More than the sum of its parts – how renewable energy and Egyptian private and public sectors are aiming to solve water supply

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Introduction

Ensuring sufficient water supply – from source, generation and distribution – is a key infrastructure concern for any fast-growing country.

Annually, Egypt currently generates 570 cubic meters of water per person, principally from the Nile River, which means the country falls below the international threshold for water scarcity according to the Ministry of Water Resources and Irrigation. The availability of this supply and its sufficiency, however, are facing challenges due to the exponentially growing Egyptian population and the impact of the Grand Ethiopian Renaissance Dam, of which construction began in 2011.

In anticipation of the potential water supply issues, a new legal framework is being implemented to allow the public and private sectors to mobilize and partner to ensure the availability of water resources from the Nile River. Sitting in the north-east corner of Africa, Egypt possesses an abundance of land, sunny weather and high wind speeds making it a prime location for renewable projects to facilitate its water supply infrastructure.

The New Water Resources and Irrigation Law

In an effort to improve the management of water resources and achieve equitable distribution between its people, the Egyptian House of Representatives has recently approved a new Water Resources and Irrigation Law as part of the national water resources strategy, which will entail an investment of USD 50 billion in the Egyptian water sector up until 2050. The much-anticipated new legislation aims to fill the gaps of its ancestor, the Water Resources and Irrigation Law No. 12 of 1984 and its amendments, to reflect 21st century circumstances. It addresses the protection of water resources, waterways, facilities, equipment, irrigation and drainage property, calling for the use of modern irrigation methods in agricultural lands, and activating water user associations. Moreover, the new law promotes the concepts of water consumption rationalization and maximization of the use of available resources in the country. One of the key and most important contributions of the new law is encouraging the participation of the private sector in water-related projects. The law contemplates private companies to hold major roles in managing, operating and maintaining the water and drainage infrastructure scattered around the country's key areas.

The Desalination Program

The Government announced, in July 2020, a five-year program to develop 47 desalination plants across many different governorates in Egypt including Suez, Ismailia, Dakahlia, North and South Sinai, the Red Sea Coast, Kafr El Sheikh, Beheira Matrouh and Port Said worth an estimate of USD 2.8 billion. These plants will be powered by renewable energy — the Egyptian Government has a goal to increase the supply of electricity generated from renewable sources to 20% by 2022 and 42% by 2035.

The desalination program entails a partnership between The Sovereign Fund of Egypt (TSFE) and local and foreign investors to build, own, and operate the plants. The Fund's Director General, Ayman Soliman, has publicly stated the plants will be run by solar power and other renewable energy resources. Analysis by the Global Solar and Wind Atlas has indicated that the areas surrounding the Nile from the east and west have the potential to produce around 31,150 MW of wind power and 52,300 MW of solar. By using solar energy to power the plants, the environmental impact of desalination and the operating costs of the facilities should be reduced.

Desalination is a method used to remove excess salts and other minerals from different sources of water; seawater, brackish, rivers and streams converting it to safe, potable or usable water, and will provide an alternative source of water supply for Egypt. Desalination presents many advantages to its users, other than providing accessible drinking water, like helping with seawater habitat protection and providing water to the agricultural industry, ideal for a country like Egypt that depends highly on agriculture and holds a large population located mainly around the Nile. A desalination plant, however involves high building, operation and maintenance costs; costs that are greatly affected by the energy price change. Accordingly, involving the private sector aims to allocate these risks to expert developers and investors who can manage them over the long term and also address their environment impacts given the large amount of salt and minerals extracted from the water.

The desalination program is to be overseen by the New Urban Communities Authority (NUCA), (an Egyptian government authority affiliated with the Ministry of Housing) , the General Organisation for Physical Planning, (a state body responsible for setting the overall policies pertaining to urban planning and sustainable development and preparing strategic plans and programs on the national, regional and local levels) and the Holding Company for Water and Wastewater (HCWW (established by the state by Decree No.135 of 2004 and provides drinking water purification, desalination and distribution; wastewater collection, treatment and disposal; and sludge and treatment services)).

The five-year desalination program will be divided into three stages, starting with the fortification of water supplies in underserved areas in North and South Sinai, the Red Sea and Matrouh through the establishment of 19 seawater desalination plants with a total capacity of 312,000 cubic meters a day, costing around 430 million dollars. The second stage of the program is estimated to cost over USD 413 million dollars and entails the construction of seven desalination plants producing a total of 335,000 cubic meters of water. Nineteen plants with a total capacity of 1.29 million cubic meters of water are planned to be built during the third phase, costing approximately 1.85 billion dollars and two plants will be built during the fourth and final phase of the project producing a total capacity of 100,000 cubic meters per day.

Conclusion

In a recent presidential meeting, Egyptian President Abdel-Fattah El-Sisi urged state officials to localise the components of the water desalination technology and insisted on the integration thereof within the state's general policy to achieve further progress in this field. The plan is to ensure "every drop of water is preserved" according to Prime Minister Madbouly, in accordance with the no-waste spirit of the new Water Resources and Irrigation Law. The framework provided by the law allows the public sector and the private sector to ensure the sustainability of water supply using public land, private capital and innovative and renewable technology.

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