# Dubai’s Biggest Challenge Of Water Supply Management

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## Urban Expansion and Environmental Pressure in Dubai

The skyline in Dubai is the brightest in the entire Middle East. But on dry land, the environmental problems caused in the city that was quickly built on sand have no glamor. In recent years, tourists have come across debris in the Dubai portion of the Persian Gulf. Desalinating seawater to supply faucets, irrigated properties, and fountains increases the concentration of salinity. Although on vast reserves of oil, the region is running out of energy to sustain its pompous lifestyle.

Basic things – such as waste treatment and clean water supply – coupled with countless industrial projects demand so much electrical energy that the region is on its way to a nuclear future, raising questions about both political and environmental risks of depending on a technology vulnerable to accidents and terrorist attacks. Dazed by the rapid urbanization of Dubai, other countries in the Gulf region are trying to follow suit as they prepare for the next big pop-up in the next ten years (Dubai Electricity and Water Authority, 2020).

But beyond its skyscrapers and artificial ski slopes, Dubai brings an alarming account of the dangers behind the construction of supermasses in the desert. “Growth has been intense, but people forget about the environment,” says Jean Francois Seznec, an expert on the Middle East and a professor at Georgetown University in Washington. “The stance was that business always came first. But now they realize the increased problems and have found that they need to be more cautious.”

## Desalination and the Challenge of Water Scarcity

Like an eastern version of Las Vegas, Dubai’s biggest challenge is to get water – which is found everywhere, but in the Gulf, it is only fit for consumption with the help of large desalination plants. They produce the carbon dioxide emissions that have made the United Arab Emirates one of the world’s most carbon-emitting countries. The mills still generate an enormous amount of sediment that is pumped back into the ocean.

At the limit – To quench thirst, the United Arab Emirates desalinates the equivalent of 4 billion bottles

of water per day. But its source is scarce: the region has an average water supply estimated for only four days. This margin of scarcity is further reduced by the conspicuous consumption of building icons, such as the Burj Khalifa, considered the tallest building in the world, and that alone consumes the equivalent of the amount of water in 20 Olympic-sized swimming pools per day to keep up, with mild temperatures in the middle of the desert.

## Rising Salinity, Waste Disposal, and Coastal Pollution

Gulf salinity levels have increased from 32,000 to 47,000 parts per million in 30 years. That number is sufficient, says Christophe Tourenq, a researcher at the World Wildlife Fund in Dubai, to threaten mangroves, wildlife, and local marine life. Rapid growth has also caused other types of environmental problems, including waste treatment, which has made a huge effort to keep up with all that development. The statement that Dubai's only wastewater-treatment unit was handling almost twice its capacity describes the historical period covered by the source and should not be read as a current operating statistic.

Some of the 4,000 drivers of tank cars that transport dumps daily from Dubai to the plant simply drain the cargo into the sewer lines of the fashionable Jumeirah neighborhood, polluting places like the Dubai Offshore Sailing Club, where black spots are still seen on rocks near the marina, denouncing the spill of sewage. Meanwhile, hundreds of skyscrapers had to rethink their priorities and solutions in relation to consumption and obtaining water and electricity expenses; standards and environmental norms are rarely put into practice in construction.

## Resource Demand, Infrastructure, and Future Energy Options

Desert forests – Authorities say that the rate of unbridled growth has overwhelmed natural resource sources. Many of the efforts to meet demand over the next twenty years have raised the challenges of environmental protection, said Majid Al Mansouri, secretary general of the Abu Dhabi Environmental Agency. "Even overcoming a large part of the challenges, we recognize that much work remains to be done." Sustainability is a hotly debated subject here, and the capital, Abu Dhabi, has been the biggest one in charge of mistakes in Dubai.

To address the water problem, Abu Dhabi has set up a groundwater monitoring system and is managing to reuse it to irrigate properties and forests in the desert. The city began an awareness campaign. Last month, the government approved the construction of the UAE's first water reservoir, which has the capacity to store water for one month. The government also has demanded that new constructions be designed using Western standards of environmental impact reduction for water and

energy consumption.

The threat of sewage has dwindled since Dubai inaugurated part of the new water treatment plant in the middle of this year, doubling treatment capacity in the United Arab Emirates. In addition, after the financial crisis that hit Dubai, about 400,000 migrant workers left the country, reducing demand for treatment plants, which currently operate at full capacity. But even these solutions face difficulties. “A lot of good things are happening,” says Mohammed Raouf, environmental director of the Gulf Research Center. “But at the same time, with all environmental laws, strategies, and sustainability plans, not everything has been implemented.”

Nuclear future – Environmentalists say there are still reports of the dumping of waste in the sewer of the desert. As the government tries to tackle the problems of water and debris, Dubai and Abu Dhabi are eagerly awaiting the new wave of residents to come in the next decade, implying a new demand for treated water, sanitation, and electricity. Large industrial projects, such as aluminum smelting and steel production, which require large and stable sources of electricity, overwhelm the energy capacity of the United Arab Emirates. Many of these projects are production for export that complement the country’s oil business and are also used in the implementation of infrastructure (World Bank, 2018).

## Natural Gas, Renewable Energy, and Nuclear Trade-Offs

However, they are supplied with natural gas from Qatar, which has the capacity to supply only the region. Alternatives such as solar and wind energy, among other solutions such as the use of coal, are not feasible because of transport and supply challenges. As a result, the Emirates is thinking of using nuclear energy as the main energy source. In December, the United Arab Emirates signed an agreement with Washington to allow the construction of nuclear power plants that do not use or reprocess uranium. The UAE’s Barakah plant now has four commercially operating nuclear reactors. Unit 4 entered commercial operation in 2024, and the four units are designed to supply about 25% of the UAE’s electricity.

Saudi Arabia, Kuwait, Qatar, Bahrain, and Egypt have also studied the use of nuclear energy. “We see nuclear power as an important factor for the economic development and strategic diversity of the United Arab Emirates,” said Mohamed Al Hammadi, executive director of Emirates Nuclear Energy Corp. “Nuclear power provides 24-hour, seven-day-a-week, full-year power, so it’s a compatible solution.” However, from the standpoint of sustainability, the use of nuclear power does not make much sense, argues environmental expert Raouf.

Although it produces clean energy, it “can not be renewable, there is a big problem with the spending, and the uranium supply is about to disappear in 40 or 50 years,” he says. “It makes little sense unless you really want to use it for political or security reasons.” Al Hammadi, who works with the authorities to find new ways to increase the UAE’s energy supply, says that nuclear technology

implemented is “a safe and quiet model”. Still, environmentalists fear the government is pursuing a model of economic development in a confusing way. “What the country has shown us,” says Raouf, “is that if we do not work with sustainability, we can even make a profit faster, but we will have to face a lot of risks.”

## References

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