

TAWEELAH REVERSE OSMOSIS TREATMENT FACILITY: MILESTONE ACHIEVEMENT IN SUSTAINABLE WATER MANAGEMENT AND DECARBONIZATION



ACWA Power and the Emirates Water and Electricity Company (EWEC) have marked a significant milestone with the commissioning of the first phase of the Al Taweelah Independent Water Plant in the United Arab Emirates (UAE). Taweelah is the world's largest reverse osmosis (RO) treatment facility. It is powered partially by a nearby solar park, which was designed to meet 30% of the plant's electricity demand by year 8 with a target of ultimately meeting 55% of electrical demand.

Taweelah joins EWEC's roster of operational RO desalination plants, bolstering the UAE's commitment to sustainability. As demand for water and electricity surges annually, the UAE embraces public-private partnerships to address infrastructure needs. Aligned with the UAE's Energy Strategy 2050, which targets a 50% contribution of carbon-free energy by 2050, efforts are underway to increase clean energy sources and reduce energy consumption by 40% by 2030. Additionally, the UAE aims for all desalinated water to be produced using clean energy sources and waste heat by 2030, marking a significant stride towards sustainable water management.

The Al Taweelah Power and Water Desalination Complex in Abu Dhabi completed commissioning of the Taweelah RO facility in 2022. By mid-2023, it was supplying 909,200 cubic meters of water per day, a 44% increase in capacity compared to the world's previous largest RO plant. The facility supplies treated water to over 350,000 households and has set new efficiency and cost benchmarks by adopting RO technology over traditional thermal desalination methods.

The Taweelah RO facility is owned by a consortia of the TAQA Group (20%), Mubadala (40%), and ACWA Power (40%). EWEC has a 30-year Water Purchase Agreement with Taweelah that was agreed in 2019.

EWEC has spearheaded the coordinated planning, purchasing, and supply of water and electricity across the UAE. Those efforts included adoption of low-carbon intensive RO technology like that at Taweelah which have significantly boosted energy efficiency by 96% and slashed carbon emissions by over 85%. This adoption aligns with EWEC's strategic goal to decouple water and power generation, playing a pivotal role in the UAE's Net Zero by 2050 initiative. Plans are in motion to expand RO production capacity, with a target of achieving 90% of all water desalination through RO by 2030, resulting in an 88% reduction in associated carbon emissions.

Othman Al Ali, EWEC's CEO, lauded the collaborative effort that propelled Taweelah RO to become the world's largest commercially operating RO desalination facility, emphasizing its pivotal role in the UAE's sustainability journey: "The Taweelah RO facility is part of EWEC's strategic shift of its water and power generation portfolio, supporting the decarbonisation of the energy sector in line with the UAE Net Zero by 2050 strategic initiative. We are proud of the collaboration with our partners that has enabled Taweelah RO to reach over 90% of its water production capacity, making Taweelah the world's largest commercially operating reverse osmosis desalination facility."



Al Ali went on to say that the company "... plans an additional 290 MIGD (1,312,000 cubic meters) of additional RO production capacity by 2027; and by 2030, 90% of all desalinated water consumed in the UAE will be produced using reverse osmosis, enabling an 88 percent reduction in our carbon emissions associated with water production." He went on to state, "EWEC's strategic investments in world-class, utility-scale transformative reverse osmosis water desalination facilities are enabling Abu Dhabi and the UAE to accelerate its journey into the next chapter of sustainability."

The Al Taweelah Independent Water Plant marks a pivotal step forward in the UAE's commitment to sustainable water management and decarbonization efforts. With the adoption of low-carbon intensive reverse osmosis technology, the UAE is poised to meet its growing water demands while significantly reducing carbon emissions. The success of Taweelah RO underscores the nation's dedication to embracing innovative solutions and public-private collaborations to address the challenges of water scarcity and environmental sustainability. As the UAE continues its journey towards a greener, more resilient future, initiatives like Taweelah RO serve as beacons of hope, guiding the nation into the next chapter of sustainability and prosperity.

The International Desalination and Reuse Association (IDRA)

Desalination plays a crucial role in addressing the escalating water demands of regions facing water scarcity worldwide. As populations grow, industrialization expands, and climate change exacerbates droughts, traditional freshwater sources become increasingly strained. Desalination offers a viable solution by harnessing the abundant resource of seawater and converting it into potable water. This technology enables arid and water-stressed regions to diversify their water supply, reducing dependency on limited freshwater reserves. Additionally, desalination plants can be strategically located near coastal areas, minimizing the need for extensive freshwater transportation infrastructure. By providing a reliable and sustainable source of water, desalination empowers communities to thrive even in the face of water scarcity, fostering economic growth, agricultural productivity, and overall societal resilience. Thus, investment in desalination technology is paramount for ensuring water security and mitigating the impacts of water scarcity in vulnerable regions around the globe.



The IDRA is dedicated to shedding light on pioneering industry initiatives aimed at reducing carbon footprints within water desalination and reuse processes. As the world faces escalating environmental challenges, it is imperative to recognize and amplify efforts that prioritize sustainability in water management practices. By highlighting these initiatives, the IDRA aims to inspire further innovation and collaboration within the industry, fostering a culture of continuous improvement. This spotlight marks the beginning of a series promising to showcase more groundbreaking advancements and strategies that contribute to a more sustainable future for water resources worldwide.

SOURCES

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