

# WATER DESALINATION REPORT

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## United States

### FEDERAL BUDGET WILL BOOST DESAL R&D

This past Friday afternoon, the US Federal government signed its \$1.3 trillion 2018 omnibus bill into law. The bill—*omnibus* means ‘for all’ in Latin—covers all government spending for all departments during the fiscal year.

Although the word *desalination* wasn’t mentioned once in the 2,232-page bill, funding for desal research was included as a part of the Department of Energy’s (DOE) \$34.5 billion allocation, of which the DOE’s Advanced Manufacturing Office (AMO) will get \$20 million for the proposed Energy-Water Desalination Hub.

Now that the Desal Hub has been funded, it is anticipated that the AMO will soon release a formal request for information (RFI) to interested consortia within the next month or two. The RFI would be followed by a request for proposals (RFP) from qualified respondents, with the successful team being responsible for coordinating and accelerating the commercial development and manufacturing of desalination and advanced water treatment technologies.

The Desal Hub is not the only desal-related research project that will be undertaken by the DOE. It is currently evaluating proposals to support the research, development and demonstration of technologies to integrate solar thermal technologies into desal processes as part of its SunShot initiative.

Three groups have begun to organize teams that includes National Laboratories, academic institutions, utility and industry partners to respond to an RFP.

Additional desal and water reuse research funding is included as part of the Bureau of Reclamation’s funding allocation.

## Global Water Summit

### TECHNOLOGY IDOL LINE-UP SET

For the past nine years, GWI’s Global Water Summit has included the event to showcase new desal related technologies. This year’s Technology Idol event will be held during the upcoming Summit in Paris, France.

The participating technologies will include five early-stage desal technologies. The presenters and their topics are:

### Pani Energy – Vancouver, Canada

Presenter: Devesh Bharadwaj, CEO

Technology: Adaptive Desalination Technology (ADT), an advanced SWRO process, which reduces energy consumption to as low as 1.4 kWh/m<sup>3</sup> (5.3 kWh/kgal) using novel plant operational methodologies and intelligent algorithms for process design and control. Many existing RO plants can be retrofitted using simple upgrades for quick project paybacks.

### Via Separations – Boston, Massachusetts

Presenter: Shreya Dave, CEO

Technology: NUfiltration, a robust NF membrane platform that accomplishes size exclusion at the nanoscale. The technology is also solvent and oxidizer tolerant, especially at elevated temperatures, and is tunable to enable the separation of small molecular weight compounds across a number of critical industries.

### Sunny Clean Water – Buffalo, New York

Presenters: Qiaoqiang Gan, founder; and Haomin Song, CTO

Technology: Solar vapor generation with no electrical input offers a promising, environmentally benign desalination solution. Sunny Clean Water’s process employs accelerated water evaporation and condensation rates, which can be integrated with a home-based solar water heating system to enable extra functionality for water purification.

### MIT – Cambridge, Massachusetts

Presenter: Professor Evelyn N. Wang

Technology: This new device takes advantage of adsorbent materials known as metal organic frameworks (MOFs) to passively capture water vapor, which can be released by natural sunlight. This water vapor is then condensed with an air-cooled heat sink to produce drinking water.

### CosmosID – Gaithersburg, Maryland

Presenter: Manoj Dadlani, CEO

Technology: The company is applying its microbial genomics platform—which focuses on rapid characterization of microbes and pathogens—to the water treatment and membrane market to improve the identification of organisms responsible for biofouling and/or membrane breaches in reuse applications.



The event, which is sponsored by Gradiant Corporation, will be held on Monday afternoon, 16 April. For more information on the Summit, visit [www.watermeetsmoney.com](http://www.watermeetsmoney.com).

**Palestine**

**GAZA SWRO PROJECT NOW 80% FUNDED**

Last week, a European Commission-sponsored pledging conference in Brussels consolidated political and financial support for a seawater desalination plant that would be the largest investment project completed in the Gaza strip. Co-hosted by the Palestinian Authority, the event garnered €456 million (\$563 million) of the €562.3 million (\$694 million) needed to construct a SWRO project with a minimum production capacity of 150,000 m<sup>3</sup>/d (39.6 MGD).

The entire Gaza Desal Plant project includes an €87.5 million on-site power supply with 15 percent renewable energy, a €130 million, 110km (69 mi) long north-south conveyance system with a pump station and five main booster stations, a €30 million strategic water loss reduction plan, and €99.8 million of other costs.

Fourteen countries and institutions committed financial support with the Islamic Development Bank providing 50 percent of the total project costs and the European Union providing €77.1 million.

Gaza has been under a tight Israeli blockade since 2007, which has been one of the roadblocks to development of previous small-scale desal projects. However, Israel has said that it supports international efforts to construct a large-scale desalination plant in Gaza, something that is crucial if the project is to move ahead.

Two million people live in the 365km<sup>2</sup> (141 mi<sup>2</sup>) Gaza strip, and its coastal aquifer is both extremely saline and overused, suffering from a 120 million m<sup>3</sup>/y (92,280 AFY) deficit.

The Palestinian Water Authority has reportedly prepared the tender documents and preliminary plant designs, and the European Investment Bank is expected to begin a mid-April tendering process.

**UAE**

**23 SOQS RECEIVED FOR Taweelah SWRO**

Abu Dhabi Water and Electricity Authority (ADWEA) is understood to have received statements of qualification (SOQs) from 23 prospective bidders interested in participating in the upcoming Taweelah RO IWP, from the 40 companies that initially submitted expressions of interest in the project.



**One of the World’s Biggest**

Abu Dhabi Water and Electricity Authority (ADWEA) supplies electricity and potable water to over two million people in the Abu Dhabi Emirate. Its Taweelah Water and Power Complex is located about 50km (31 mi) due northeast of the Abu Dhabi city center and is one of the world’s largest desalination sites. When the proposed Taweelah RO Independent Water Project (IWP) is completed, the site will be capable of producing 2.24 million m<sup>3</sup>/d (592 MGD) of desalted seawater.

**Taweelah A1 Plant** – Gulf Total Tractebel Power Company purchased and rehabilitated the existing Taweelah A1 Plant and later added an A10 extension. Using a combination of MSF and MED technology, it produces 378,500 m<sup>3</sup>/d (100 MGD) of desalted seawater in addition to a net power production of 1,592MW.

**Taweelah A2 Plant** – Emirates CMS Power Company built, owns and operates this plant, which produces 227,100 m<sup>3</sup>/d (60 MGD) of water using MSF technology in addition to its net electrical power production of 710MW.

**Taweelah B Plant** – Taweelah Asia Power Company purchased and rehabilitated the existing Taweelah B Plant and B Extension. Using MSF technology, it produces 726,722 m<sup>3</sup>/d (192 MGD) of water in addition to a net power production of 2,053MW.

The firms that submitted SOQs are::

- Acciona/Pal Technologies
- Almar/Rawafid
- China Harbor Engineering
- Engie
- GS Inima
- JGC Corp
- Marubeni
- Orascom
- SNC-Lavalin
- Suez
- Utico
- Veolia
- ACWA Power
- Aqualia
- Cobra
- GIC
- Hyflux
- Malakoff
- Mitsubishi Corp
- PowerChina
- Sojitz
- Sumitomo
- Valoriza

ADWEA is considering options for both a single contract for the full capacity of 908,400 m<sup>3</sup>/d (240 MGD) and an option for two parallel plants with capacities of 454,200 m<sup>3</sup>/d (120 MGD) each.

A list of pre-qualified developers should be set by the end of June, with an award possible by the end of the year.

The project's advisory team for the design and procurement includes Alderbrook (financial), ILF (technical) and White & Case (legal).

### Texas

#### JV TO ACQUIRE BANKRUPT CHEM PLANT/SWRO

Alpek, a Mexico-based chemical manufacturer, has announced that it is part of a newly formed joint venture (JV) that has entered into an asset purchase agreement to acquire M&G USA and its unfinished Corpus Christi integrated PTA-PET manufacturing plant and 8.8 MGD (33,300 m<sup>3</sup>/d) SWRO plant for \$1.125 billion. The other members of the Corpus Christi Polymers LLC consortium are Thailand's Indorama Ventures Holdings and Taiwan's Far Eastern Investment (Holding) Ltd.

The City and the Port of Corpus Christi had established an interlocal agreement to acquire the desal facility, which was to be auctioned off as a separate item; however, all of the M&G assets were purchased by Corpus Christi Polymers.

Under the terms of the purchase agreement, the JV partners will complete the project, and each of the three partners will have the right to receive one-third of the capacity of PTA and PET produced. The timeline for the plant completion has not been announced, nor has anything been said about the possibility of expanding the SWRO to its permitted build-out capacity of 22 MGD (83,270 m<sup>3</sup>/d).

In a separate development, *WDR* has learned that a group of civic leaders who had been considering building a merchant SWRO plant in Corpus Christi, has put its development plans on hold, and released the EPC/OEMs with whom they had been partnering to pursue their own interests.

### Quackery

#### RAW WATER'S PREDECESSOR

Earlier this year, we heard about the live water craze, which some people celebrated because it came from an off-grid source and was untreated and non-disinfected. It was so "alive and abundant with healthy microflora" that it would remain fresh and for one lunar cycle, before turning green (WDR2018-2).

Veteran desalter Dave Laker reminded *WDR* that Millennials are not the first to have fallen victim to a Pied Piper of Water. About 100 years ago, long before "live water" was touted as healthy, a southern California company promoted its Revigator—a water cooler lined with carnotite, a radioactive ore containing uranium, vanadium and radium—to cure arthritis, senility and flatulence.



Its directions suggested that users "Just fill the Revigator at night. The water remains in contact with radium ore for 12 hours. By morning, the water has returned to this healthful state." It promised to deliver "Your most highly prized possession: Good Health."

Another company rented its Radio-Rem, a device similar to the Revigator, to customers with chronic arthritis, reminding them that "Radio-Active water should not be given as a last resort—because better results followed the treatment in earlier cases."



Then there were the entrepreneurs who sold Radithor, a *certified* radioactive water containing "radium and mesothorium in triple distilled water." Advertised as "Liquid Sunshine", it was prescribed to steel mogul Eben Byers as treatment for a nagging arm injury. He drank daily doses of Radithor for three years before he died of necrosis in both jaws, anemia and a brain abscess, all symptomatic of radium poisoning. He was buried in a lead-lined coffin.

Byers' death prompted the newly formed FDA to crack down on uranium blankets, radium chocolates and baths, caradium hair dye, radioactive suppositories and other supposed remedies that were based on the notion that low doses of radiation are beneficial.

#### Last week to vote for Global Water Awards

Voting for the 2018 Global Water Awards closes this Friday. Voting is open to subscribed readers of *Global Water Intelligence* and *Water Desalination Report*, and early bird Global Water Summit registrants. For details, visit <https://globalwaterawards.com/the-process/#short>.

**AMTA****NEW BOARD, EXEC COMMITTEE NAMED**

At a board meeting following its recent Membrane Technology Conference, the American Membrane Technology Association (AMTA) welcomed its new board members and elected its new executive committee as follows:

*Newly Elected Board Members:*

- Buddy Boysen (Hazen and Sawyer)
- Rebecca Wilder (Town of Jupiter, Florida)

*Re-appointed Director-at-Large:*

- Mike Snodgrass (Ovivo USA)

*Executive committee members:*

- Brent Alspach (Arcadis), President (second term)
- Christine Owen (Hazen and Sawyer), 1<sup>st</sup> Vice-President
- Jill Miller (Bozeman, Montana), 2<sup>nd</sup> Vice-President
- Lynne Gulizia (Toray Membrane USA), Secretary
- Karen Lindsey (Avista Technologies), Treasurer
- Scott Freeman (Black & Veatch), Past President

For a completed listing of all current board members, visit [www.amtaorg.com/about-amta/board-of-directors](http://www.amtaorg.com/about-amta/board-of-directors).

**IN BRIEF**

Australia-based **Water Resources Group**, which has dabbled in developing small-scale SWRO and renewable energy projects, will change its name to Purifloh Ltd., reflecting its interest in the hydroxyl ion (OH). The company, which has traded on the Australian stock exchange since 2010, will also change its ASX listing to PO3, which reflects its interest in ozonation of air and water flows. The company's share price had dropped to near-zero in late 2017, but rose to A\$0.90 earlier this year after it raised A\$625,000 (\$470,000) for working capital. It closed last week at A\$0.64.

**IFM Investors**, the Australian infrastructure fund, has signed an agreement to acquire 49% of **FCC Aqualia**, the water and desalination arm of Spain's FCC service group, for €1.029 billion (\$1.26 billion). FCC will retain control of Aqualia and will use the proceeds from the sale principally to reduce its financial debt. The deal is subject to regulatory approvals and is expected to close in August.

**Evoqua Water Technologies** has announced the closing of a secondary public offering of 20,125,000 shares of common

stock by certain shareholders of the company at a public offering price of \$22.00/share. The company did not sell any shares in the offering, and did not receive any proceeds from the sale of shares by the Selling Stockholders, including from the exercise by the underwriters of their option to purchase additional shares.

Although the **Rosarito Seawater Desal Plant** project, in Baja California, Mexico, is believed to be several months from financial close, with two federal permits—a seawater use permit and a concentrate discharge permit—still to be secured, the state governor held a groundbreaking ceremony at the plant site this past Friday. The 100 MGD (378,500 m<sup>3</sup>/d) SWRO project is being developed by Consolidated Water Company's (CWCO) Mexican subsidiary, NSC Agua. Suez will design and construct the project, while an NSC Agua-Suez joint venture will operate it.

Los Angeles-based **Moleaer** reports that it has upgraded an MBR at Bear Republic's northern California brewery with its aeration system. The MBR, which follows an anaerobic process, was upgraded to employ pure oxygen and a 5-hp XTB Nanobubble Generator to enhance oxygen transfer efficiency, reduce energy costs and eliminate the need for chemical defoamers.

**The Village of Wellington, Florida**, will hold a mandatory pre-bid meeting for the construction element of an upgrade and expansion of its two BWRO plants on 2 April. A new train will be added to each facility while the existing systems and/or infrastructure will be re-configured and upgraded. Bids will be due on 3 May, and Kimley-Horn is providing design services and will act as owner's engineer.

**PEOPLE**

**Imran Jaferey** has been appointed chief operating officer of Nanostone Water. Formerly the vice president of sales for Headworks, he will now be based in Boston, Massachusetts, and may be contacted at [imran.jaferey@nanostone.com](mailto:imran.jaferey@nanostone.com).

**Brad Hice**, formerly with DeNora Water Technologies, has been appointed as Moleaer's senior business development manager. He will be based in North Dakota, and may be contacted at [brad@moleaer.com](mailto:brad@moleaer.com).