



Prospect of using alternative energy for power and desalted water productions in Kuwait

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ABSTRACT

Extensive research is conducted in Kuwait to apply renewable energy (RE) for electric power (EP) generation. The Kuwaiti Ministry of Electricity and Water (MEW) formed a committee to study the introduction of solar energy to generate EP. Meanwhile, the government formed a committee to take the necessary steps to build the first nuclear power plant (NPP) for EP production and desalting seawater. This study addresses the technical and economical aspects of using NPP and RE in generating EP in Kuwait in comparison with presently used combined cycle stations which are operated with natural gas or oil fuel. The results of this study indicate that installing wind energy (WE) or solar cells photovoltaic solar cells (PV) power plant (PP) cannot be considered a capacity addition. Capacity addition is required to handle the ever increasing peak load. The WE and PV PPs are primarily fuel savers for the existing fossil fuel plants. The intermittent and the non-dispatchable nature of the WE and PV plants make them unable to generate consistent output like fuel-fired PPs. Their output should be taken by the grid and this decreases the load on the operating dispatchable PPs and thus reduces their fuel consumption. Among the thermal solar concentrating PP options (solar tower, solar dish with Stirling engine, and parabolic trough mirrors), the ones using parabolic trough are the only solar type PP that have reached commercial maturity with well-proven records of reliability and availability. This type of PP should be augmented with supplementary fossil fuel or thermal storage system to become a dispatch-able plant.

Keywords: alternative energy, desalination, electric power, solar energy, combined gas/steam power plants, nuclear power plants, wind energy, levelized energy cost, dispatch-ability, photovoltaic, concentrated solar power.
