working with its Corporate Class I members to develop a program that will provide internship opportunities for members of the IDA Young Leaders Program at participating member companies.

The specific opportunities, including duration of the internship, will be outlined by participating IDA Corporate member companies, which will send the information to IDA including the requirements of the potential interns and corporate contact details for direct application by IDA YLP members.

The internship opportunities will be advertised and applications will be open for a specified period. The applicants will apply directly to the company for their internship via the IDA website. The participating company will then review applications and implement its recruitment process (IDA will not be involved in the selection process). The final choice of the intern will be decided by the IDA Corporate Class 1 members who will then advise IDA of the successful candidate(s). Announcement of the successful interns will be made first by the IDA. The participating companies may opt to provide a stipend to interns but this decision is left to them.

At the end of the internship, the intern will be asked to write a one-page summary of their experience.

IDA recommends a short assignment ranging from 6 weeks to 3 months depending on availability and resources of the IDA Corporate Class 1 members. Participating companies may also opt to offer shorter and longer opportunities as their resources permit.

*"This program will offer a powerful membership benefit to young professionals, universities and corporations. Internships provide relevant experience to young professionals that can aid in job searches and career development. The internships offer a unique opportunity to work in a utility/company/institution of their choice where they will be given the avenue to acquire technical knowledge and experience in their chosen field of study. Companies are constantly searching for new, upcoming talent and these internships will allow them to work directly with the student/young professional and evaluate their abilities. They can thereafter choose to hire the intern based on their proven talents. The program is a win/win for all involved,"* says Shannon McCarthy, IDA Secretary General.

For more information, visit [www.idadesal.org](http://www.idadesal.org). ■

## IDA to Support 2018 Greening the Islands International Conference

On behalf of Spain's Balearic Islands, Menorca will host the 5th edition of the [Greening the Islands International Conference on 17-18 May 2018](#). The annual gathering will be held in association with the Government of the Balearics, the Municipality of Minorca, the Biosphere Reserve Institution of Minorca and the Spanish Solar Photovoltaic Industry Association (UNEF), with the support of IDA.

The conference, in line with previous editions, will focus on the enlarged concept of circular island economies, investigating the nexus between energy, water and mobility while also embracing waste, agriculture, culture and traditions. The program gives attention to the topic of water with a session on "Desalination of Marine and Brackish Waters: Innovation Related to Renewable Sources. Solar-Desalination Solutions: Political and Economic Challenges and Potential Market". The conference is the must-attend event for sustainability professionals and players who are working in island contexts and other remote locations.

The 4th edition of the Greening the Islands Awards will be held in occasion of the international conference in Menorca. Islands from around the world are [invited](#) to enter as long as they have worked on projects related to the following topics:

- Renewable Energy and Energy Efficiency
- Sustainable Mobility and Transportation
- Water

The conference is confirmed to be an "online event" thanks to the live streaming and the interactive functions of the [GreeningTheIslands.net](#) web platform, which facilitates the involvement of a larger number of island stakeholders.



**GREENING  
THE ISLANDS.NET**  
CONNECTING ISLAND INNOVATIONS

In addition, the Conference will host the first operational meeting of the [Greening the Islands Observatory](#), a continuous structured research and analysis on energy, water and mobility, looking into island needs across different sectors, starting with energy, water and mobility.

The Observatory will map the most sustainable and innovative solutions, trends on technologies and costs, providing key information to develop strategies and plans.



*IDA thanks Gianni Chianetta, Director at The Green Consulting Group and Greening the Islands Conference, for reporting on this project. Mr. Chianetta is Vice-President at Global Hybrid Power and is a member of the Global Solar Council Steering Committee.*

*Greeningtheislands.net – connecting island innovations – is a global initiative that has been launched to spread the word about sustainable island projects and help them to be replicated in as many locations as possible.■*

## IDA in the News: GineersNow Water Leaders Magazine and GineersNow TV



IDA garnered the cover of GineersNow's [Water Leaders Magazine March issue](#), capturing several pages of prime coverage including interviews with IDA President Miguel Angel Sanz and Secretary General Shannon McCarthy. Importantly the issue also served as a showcase for several IDA corporate members and affiliates: Acciona Agua, AEDyR, Toyobo, PUB Singapore, PakDA, Almar Water Solutions, Suez, Aquatech, WSTA and Future Pipe Industries were all featured in the issue.

GineersNow is also extending a special membership offer to readers of its Water Leaders Magazine and the GineersNow community – 10% off for the 2018-2019 membership year (July 1, 2018-june 30, 2019) plus free membership for this April, May and June. The offer is open to new members only. For information, contact [membership@idadesal.org](mailto:membership@idadesal.org)

GineersNow also interviewed Mr. Sanz and Ms. McCarthy during this year's International Water Summit in Abu Dhabi for its TV channel, GineersNow TV. To watch the interview, [click here](#). ■

## IDA Participated in Three Events during March

### ***Miguel Angel Sanz reports on a busy month for IDA at three leading industry events.***

This year started with the renewal of a collaboration agreement between the International Water Summit of Abu Dhabi and the participation in IWS January event. Activity has continued to build, and March 2018 was very intense in terms of IDA activities at events around the world.

Secretary General Shannon McCarthy attended the **Membrane Technology Conference** in Palm Beach on March 12-15, an event presented by AMTA/AWWA in partnership with the Water Environment Federation and WaterReuse Association (see page 39).

 Energy efficient desalination: Results from the Ghantoot pilot studies 17-Jan-2018 14:30 – 16:10	 Laying the foundations for efficient water use 17-Jan-2018 16:10 - 16:55	 Taking the waste out of wastewater 18-Jan-2018 12:10-12:55	 Global Clean Water Desalination Alliance 18-Jan-2018 08:45 – 10:00	
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Join them at Abu Dhabi National Exhibition Centre (ADNEC) in Abu Dhabi!

**INTERNATIONAL WATER SUMMIT**  
PART OF ABU DHABI SUSTAINABILITY WEEK



This year IDA also supported **WEX Global**, held March 12-14 at the Oitavos Hotel in Cascais-Lisboa. IDA organized one of the desalination sessions – “The Future of Desalination: New Horizons!” – in which several IDA Directors were speakers. The moderator was: Miguel Angel Sanz, and speakers included Borja Blanco, IDA Director and CEO of Aqua Advise; Mohamed Taibi, AEC Project Director; and Jose Maria Ortega, AMEA Development Director of Acciona Agua. There were very interesting discussions about future desalination plants in MENA region, procurement methods and energy optimizations.



This year Brasilia hosted the **8th World Water Forum**. As with the two previous events, IDA was well represented by several Directors: past IDA President Dr. Emilio Gabbrielli, Alejandro Sturniolo, Zamzam Alrakaf and Miguel Angel Sanz.

The WWF8 was the most attended of the World Water Forums, having over 105,000 attendees with an incredible participation in all sessions. The majority of the rooms were totally full, having queues of people waiting outside. That was the case where IDA participated.

Miguel Angel Sanz took part as IDA President in two thematic sessions to talk about desalination and water reuse.



IDA Directors were also active in several other sessions of the WEX event, such as Dr. Corrado Sommariva, who participated in the session “Water Cycle Management and Water Reuse”; and Leon Awerbuch speaking in the session “Seawater Desalination and Digital Revolution”.

IDA’s President was also a speaker in the first plenary session: “Tackling Climate Change & Building Resilience: Climate Change Cities”.



In the Climate session 1C2, “Low Carbon Water Services to Achieve Climate Mitigation”, Mr. Sanz spoke about the use of renewable energy in desalination to minimize the carbon footprint, and about the Global Clean Water

Desalination Alliance commitments to increase the use of green energies in desalination. Also participating in this session was Zamzam Alrakaf, IDA Director from the Middle East. The session was very participative, and 80% of the questions in the debate were devoted to desalination.

In the Urban session 4B2, "Recycling Waters", Mr. Sanz was the keynote speaker talking about the main uses, drivers and challenges of wastewater reuse. The speakers from this session presented different cases studies from around the world: PUB of Singapore and NEWater, Direct Potable Reuse of Windhoek, irrigation in Bolivia represented by the Ministry of Environment, and agricultural use and aquifer recharge



in Spain. The majority of the proposed questions were about water tariffs, sustainability, PPPs, public awareness and regulations.

During the WWF, we organized a meeting with representatives of Spanish Ministry of Agriculture, Fisheries and Environment, including the Water General Director, Liana Ardiles, to review the collaboration and participation in the IDA

Water Reuse Conference in Valencia.

On World Water Day, the Urban Thematic closing session emphasized the importance of recovering the water cost in tariffs and improving regulations in the countries to accelerate the reuse of treated wastewater. ■

# IDA Connections

## IDA Connections Now Accepting Member News

IDA Connections is now accepting news items from our members for publication. Please feel free to send news about company developments, products/services, research findings and people. The deadline for the next issue is July 20. Member news will be published space permitting and pending the review of IDA Connections' editorial staff.

Submissions must be sent as Word documents to editor Ann Seamonds at [seamonds@seamonds.com](mailto:seamonds@seamonds.com). Images must be sent as separate attachments and must be high resolution jpeg files (at least 300 dpi at 4" x 6"). If you would like to contribute a more expansive article, please contact Ann Seamonds about your story idea.

## Marketing Opportunities with IDA

IDA will soon offer marketing opportunities in IDA Connections, on its websites and bulletins, creating new avenues to promote your company's brand, products and services, and leadership in the global desalination and water reuse community.

IDA Connections now has expanded circulation to more than 10,000 advanced water treatment professionals around the world and strategic partnerships, and our events, advocacy and outreach programs can enhance your profile around the world.

In addition, we are offering sponsorship opportunities not only for our [2018 International Water Reuse and Recycling Conference in Valencia](#), Spain, and our eagerly anticipated 2019 IDA World Congress in Dubai, but also for our [Young Leaders Program](#), [mentor program](#), and educational programs such as the IDA Academy, [Channabasappa Memorial Scholarship](#) and [IDA Fellowship Program](#).

We will be sending a link to our media kit shortly with opportunities in IDA Connections, our website and e-alerts. For more information about sponsorship opportunities, please contact [info@idadesal.org](mailto:info@idadesal.org)

*IDA Connections* is available on the IDA website, [www.idadesal.org](http://www.idadesal.org). The views expressed in articles contributed to IDA Connections are not necessarily the views of the International Desalination Association. IDA assumes no responsibility for unsolicited manuscripts and/or artwork.

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Please visit the IDA website ([www.idadesal.org](http://www.idadesal.org)) for a listing of industry events and updates on all IDA activities.



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