

# Why thirsty Arab region needs sustainable desalination tech

Author:

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DUBAI: For all its hydrocarbon wealth, the Middle East and North Africa (MENA) region suffers from a fundamental scarcity, namely of underground renewable freshwater resources.

The region, one of the most water-scarce places on the planet, has some of the lowest water-availability levels on a per-capita basis.

Desalination dependence in the region is therefore high, even though desalination processes have a direct impact on the issue of sustainability and renewable-energy portfolios of these countries.

Data from the International Energy Agency (IEA) show that two-thirds of the water produced from seawater desalination in the region are, at present, from fossil fuel-based thermal technologies.

The rest is derived from membrane-based desalination, which relies heavily on electricity produced by burning natural gas.

Currently, the Middle East accounts for roughly 90 percent of the thermal energy used for desalination worldwide, with the UAE and Saudi Arabia at the helm.

To satisfy the drinking-water requirements of the region's 400 million-plus people, a high reliance on non-conventional water resources such as desalination and the reuse of treated wastewater is "imperative," Waleed Zubari, coordinator of the Water Resources Management Program at the College of Graduate Studies in Manama, Bahrain, told Arab News.

In fact, desalination becomes the only viable source for drinking water as the reuse of treated wastewater is increasingly being used for agriculture and landscaping, he said.

But the widely used desalination process based on fossil-fuel technology is an economic and environmental burden for countries with a high reliance on hydrocarbon revenues.

"Can we have sustainable water supply by desalination? Alternatively, can we have sustainable desalination?" asked Zubari.

Desalination, particularly co-production technologies that produce electricity and water as by-products, is an "energy intensive" process that claims at "alarming rates" a sizable portion of the energy resources in the Gulf Cooperation Council (GCC) countries, he said.

Despite a “tremendous decrease” in the cost of desalination over the decades, the practice is causing the fast depletion of the region’s energy resources and threatening the very source of some countries’ income, he added.

The way forward is to look beyond the deployment of non-renewable resources such as fossil fuels to produce desalinated water.

## **FASTFACT**

By 2040, desalinated seawater production in Mideast to increase almost 14-fold. (World Energy Outlook)

According to a special report in the World Energy Outlook series, “Outlook for Producer Economies,” for resource-rich economies “the high reliance on hydrocarbon revenues, coupled with the risk of fluctuations in prices, creates well-known pitfalls.”

However, the report noted, in response to changing conditions and the growing emphasis on renewables, “many major producers are displaying a renewed commitment to reform and economic diversification.”

The World Energy Outlook series examined six resource-dependent economies that are pillars of global energy supply: Iraq, Nigeria, Russia, Saudi Arabia, the UAE and Venezuela.

It assessed how the prospects for these major oil- and gas-producing economies will evolve in various scenarios by 2040.

The production of desalinated seawater in the Middle East, the report said, is projected to increase almost 14-fold during this period.

Globally, too, water desalination as a source of freshwater supply has become a major priority due to rapid population growth, poor water-management practices and global warming. The latter is believed to be decreasing annual rainfall by 20-40 cm.

To meet these challenges, there is “a concerted shift towards membrane-based desalination,” the report said.



Desalination, particularly co-production technologies that produce electricity and water as by-products, is an energy intensive process. (AFP )

Membrane-based technologies use electricity as the driver for desalination.

For example, “reverse osmosis (RO) technologies” in membrane-based processes account for 60 percent of the capacity in Oman and roughly half the capacity in Saudi Arabia.

The Saudi state-owned Water and Electricity Co. is currently developing the Rabigh 3 project, which is expected to come on stream in 2021, with the potential to become one of the largest membrane-based seawater-desalination plants in the world.

The need of the hour, according to Zubari, is to achieve a degree of sustainability for desalination, which he said depends on countries “minimizing associated costs and maximizing desalination’s added value in the region.”

He believes this can be done through investment and ownership of desalination technologies, and urges governments to increase water conservation and decrease water waste and loss.

“One of the main options is the development of renewable energies to power desalination plants, particularly solar energy, in which the GCC countries have a comparative advantage,” Zubari said.

His view is seconded by Dr. Emad Yousef Alhseinat, assistant professor of chemical engineering at the UAE’s Khalifa University.

Energy sustainability is key to achieving sustainable desalination, said Alhseinat, adding that to achieve this objective, GCC countries have to diversify their energy sources to include renewable forms such as solar, wind and wave.

“And to get sustainable desalination processes, we need to invest in developing desalination technologies that are compatible with renewable energy,” he said.

According to Alhseinat, desalination processes, whether classified as thermal or membrane-based, require large amounts of energy to produce fresh water.

For example, “in RO processes, there is a need to reach a pressure of 50-80 bar to desalinate salty water,” he said, adding that this “high pressure” requires big pumps of water that consume large amounts of energy.

In short, he said, this process is “energy intensive, meaning high-cost, low-economic impact and high-carbon footprint.”

Another way to improve desalination in the region, added Alhseinat, is to allocate more investments to research and development in order to enhance the efficiency of current desalination plants.



This picture taken on December 11, 2019 shows a view of Jubail Desalination Plant at the Jubail Industrial City in Saudi Arabia's Eastern Province overlooking the Arabian Gulf. (AFP file photo)

"This can be done through adopting state-of-the-art optimization tools such as data mining and machine learning," he said.

Applying artificial intelligence to analyze desalination data could also be a promising approach, according to Alhseinat.

Another important aspect of the desalination debate is its impact on the ecosystem. Injecting the hypersaline brine, or the waste stream of desalination plants, into the ground is harmful to the marine environment, particularly in the Arabian Gulf, said Alhseinat.

He believes a "zero-liquid discharge approach" could be developed to reduce the environmental impact.

Highlighting the dependence of the Middle East, indeed the world, on desalination technologies is the fact that there exist approximately 18,000 commercial desalination plants in operation internationally, with total installed production capacity of 86.55 million cubic meters per day (m<sup>3</sup>/day) or 2,870 million gallons per day (MGD).

"About 44 percent of this capacity (37 million m<sup>3</sup>/day) or 9,860 MGD is located in the Middle East and North Africa. Desalination in this region is projected to grow at a rate of 7-9 percent per year," Alhseinat said.

While it may be the solution to freshwater shortage in the region, "so far

there is no expectation of a direct economic value from it,” he added.

“Desalination in the GCC is contributing indirectly to the economic growth of the region even though it is considered as a cost in the countries’ energy bill.”

At the end of the day, Alhseinat said, assuring the availability of freshwater is a must for any country to have sustainable economic growth.

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*Twitter: @jumana\_khamis*





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## [UAE announces suspension of all flights from Pakistan](#)

Sun, 2020-06-28 22:08

LONDON: The UAE will temporarily stop receiving passengers on flights coming from Pakistan, the country's civil aviation authority said on Sunday. The suspension, which comes into effect on Monday, will last until a special laboratory to conduct coronavirus tests is established, the Emirates' state news agency WAM reported.

The decision also applies to transit flights originating from Pakistan, where the number of coronavirus cases is rising rapidly. The authority advised all passengers affected by the suspension to get in touch with the airlines they were due to travel with.



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## [Lebanese security forces investigating explosion near Hariri convoy this month](#)

Author:

Reuters

ID:

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Sun, 2020-06-28 18:48

BEIRUT: Lebanese security forces are investigating an explosion 11 days ago that took place near the convoy of former Prime Minister Saad Al-Hariri, Hariri's office said on Sunday.

Hariri's office said the incident, in which nobody was hurt, took place during a tour of the eastern Beqaa valley and was not made public at the time to prevent inflaming passions in an already politically charged atmosphere. "Since the convoy did not get exposed to any attack ... (Hariri's) decision was to keep it secret and await the results of the relevant security forces," it said in a statement.

Remnants of a missile were found almost 500 meters away from the route taken by Hariri's 30-car convoy, which was equipped with jamming systems, Saudi owned pan-Arab Al Hadath TV station said in a report on the incident on Sunday.

Hariri, Lebanon's leading Sunni Muslim politician, resigned last October in the face of mass protests against the sectarian ruling elite. The country has since then been in the throes of the worst economic and political crisis since its 1975-90 civil war.

Hariri's father, also a former prime minister, was killed by a bomb in 2005.



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Lebanon judge issues media ban against US ambassador over Hezbollah comments

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## [Riyadh Agreement aims to unify the Yemen's structure: prime minister](#)

Sun, 2020-06-28 20:11

RIYADH: Yemen's prime minister called on Sunday for a return to implementing the Riyadh Agreement as it is a "win-win for all."

Maeen Abdulmalik Saeed said the goals of the deal reached last year between the government and southern separatists are aimed at "uniting all forces and efforts within the state structure" and defeating the Houthi militia, Yemen's state news agency reported.

The agreement was signed last year after government forces and troops loyal to the Southern Transitional Council (STC) clashed last summer. While the agreement was widely hailed at the time, tensions have flared in recent months between the two forces, which are meant to be allies in the war

against the Iran-backed Houthis.

Last week, the Arab Coalition said the STC and government had agreed a cease-fire and talks would take place again in Riyadh to make sure the Riyadh was fully adopted.

Speaking at a meeting of President Abed Rabbo Mansour Hadi's advisory body and the presidency of the House of Representatives, Saeed said he valued the role of Saudi Arabia its support for the Yemeni state and its people.

"The government worked ... to implement its obligations regarding the Riyadh Agreement and took serious action to ensure that the main and crucial battle compass against the Houthi coup was not diverted," he said.

Sultan Al-Barakani, speaker of the Yemeni House of Representatives highlighted the importance of implementing the Riyadh Agreement and the consultations being held "at a high level to accomplish this under the auspices and supervision of Saudi Arabia."



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Yemen president urges STC to implement Saudi-led Riyadh Agreement  
Yemeni delegation arrives in Saudi Arabia to discuss implementation of Riyadh Agreement

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## US ambassador appears on Lebanese TV despite court-imposed ban

Author:

Reuters

ID:

1593348915108544600

Sun, 2020-06-28 12:44

BEIRUT: Lebanese media broadcast interviews with the US ambassador on Sunday, ignoring a ruling by a judge who banned the diplomat from television for a year over remarks that criticized the powerful Shiite movement Hezbollah. Hezbollah is the main political force behind the Lebanese government. Washington considers the heavily armed pro-Iran movement to be a terrorist group.

We believe very much in freedom of expression and the important role a free media plays in the United States and Lebanon. We stand with the Lebanese people.<https://t.co/7IB2d96CJ8>

– U.S. Embassy Beirut (@usembassybeirut) [June 27, 2020](#)

In an interview with Saudi-owned AlHadath television on Friday, US ambassador Dorothy Shea said Hezbollah's behavior was preventing Lebanon from properly dealing with a deep economic crisis.

A Shiite judge in the southern city of Tyre ruled on Saturday that Shea's comments had incited sectarian strife, and banned broadcasting interviews with her for a year. State-owned National News Agency (NAA) said media that violate the ban would be fined \$200,000.

But the government has repudiated the court ruling, while criticizing Shea over the remarks that had prompted it.

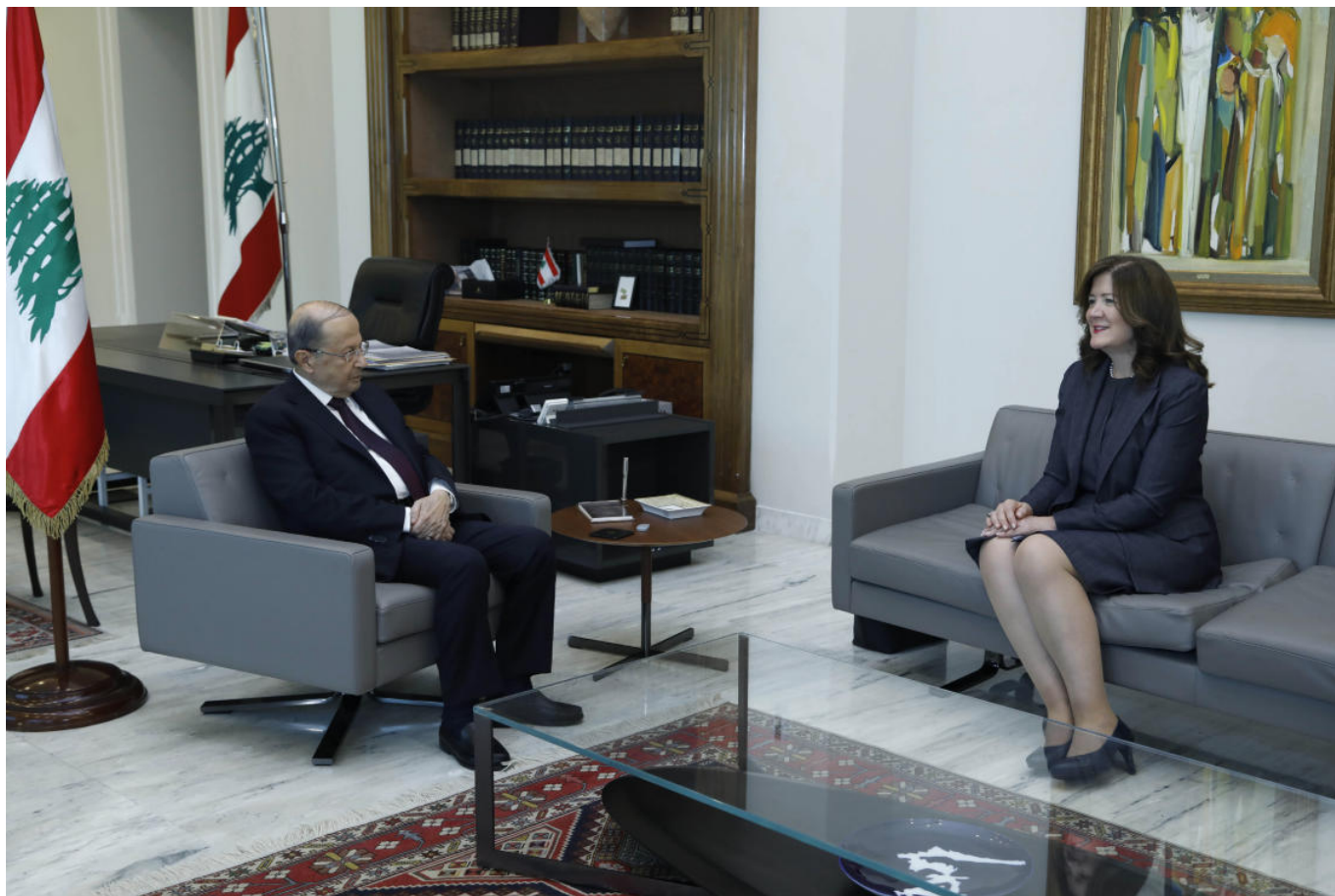
Information Minister Manal Abdel Samad tweeted that while she understood the judge's concerns about diplomats meddling in Lebanon's internal affairs "no one had the right to prevent the media from covering news, or to curb press freedoms."

A Lebanese government official and a Western diplomatic source both said Shea had been summoned to the foreign ministry on Sunday. No further details were given.

In one of several media appearances on Sunday, Shea told broadcaster MTV that a senior government official had assured her the court did not have the authority to order the ban, and that the government would take steps to reverse it.

She described the ruling as a "really pathetic" attempt to silence the media,

and said the government should focus more on implementing economic reforms. "I would suggest that we all try to put this chapter behind us," she said.



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