

## Desalination at 2.9 kWh/m<sup>3</sup>: Inside Dubai's Hassyan RO Megaproject

Dubai is setting a new global benchmark in sustainable water production with the development of the **Hassyan Seawater Reverse Osmosis (SWRO) Desalination Plant**. This state-of-the-art facility is poised to become the world's largest solar-powered desalination plant, delivering an impressive capacity of **818,000 cubic meters per day (180 million imperial gallons per day)** while achieving an exceptional energy efficiency rate of **2.9 kilowatt-hours per cubic meter (kWh/m<sup>3</sup>)**. [BNC Network](#), [NS Energy](#)

“Our efforts have made the impossible possible, reducing the energy consumption of large-scale desalination to 2,9 kWh/m<sup>3</sup>.”



Representatives of Dubai Electricity & Water Authority and Saudi Arabia-based ACWA Power at the signing ceremony for the first phase of the project.

Photo courtesy DEWA

## **Project Overview**

- **Location:** Approximately 55 kilometers southwest of Dubai Creek. [TPG Media](#)
- **Capacity:** 818,000 m<sup>3</sup>/day, sufficient to supply drinking water to **2 million people**. [Engineering News-Record](#)

Located approximately 55 kilometers southwest of Dubai Creek, the Hassyan desalination plant will have a capacity of 818,000 cubic meters per day (m<sup>3</sup>/d) — 180 million imperial gallons per day (MIGD) — providing a safe and reliable source of drinking water to two million people. The plant will start operating in 2026, with a gradual ramp-up to full capacity in 2027. The project is part of a broader strategy to sustainably increase water desalination capacity to help support Dubai's increasing demand for water in domestic and commercial settings. Furthermore, this plant will be the largest desalination plant powered by solar energy in the world.

- **Technology:** Advanced **Reverse Osmosis (RO)**, engineered by Veolia's subsidiary **SIDEM**. [Veolia](#)
- **Energy Source:** Powered by solar energy, aligning with Dubai's clean energy initiatives.
- **Operational Timeline:** Expected to commence operations in **2026**, reaching full capacity by **2027**. [Enterprise News MENA](#)
- **Investment:** Approximately **\$925 million (AED 3.377 billion)**. [Utility Business MENA](#)

**Veolia secures USD 320 mn contract for Hassyan plant:** French waste and water management company [Veolia's](#) smart desalination subsidiary [Sidem](#) secured a USD 320 mn agreement to engineer and provide technology for the solar-powered Hassyan water desalination project in Dubai, according to a [press release](#). The Dubai Electricity and Water Authority (Dewa) and Saudi renewable energy giant Acwa Power recently reached [financial close](#) on the AED 3.4 bn (USD 925.8 mn) plant which is scheduled to start operations in 2026 and reach full capacity in 2027.

## Technological Innovations

The Hassyan plant exemplifies cutting-edge advancements in desalination technology:

- **Energy Efficiency:** Achieves a record-low energy consumption of **2.9 kWh/m<sup>3</sup>**, representing a **35% reduction** over the past decade. [Utilities Middle East](#)

SIDEM's extensive expertise in large-scale desalination, including the critical pre-treatment and post-treatment stages, has helped maximize the potential of RO technology in terms of energy efficiency, reducing the energy consumption of RO desalination plants by a further 35% over the past 10 years.

- **Solar Integration:** Utilises solar power to operate, reducing reliance on fossil fuels and minimising carbon emissions. [ACWA Power](#)

- **Advanced Pre-treatment and Post-treatment:** Employs sophisticated processes to enhance membrane longevity and water quality.

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This agreement between ACWA Power and DEWA is another example of the strong collaboration between ourselves and our valued partners in the United Arab Emirates. The Hassyan IWP will be the largest plant of its kind in the world, and we have set a new record for the lowest levelised water tariff. The plant will be highly efficient, desalinating water through reverse osmosis powered by solar energy. With our years of experience in the industry, ACWA Power has ambitious aims and we are proud of continually breaking records through innovation and using new technologies to enhance water security. With this project, we are reaffirming our commitment with our partners towards achieving the Dubai Clean Energy Strategy 2050

**Mohammad A. Abunayyan, Chairman of the Board of Directors, ACWA Power**

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## Environmental and Strategic Significance

- The Hassyan project is a cornerstone in Dubai's strategy to ensure water security and sustainable development: [Veolia](#)
- **Water Security:** Contributes to DEWA's goal of increasing desalination capacity to **730 million imperial gallons per day (MIGD)** by 2030. [Gulf Business](#)
- **Sustainable Development:** Aligns with the **Dubai Clean Energy Strategy 2050** and the **Dubai Net Zero Carbon Emissions Strategy 2050**, aiming for 100% clean energy sources. [ACWA Power](#)

The decision to operate with gas instead of coal aligns the Dubai Clean Energy Strategy 2050 and Dubai's carbon neutrality strategy by 2050 to provide 100% of the energy production capacity from clean energy sources by 2050 while ensuring Dubai's energy supply security by maintaining a diversified energy mix. With operation on natural gas instead of coal, the project will thus avoid approximately 30 million tons of CO2 emissions just by 2030.

- **Environmental Stewardship:** Located near the **Jebel Ali Wetland Sanctuary**, the project incorporates measures to protect local biodiversity, including endangered turtle nesting sites. [Veolia Water Technologies](#)

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