Republic - Export Building, 1st Floor
2 Clove Crescent
London E14 2BE
Tel: +44 (0)20 7654 5500
Fax: +44 (0)20 7654 5555
E-mail: water@iwahq.org
www.iwa-network.org

IWA Webinar

"Water Reuse in the United States: A Trend on the Rise" Q&A report

Webinar available at: https://iwa-network.org/learn/water-reuse-in-the-united-states-a-trend-on-the-rise/

Q&A report

Questions to be answered

#	Question	Panelist	Answer
1	With the increase of water reuse, how do you deal with emerging contaminants that have passed through the traditional treatment processes, such as PFAS and nanoplastics?	ESD	Advanced treatment processes can remove these contaminants, in particular RO (for PFAS and nanoplastics) and also GAC or ion exchange (for PFAS).
2	Three of the most challenging organic and non-organic contaminants to remove.	ESD	The answer depends on the treatment approach. Generally smaller, more polar molecules are harder to remove though typical treatment approaches.
3	Are funds from Water Reuse only available for studies in the USA?	J West	WateReuse and its state sections, including CA advocate for grant and loans for recycled water. We also support public funding for research. In CA our grant and loan funding is generally limited to public agencies. The Water Research Foundation funds research with international partners as long as the study results are applicable to US utilities.
4	'@ Julie what are best way for receive research grant like educational background as well facilities for student from South - East asia like Bangladesh	Julie Minton	Water Research Foundation programs are open to international applicants and students. Please visit https://www.waterrf.org/programs for more information.
5	Do you have water reuse projects where you deal with multiple potential end-users?	J West	This is often decided before the project is developed through scoping. For non-potable in CA

the international water association

Republic - Export Building, 1st Floor
2 Clove Crescent
London E14 2BE
Tel: +44 (0)20 7654 5500
Fax: +44 (0)20 7654 5555
E-mail: water@iwahq.org
www.iwa-network.org

	How do you decide which one will receive the reclaimed water?		public agencies often have staff that perform community outreach and seek recycled water customers for non-potable.
6	At what population level or water flow amount is water reuse financially sustainable and/or viable?	JWest	Recycled water projects vary in complexity and cost -- with potable reuse and DPR the most complex. For now in CA the more complex/expenses projects are being undertaken and planned in cities. Non potable irrigation projects are located in smaller communities statewide.
7	What is the define the price of the reclaimed (recycled) water?	J West	This varies greatly in CA depending upon the type of recycled water (potable-non potable) and location in the state. Often the cost is more than traditional sources (imported/groundwater pumping). But during shortages the importance (real value) of a secure source of locally controlled, sustainable supply is hard to quantify.
8	Water reuse for drinking from wastewater how does USA reacts?	J West	This varies throughout the country. In CA many communities are supportive once they understand the treatment process (often potable reuse agencies have demonstration facilities for the public) Ongoing outreach is critical.
9	At what population level or water flow amount is water reuse financially sustainable and/or viable?	J West	See answer 7
10	Are you aware of any negative events, for example a microbiological outbreak or other type of problem, involving reclaimed or reused	ESD	I am not aware of any adverse health outcomes from recycled water use in the US.

the international water association

Republic - Export Building, 1st Floor
2 Clove Crescent
London E14 2BE
Tel: +44 (0)20 7654 5500
Fax: +44 (0)20 7654 5555
E-mail: water@iwahq.org
www.iwa-network.org

	water? I mean, I see a lot of successful initiatives. Are we reporting our bad experiences too?		
11	Are there regulatory standards that water reuse must be qualified as safe drinking water? What additional treatment processes must make that happened?	ESD	Reuse is regulated at the state level. Several states have defined regulatory standards for potable reuse; others have not.
12	Please provide cost comparsion between potable water production from desalination plant and potable water from reuse plant(sanitary sewer as water source)?		Cost comparison information can be found in the following report: https://www.researchgate.net/publication/314462281_Energy_Use_and_Economics_of_Direct_Potable_Reuse
13	In which situations would it be more appropriate for water reuse standards to meet groundwater standard versus meeting drinking water standards?	ESD	The recyled water must always meet the standards for any use for which it is provided.
14	What is expected to be the price of recycled water for irrigation and, have the farmers agreed to pay for it?	J West	Yes farmers are paying for recycled water in CA. In CA prices vary. In previous decades it was free, but as water scarcity increases this has changed. More information can be found on the CA Ag Reuse Committee site. https://watereuse.org/educate/water-reuse-101/agricultural-reuse/
15	What about the actual reutilization costs($/gal)? Could you please give some approximative ranges?	ESD	Costs vary greatly. Speaking only to treatment costs, those can range from negligible additional cost for non-potable reuse (non-food crop irrigation, for example) to high ($2,000 /AFY) for advanced treatment.

the international water association

Republic - Export Building, 1st Floor
2 Clove Crescent
London E14 2BE
Tel: +44 (0)20 7654 5500
Fax: +44 (0)20 7654 5555
E-mail: water@iwahq.org
www.iwa-network.org

16	Do you use metagenomics to track pathogens? What are the benefits and challenges of these microbiological monitoring techniques?	ESD	Metagenomics is a tool currently used mainly in research.
17	How are these projects financed, and does CAPEX consider the transportation to the consumption local (in case of agriculture, for example)?	ESD	Projects are funded from a combination of sources, including grants, low-interest loans, and rate increases.
18	Great presentation. I'd be interested in the link to the quality standards underpinning the different uses: agri use, IPR, DPR and so on.	ESD	Thank you! The US EPA 2012 Reuse Guidelines are a good reference.
19	What are some of key issues that someone would concern about using water reuse, like pathogens, and other contaminants as an alternative water source?	ESD	Pathogens and regulated chemicals are the primary concern. We also track
20	As you are working on some new technology in water reuse system, Did you study to optimize for previous frustration and treatments by using these new bringing technologies?	ESD	I don't understand the question.
21	General question for all speakers: Have you encountered good examples of implemented economic models that help argue for reuse by including enviromental externalities, for example? This could help offset the CAPEX intensity that is often a big obstacle for implementation. Or whole-cycle integrated approaches in which project funding takes into account the avoided withdrawal from critical reserves?	All speakers	This is standard practice in integrated water resources planning. In that context, reuse is just one tool in the overall optimization effort.
22	How to deal with lack of public acceptance? One of the main difficulties when implementing potable reuse might be convincing the citizens to drink reclaimed water. One question I've been ask	ESD	Potable reuse isn't always the right solution. Site-specific factors will determine what makes the most sense. Some communities don't have

the international water association

Republic - Export Building, 1st Floor
2 Clove Crescent
London E14 2BE
Tel: +44 (0)20 7654 5500
Fax: +44 (0)20 7654 5555
E-mail: water@iwahq.org
www.iwa-network.org

	and I can not convincingly answer it is: why reusing water for potable reuses when it can be reused by bigger consumers such as industry or agriculture? Thanks		agriculture or industry, or they are too far away from the wastewater plant.
23	Excelentes presentations. What is the degree of acceptance of people to drink treated water? Are there studies on the safety of drinking water that has been treated?	ESD	Thank you! Public acceptance of new reuse projects depends a lot on the existing level of trust the community has in its water provider and can be increased by public education campaigns. There are many studies, for example from the Water Research Foundation, demonstrating the safety of potable reuse.
24	How are these projects funded? Tariffs, taxes, Grants? Time-horizon of the supplying contracts? Are there and what are the differences between DPR and IPR funding?	ESD	See #17.
25	Are there opportunities for reuse projects using existing infrastructure without necessarily improving or adding to existing treatment processes?	Jwest	Yes. In CA the North Valley Regional Recycled Water program is a great example of using existing infrastructure for conveyance – https://www.almonds.com/why-almonds/almond-living-magazine/meet-woman-behind-north-valley-regional-recycled-water-program
26	What about the challenges with Factor Yuck?! What is the way to reduce the impact of rejection?	J West	First be honest and open always. Most major projects in CA hire professional help and outreach coordinators. WateReuse CA has a specific committee to discuss these issues and has developed resources https://watereuse.org/sections/watereuse-california/communications-collaborative-group/

Republic - Export Building, 1st Floor
2 Clove Crescent
London E14 2BE
Tel: +44 (0)20 7654 5500
Fax: +44 (0)20 7654 5555
E-mail: water@iwahq.org
www.iwa-network.org

27	In your experience, which are the most critical needs regarding water treatment? And the main obstacles promoting these new projects?	ESD	See other answers.
28	1,4 dioxane and NDMA are required to be removed by California DDW. How do other processes (than UVAOP) address these?	ESD	Industrial source control, avoiding NDMA formation.
29	In regards to aquifer injection, what concerns do you have biomat production and ultimately bioclogging and are the benefits of this biological barrier as a possible additional treatment considered	ESD	Injected water contains a disinfectant residual to avoid clogging the wells with biological material.
30	What has been the main strategy for people to accept water reuse or what is planned for it?		See answer 26
31	Many thanks, Jennifer. The same in Portugal, Europe. I think we need to have "cheap money" (grants, low interests) to launch water reuse as an alternative water resource.	J West	Yes low interest loans and grants help to kick start projects.
	What have been your experiences in water governance from both political will and financing resilience or sustainability	J West	In CA these projects take local and often statewide political will – as public funding (grants and loans are usually involved) They need to understand the long-term investment in developing sustainable supplies even when there is a wet year. This takes leadership and vision.
32	I think in California, at least, potable reuse is being viewed as a lower cost alternative to seawater desalination.	Jwest	Traditionally recycled water has been less expenses than ocean desalination.

Answered questions

#	Question	Panelist	Answer
1	What is the most commonly used tertiary technology(s) for removing micro-pollutants/emerging contaminants		No - worldwide participation is welcome. Our Tailored Collaboration

Republic - Export Building, 1st Floor
2 Clove Crescent
London E14 2BE
Tel: +44 (0)20 7654 5500
Fax: +44 (0)20 7654 5555
E-mail: water@iwahq.org
www.iwa-network.org

	from wastewater secondary effluent for water reuse?		https://www.waterrf.org/tailored-collaboration-program program requires subscriber to lead/participate. Otherwise open to all, but pulling in subscribers is advantageous.
2	'@Julie, thanks for the nice presentation! Do you know any examples of advance carbon technologies (alternative to RO) that you mentioned?	Julie Minton	Eva will review treatment trains NOT using RO in her presentation coming up. Re: public perception of drinking purified water - it requires utility engagement early on to get public on board. Happy to discuss further during panel..

Questions received during registration

#	Question	Panelist	Answer
1	Is this technology applicable in Africa countries? How about the cost viability, project feasibility, benefits, etc		A good starting point would be to investigate the world's first DPR project in Namibia, Africa. https://www.awwa.org/AWWA-Articles/dpr-project-in-africa-cradle-of-water-reclamation For information on cost, please see #12 in the "Questions to be answered" section.
2	Best possible method to reduce Total Dissolved Solids in water other than R.O.? Concentrate Water being rejected in large volume	ESD	There are no good solutions for desalination other than RO.
3	Have you had issues with organic matter in your treatment? if so, how have you dealt with it?	ESD	The US EPA 2012 guidelines and the US EPA 2017 Potable Reuse compendium are good resources.
4	how a circular model for water use and reuse can be achieved in developing nations?		A great resource to answer this question is the "Water in Circular Economy and Resilience" report published by

the international water association

Republic - Export Building, 1st Floor
2 Clove Crescent
London E14 2BE
Tel: +44 (0)20 7654 5500
Fax: +44 (0)20 7654 5555
E-mail: water@iwahq.org
www.iwa-network.org

			the World Bank in 2021 https://openknowledge.worldbank.org/handle/10986/36254
5	How are you addressing emerging concerns (climate change, circular economy, PFAS) in your reuse applications?	ESD	Water reuse is the definitional "circular economy concept" for water. It is a measure that can be used to adapt to climate change impacts, though advanced treatment also often requires a lot of energy. Treatment (RO, GAC) exists to address PFAS and other emerging contaminants.
6	How are you planning to get the public to accept recycled or reuse water as an alternative or supplementary water supply?	JWest	See answer 26
7	How can this technology be used in development countries especially to solve water scarcity in water stressed areas?	ESD	Water reuse is not a technology, it is a *practice*. Many different technologies exist. The US EPA 2012 guidelines and the US EPA 2017 Potable Reuse compendium are good resources.
8	What are the current major research gaps in this area for reuse adoption/implementation??		The Water Research Foundation recently held a water reuse research needs workshop. The major research gaps identified include projects in the areas of source water control, treatment, monitoring, public acceptance, workforce needs, etc. Results from this workshop will be released by WRF soon(?).