

Switching on to the wind and sun



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Egypt is poised to integrate more renewable energy resources into its national electricity grid

Egypt is well aware that the challenge of pursuing economic development as well as protecting the environment cannot be fully met except through a sustainable energy production system, which largely depends on renewable energy (RE) resources. In April, the Supreme Council for Energy adopted an ambitious plan which aims at covering 20 per cent of the country's total electricity needs using RE by 2020. Notably, 12 per cent of this will come from wind energy, which translates into 7000 mega watts (MW) of grid-connected wind farms. This plan opens the door for the private sector to play an active role in developing new and RE resources.

"The Egyptian electricity sector recently drafted a new electricity act to encourage renewable energy utilisation and private sector involvement in the process," stated **Minister of Electricity and Energy** Hassan Younes during a conference on the future of RE in Egypt. The event was sponsored by the **Ministry of Electricity and Energy**, the Egyptian-British Chamber of Commerce (EBCC) and the New and Renewable Energy Authority (NREA). The new legislation is expected to be presented to parliament next winter.

Younes underlined that Egypt is in the contracting phase to implement the first solar thermal power plant of 140MW, including a solar share of 20MW. Planned to operate by 2010, the project is one of four similar ones to be implemented in India, Morocco and Mexico, and is co-financed by Global Environment Facility (GEF).

According to the minister, a national plan to foster increasing wind contribution in electricity generation has already been laid out. "The coming period will witness a number of bids to invite competitive private sector companies to supply power from renewables," he revealed, adding that investors will be guaranteed long-term power purchase agreements to reduce financial risk. To encourage private sector participation, resource assessment, feasibility studies and technical support for potential project developers will be provided.

Studies have shown Egypt's abundant wealth of renewable energy resources, wind and solar energy in particular. "Egypt lies in the sunbelt area which has the greatest solar concentration," stated Amin Mubarak, professor of mechanical engineering at Cairo University and former chairman of the Industry and Energy Committee at the People's Assembly. Mubarak added that the solar concentration in northern Egypt is estimated at 2000kwh/m² per year, while it reaches approximately 3200kwh/m² per year in the south. "This is actually the best place in the Middle East for solar energy," he asserted. In fact, Egypt is the first country in the region to build a solar thermal plant in 1913 when American inventor Frank Shuman built a solar thermal plant in Maadi, Cairo, added Mubarak.

In 1986, NREA was established to act as the national umbrella under which renewable energy RE technologies for potential applications, particularly generating electricity on commercial scale, were to be promoted. At present, wind energy generation is at the core of NREA's current and future plans. A *Wind Atlas* for the entire country was issued in 2005, which indicated that about 20,000MW of wind farms can be housed in the Gulf of Suez area, which has been compared to the most favourable regions in northwestern Europe.

"The *Wind Atlas* is considered the basis for all decisions related to wind energy planning and feasibility studies in the future," according to Khaled Fekry of NREA. Consequently, a number of pilot wind farms have been operational in Zaafarana on the Red Sea, propelling Egypt's renewables from limited experimental projects to large-scale, grid-connected wind farms. A series of large-scale wind energy projects were constructed with a total capacity of 230MW and connected to the national grid. Some 80MW are under implementation and will be operational in early 2008, while 240MW are still being contracted.

"It is planned to reach 850MW by 2010," stated Mubarak, noting that Egypt has the competitive advantage to be the hub for promoting wind power in the Middle East and North Africa (MENA) region. Moreover, Egypt also enjoys an excellent wind regime, particularly in the Gulf of Suez area where wind speed has been estimated at 10.8m/ second. "This is twice as much as that in Holland," pointed out Mubarak. Another site of great potential is south of Zaafarana at Gabal Al-Zayat, where an area of 700 square kilometres has been earmarked by NREA to house wind energy projects, mostly planned to be funded by private investments.

Fortunately, many components of the wind farm have to be manufactured locally because they are difficult to import. "Wind farm components are very bulky; the tower is some 50m high and the blades are massive," explained Mubarak.

On the solar energy front, Kuraymat -- situated 92km south of Cairo -- was selected to soon begin harvesting some 140MW. "The location is characterised with high solar radiation," revealed Magdi Nasrallah, professor of RE at the **American University in Cairo**. "Moreover, cooling water is available all year long because of the approximation of the site to the River Nile." According to Nasrallah, solar energy applications in Egypt mainly fall into three categories, namely domestic water heating found in hospitals, tourist villages and houses; industrial process heating as in food, textile and chemical industries; and solar electricity generation used in the new solar thermal station soon to be built at Kuraymat.

While the country's RE potential is very high, there are many factors which negatively affect the ability to utilise this potential to its fullest. **Mubarak believes long-term and heavy subsidy of oil products is a main factor for not developing RE resources at a faster and more efficient pace.** "Why generate electricity using renewable energy if I can get oil and gas at very cheap prices," he noted.

In the meantime, there are no feed-in laws which encourage the private sector to venture into building wind farms or solar thermal stations. "It is about time that we move from subsidising the final product into subsidising the technology," asserted Mubarak, adding that when Germany followed this path, the prices of RE became less and less expensive.

Notably, this month **Italy and Germany laid the foundation for the first direct current cable to export electricity from Tunisia via Cecilia.** "Tunisia will sell electricity to Italy and Germany in exchange of machinery," revealed RE expert **Hani El-Nokrashy**. "Having excellent wind potentials in the Gulf of Suez region, can we dream of connecting the south and north of the Mediterranean through a gigantic **electric** grid as Tunisia did?"