

A Technical and Economic Feasibility Study of the Use of Concentrating Solar Power (CSP) in Desalination Plants on the Kenyan Coast

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Abstract : Despite the implementation of a Feed in Tariff (FiT) for solar power plants in Kenya, the uptake and subsequent development of utility scale power plants has been slow. This paper, therefore, proposes a Concentrating Solar Power (CSP) plant configuration that can supply both power to the grid and operate a sea water desalination plant, thus providing an economically viable alternative to Independent Power Producers (IPPs). The largest city on the coast, Mombasa, has a chronic water shortage and authorities are looking to employ desalination plants to supply a deficit of up to 100 million cubic meters of fresh water per day. In this study the desalination plant technology was selected based on an analysis of operational costs in \$/m³ of plants that are already running. The output of the proposed CSP plant, Net Present Value (NPV), plant capacity factor, thermal efficiency and quantity of CO₂ emission avoided were simulated using Greenius software (Green energy system analysis tool) developed by the institute of solar research at the German Aerospace Center (DLR). Data on solar irradiance were derived from the Solar and Wind Energy Resource Assessment (SWERA) for Kenya.

Keywords : desalination, feed in tariff, independent power producer, solar CSP

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