



Contribution ID: 135

Type: **Poster Presenter**

## Modeling and Simulation of a 100 MW Concentrated Solar Thermal Power Plant Using Parabolic Trough Collectors in Pakistan

*Monday 2 April 2018 13:40 (20 minutes)*

The increasing energy demands of the modern era has created a critical situation. The world is now moving towards renewable and sustainable methods of producing energy, among them the most abundant renewable energy resource is solar energy. As the lifetime and efficiency of Concentrated Solar Power (CSP) is more as compared to photovoltaic (PV) and considering the solar potential of Pakistan, design of a 100 MW Concentrated Solar thermal power plant using Parabolic Trough Collectors and a 6-hour thermal energy storage is proposed. The CSP plant is modeled and simulated using System Advisor Model (SAM). Based on certain parameters, a location receiving an annual Direct normal irradiance (DNI) of  $1955 \text{ KWh/m}^2/\text{year}$  near Nawabshah is selected for the hypothetical solar thermal power plant. The plant consists of 189 solar collector loops with 8 parabolic trough collectors in each loop and HITEC solar salt as HTF. The simulation results, show that the plant can generate 245,688,560 kWh (245.68 GWh) of electricity annually with a capacity factor of 28.1% and 93.8% gross to net conversion. The results of PTC Power plant encourage further investigation and development of CSP technologies for electricity generation in Pakistan.

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**Session Classification:** Mechanical and Material Engineering

**Track Classification:** Mechanical & Material Engineering