

Paper Title	Analysis of Stand-Alone Micro-grid with Photovoltaic, Diesel Generators and SOFC		عنوان البحث
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Abstract

Analysis of a hybrid system, comprising of photovoltaic (PV), diesel engine generators (DEGs) and solid oxide fuel cells (SOFCs) is proposed in this study for a stand-alone micro grid. This proposal system is a source for energy in a typical city in Egypt. The component specifications of the hybrid system were discussed. Ammonia (NH₃) is a hydrogen supply for the fuel cell is clarified in this work. The hydrogen generating from synthesizing ammonia from nitrogen and hydrogen separated with renewable energy is applied to generate electrical power from the SOFC. In the present paper, the operation plan of the proposed system is optimized as a non-linear system without using battery. In addition, the analysis of the overall efficiency is shown. The operational advantages of the system were clarified. Using PV power contribution reduces the fuel consumption of the system by 33% compared by the hybrid system without using renewable energy. Moreover, this paper reported that there are reductions in fuel consumption of the proposed system with using ammonia synthesizing by 25% compared with the same hybrid system without using NH₃. The methods proposed in this work can be applied to develop comprehensive analyses in energy storage solutions using a hydrogen carrier in hybrid systems and micro grids. Moreover, increasing the efficiency and decreasing the operating cost are the advantages of powering a stand-alone micro-grid using this hybrid system; so this is proposed hybrid system becomes more economic than other hybrid systems.