ASIA-PACIFIC
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Instructions to Abstract Authors

2018 Key Dates

Submission of Abstracts due:	**Monday, 16 July 2018**
Notification of abstract selection to authors:	**Monday, 13 August 2018**
Papers due for peer review:	**Monday, 15 October 2018**
Feedback from reviewers to authors:	**Monday, 12 November 2018**
Final paper submission due from authors:	**Monday, 26 November 2018**

Your contribution will not be formally accepted and scheduled, until you have registered your attendance at the conference.

Please indicate by ticking which stream/s best fits your abstract

	STREAMS Topics listed are a guideline only. Submissions in related areas are welcome
☐	**Photovoltaic Devices** *Silicon solar cells* *Inorganic, organic, dye sensitized and perovskites* *Tandem and other solar cells* *Characterisation and quality control* *Modules and manufacturing*
☐	**Deployment & Integration** *Renewables integration, policy and regulation* *Forecasting and Resource assessment* *Minigrids and Community owned Renewables* *Field experience, performance, yield and reliability* *Distributed Energy Resources, EVs and Low emissions transport*
☐	**Solar Heating and Cooling, Low Carbon Living** *Energy Efficiency and Demand Management* *Housing and appliances* *Solar heating and cooling including heat pumps* *Cities and Communities* *Competing with gas in the domestic & commercial market*
☐	**Concentrating Solar Thermal** *Fundamentals and components* *Storage, systems and power cycles* *CSP integration, design and modelling* *CSP and high temperature processing*
☐	**Solar Fuels & Chemistry** *Storage* *Hybrids, complementary solutions and discrete applications* *Fuels and chemicals from electricity and heat* *Energy for heavy industry*
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Assessment of a Solar Parabolic Trough Power Plant with Grid Integration in Egypt

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Abstract

Concentrating Solar Power (CSP) is a promising technology for generating efficient renewable solar energy in countries with high Direct Normal Irradiance (DNI). Egypt as one of those countries can very effectively harness the sun's energy for the generation of power, which could have an appreciable impact on the future Egypt's energy plan. Nevertheless, the current and planned CSP projects do not match with the Egyptian solar energy potential. In reviewing the literature, many studies have been conducted in the Middle East on CSP technology but usually combining both technical and economic sides. In contrast there are few research projects that extend to the next step of grid integration and conducting power flow studies. Accordingly, this study examined both the technological and economic aspects for a potential 100 MW CSP plant in three locations in Egypt in addition to investigating the grid integration performance by conducting power flow analysis.

System Advisor Model (SAM) was used to evaluate the Levelized Cost of Energy (LCOE) and the annual energy output of the proposed parabolic trough power plant in each of the three selected locations. The technical parameters values were set to ensure the best generating performance. Furthermore, the proposed power plant incorporated thermal storage for 8 hours of full load, and was designed according to the load profile in Egypt.The financial parameters were set according to the current economic status in Egypt. The calculations of the LCOE included the inflation rate to give the results a more realistic approach. Finally, a power system model was created using Simulink for conducting power flow studies on the energy output to ensure the performance of the proposed CSP plant. This model was created based on the daily average electrical power output profile generated by the CSP plant as estimated in SAM simulation and later exported as an input for the Simulink Model. Figure 1 illustrates the single line diagram of the proposed power system model.

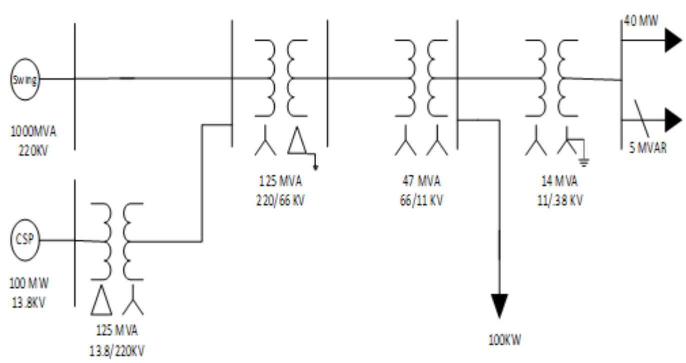

Figure 1: Single line diagram for the proposed power system model

The results demonstrated that a site near Ras Shukeir city in Egypt had the lowest LCOE with only 10.07 US ₵/kWh and good generation performance with annual energy of 464.7 GWh and a capacity factor of 53.1%. The other two sites had slightly less generated power and higher LCOE. Moreover, based on the estimated power values of the developed model, the power flow studies presented the grid integration outcome for the average daily output profile of the proposed CSP plant model with less power losses. Therefore, CSP technology can be adopted on a bigger scale in Egypt, even with the current economic status, to install an efficient CSP plant providing optimum energy output at low cost.