

Egypt and the Great Energy Debate

Egypt is at energy cross-road; it faces choices about what energy sources it will use in the future. Conventional fuels are becoming increasingly expensive and there is recognition that these fuel resources are finite. Some estimates indicate that indigenous natural gas and oil reserves, on which Egypt's electricity generation currently relies, will run out in about 30 or 40 years¹, making the transition to alternative energy sources a pressing need to avoid stagnant economic development.

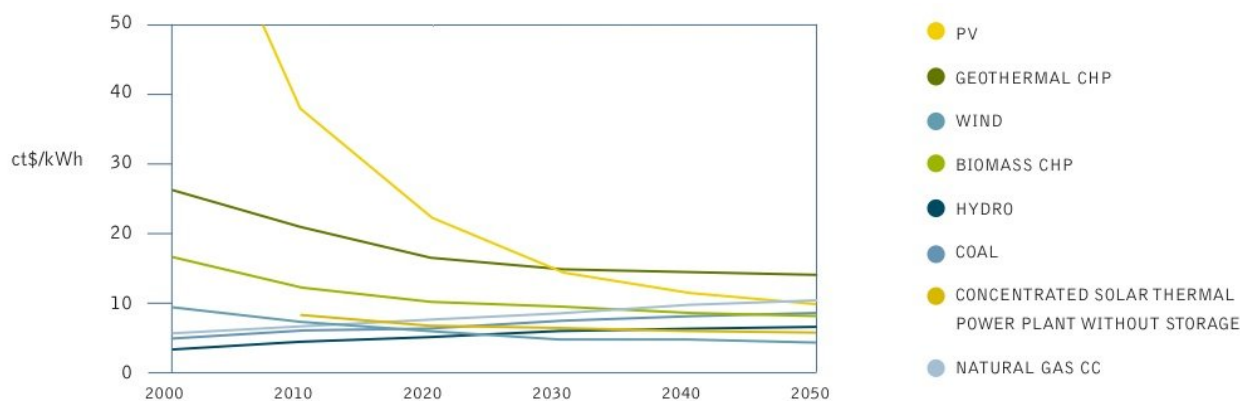
Renewables – Clean, Safe, Cheap and Available Energy

Renewable energy technologies are real, mature and economically viable today and are ready to be deployed on a large scale. Together with energy efficiency and decentralised energy systems, 50% of global energy can be supplied by renewables.

Decades of technological progress have seen renewable energy technologies such as wind turbines, solar photovoltaic panels, biomass power plants and solar thermal collectors move steadily into the mainstream, making them competitive with conventional power sources. In addition the global market for renewable energy is growing dramatically; in 2006 its turnover was US\$ 38 billion, 26% higher than the previous year. As an investment proposition the renewable energy industry is comparable with computers and mobile technology. This will only be enhanced by continued increases in price of fossil fuels and as the saving of carbon dioxide is given an increasing monetary value.

In conjunction with energy efficiency programmes and decentralised energy supply systems renewable energy technologies could deliver up to 50 per cent of global primary energy by 2050 as long as governments implement appropriate policies and actions plans².

Decreasing costs of RE technologies³



All figures for OECD Europe, except for concentrated solar thermal power plant where figures are for Middle East Note that generation costs depend partly on site specific fuel costs.

Renewables are available in Egypt

In Egypt there is over 80 times more energy readily available from renewable sources than is needed for current electricity production.

The amount of electricity produced in Egypt per year (2004 figures) is 91.72 billion KWh and the amount consumed is 84.49 billion KWh⁴. However, the amount of solar radiation available in Egypt is between 1900 KWh/sq metre/year in the north and 2600 KWh/sq metre/year in the south. If the average for the country is taken as 2300 KWh/sq metre/year then there is at least 230 billion KWh of solar radiation – over two and a half times the amount of electricity produced for the whole country⁵.

But it is not only solar technologies that can provide for the needs of Egypt. In combination, the total economically available renewable energy resource in Egypt is 7,573 billion KWh per year. This is over 80 times the amount of electricity produced per year. This is actually half the technically available renewable resource, so as renewable energy collection technologies improve, twice this amount will become available i.e. 15,086 billion KWh.

Technical and Economic Renewable Electricity Supply Side Potentials in TWh/year⁶

Hydro		Geo		Bio		CSP		Wind		PV	
Tech	Econ	Tech	Econ	Tech	Econ	Tech	Econ	Tech	Econ	Tech	Econ
80.0	50.0	n.a.	25.7	n.a.	15.3	73656	73656	7650	90.0	n.a.	36.0

Total Technically available = 15,086 TWh/year (15,086 billion KWh)

Total Economically available = 7,573 TWh/year (7,573 billion KWh)

Hydro – hydropower; Geo – Geothermal; Bio – biomass; CSP – concentrated solar power; wind – wind power; PV – photovoltaic

Renewables are Cheaper

Renewable technologies are cheaper to build, with lower operation and maintenance costs, than nuclear power.

The construction cost of the new CSP project being built by the Egypt government is estimated at US\$140 million for 140 MW⁷ – roughly US\$1 million per MW.

In comparison, the cost to build the proposed nuclear power plant is estimated at US\$1.5 billion for 1000MW⁸ – roughly US\$1.5 million per MW; in other words, it is one and a half times the costs of concentrated solar thermal power.

It is also important to note that US estimates for the development of a nuclear power plant are much higher, averaging US\$4.0 billion for a 1200MW⁹ which is over US\$3 million per MW which means that the construction costs for nuclear could be as much as three times the cost of CSP. These are just the building costs; they do not include the costs of decommissioning, of dealing with nuclear waste, nor of the fuel – problems which do not exist with renewable energy.

Current Capacity

The Government of Egypt has a target of only 3% of energy from renewables by 2010, greatly under-utilising their potential.

Total installed hydro capacity is currently 2794 MW. This includes 270 MW each from the Aswan 1 and 2; 2100 MW from the High dam; 90 MW from the Isna Dam; and 64 MW from the Naga Hamady Dam 12.

Total installed Wind Power is 315 MW - 95 MW from Hurgada and 220 MW from Al-Zafarana facilities.

The Egypt government has a renewable energy target of 3 per cent by 2010¹⁰; yet the resources available could provide a much larger contribution if the right direction, encouragement and framework were provided.

Reviving the Nuclear Threat

Nuclear power is enjoying an upsurge in interest in the Middle East. In September 2006, Egypt became the first country in the region to claim officially that it is resuming its nuclear programme; which had been frozen since the 1986 Chernobyl disaster.

More detailed plans for a 1,000 megawatt power station at Al-Dabah have subsequently been proposed by the Minister for Electricity and Energy. The site, on the Mediterranean coast west of Alexandria, has been designated for nuclear programmes since the 1980s. This decision appears to be the first stage of an Egyptian Electricity Ministry plan to build three light-water reactors along the north-west Mediterranean coast¹¹. Russia, China, and the United States have expressed interest in the project. The government has stated that the studies related to the Nuclear power plant will be finished by the end of 2007.

Nuclear power is not cheap ...

The cost of the proposed nuclear power plant is estimated at US\$1.5 billion for 1000MW – roughly US\$1.5 million per MW. However, estimates from the US for the development of a nuclear power plant are much higher, averaging US\$4.0 billion for a 1200MW¹² which is over US\$3 million per MW.

Added to the costs of construction are operation and maintenance (O and M) costs. These costs are estimated by the US EIA to be about \$54 per kw in 1997 dollars for an advanced nuclear plant although other estimates have stated over \$100 per kw. Further costs are incurred through the need to deal with radioactive waste as well as decommissioning old powerstations. By any measure, nuclear power plants are very expensive. It is important to note that the O and M costs for a CSP plant are minimal.

Nuclear power is dirty and dangerous a threat to the environment and human life ...

Nuclear power plants produce some of the most persistent and dangerous waste humankind has ever developed. Even without accidents dangerous waste is produced for which there is no technique for making safe and the routine operations of nuclear plant pollute the air, land and sea. Accidents can result in massive and persistent environmental pollution as well as direct threat to human life and well-being.

In addition, there are multiple threats to people and the environment from the operation of nuclear technologies. These include the risks and environmental damage from uranium mining, processing and transport, the risks of nuclear weapons proliferation.

In addition, whilst nuclear power plants are thought by many to make an important contribution to minimising climate change, the reality is that significant amounts of carbon are released in the mining of uranium. Further the amount of energy required to mine and process ores will increase significantly as the amount and quality of the resource decreases over the next 50 years.

Nuclear – Not the Answer

Nuclear plants are a fading technology with unsolved problems of nuclear waste disposal and very high environmental risks. With present consumption – only 7 % of the world energy demand is covered by nuclear energy today – the global uranium resources will not last longer than 50 years and are becoming more and more expensive. In spite of massive subsidies of several billion dollars per year, nuclear power has presently a share on the power plant market place of less than 1 %, which is a clear indicator of its obsolescence¹³.

References:

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- 2 Energy [R]evolution: A sustainable World Energy Outlook. European Renewable Energy Council/Greenpeace report 2007
- 3 Energy [R]evolution: A sustainable World Energy Outlook. European Renewable Energy Council/Greenpeace report 2007
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- 5 New and Renewable Energy Authority figures.
- 6 Concentrating Solar Power for the Mediterranean Region. German Aerospace Center (DLR) Institute of Technical Thermodynamics Section Systems Analysis and Technology Assessment 2005 <http://www.dlr.de/tt/med-csp>
- 7 New and Renewable Energy Authority report
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