

Desalination Plant in Egypt runs on Wind & Sun



Fortis Wind Energy (NL) and **Juwi Renewable (DE)** install a 100kW hybrid system in Egypt. Egypt, the land of the pyramids, is known to us for its ancient culture and the last year because of the uprisings for more democracy.

Egypt is less known for its large population (83 million) lives along the Nile (only 5.5% of the surface). The rest of the country is desert. The River Nile runs into Egypt from Sudan in the south and flows into the Mediterranean Sea, and forms a fertile delta.

The strong population growth means that there diligently search for new agricultural land to all the mouths to feed. There is land enough but unusable because of the lack of water. Groundwater is then pumped but is brackish water that has more salinity than fresh water but not as much as seawater. The influence of the Mediterranean is far inland to observe.

In 2008 the University of Alexandria already started a first experiment with brackish water by means of an osmosis system and filter it suitable for drinking water for the people and pets. This demo installation is at Wadi El Natrun, somewhere between Alexandria and Cairo. In this demo system a Fortis Montana (5 kW) wind turbine and 5000 Wp PV installation is used.



First Demo installation by Fortis with Montana 5 kW wind turbine

The success of this demo installation, inspired the Agricultural University of Alexandria to build a larger plant with 100 kW. The living conditions for the local population are greatly improved due to the fact that water transport, miles away, is not longer necessary. Road tankers transport everyday water from the Nile to remote areas.

Around Wadi El Natrun is a few tens of hectares of land planted with olive trees in the desert soil. The next 10 years, these trees are irrigated before harvesting the olives. This was not possible without the Wind / PV hybrid system because supplying water by road tankers would be impossible.

Off-Grid System

The system consists of four Fortis 12 kW turbines, 50 kW PV and 500 kWh battery bank to store the generated electricity.



Fortis Alizé wind turbines



Battery Bank location

The controlling of the wind turbine installation consists of 4x DVE-GFI-10K Inverter combined with Sunny Islands for the Off-Grid system.



Voltage Controller/ Inverter
& windsensor Datalogger in one housing



Sunny Islands battery Chargers /Inverters

Olive tree plantation

Now, 24 hours a day water 90 m deep can be pumped and filtered. Thereafter the water is supplied to the irrigation system. All equipment and pumps are powered by renewable energy. For Fortis this application is the largest system ever built, but we have 30 years experience with projects in Africa and Asia.

Juwi is the largest company in Germany (1800 employees) for planning and construction of wind and solar power systems. Egypt is a country that is well organized and well trained employees. Thus, there were only minor problems with the commissioning of the installation. This is rather different compared to certain countries. In January 2013, an additional week of training is planned for the University of Alexandria to teach students in the design and installation of hybrid plants. In this project, all parts are imported from the Netherlands and Germany, but in the future also locally manufactured parts should be used. The working conditions for the western engineers was tough. A daytime temperature of 30 - 40C and night of 10-15 C, no fresh food because shops are too far away, and many mosquitoes (due to water and high temperatures) is not working attractive. You have to drink a lot under these circumstances, dehydration should be avoided.

There is much interest in Egypt for these systems. Several inquiries of this application have been received for additional information and prices. First we want to build up more knowledge and measurements to determine the production costs of one liter water produced by renewable energy. The ambition to cultivate large parts of the desert is very ambitious but not impossible.



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