

Feasibility of Small Scale Renewable Desalination Units in the Jordan Valley: Solar Energy for Brackish Water Treatment

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Abstract: This paper investigates the feasibility of reviving the agricultural production from the Jordan Valley as the West Bank food Basket, might water and energy issues could be conquered by treating abundant brackish water in the Jordan Valley through renewable energy desalination. The study supported replicating the use of Reverse Osmosis technology for treating brackish water wells in the Jordan Valley. The selection was due its low energy requirement, market availability and applicability to the harsh conditions of outdoor installation, and the ease of being coupled to off-grid Solar Photovoltaic, which was also investigated. Although it's economically recommended, a call for governmental subsidizes to fund RO-PV project is recommended as its investment cost would be a burden on the Jordan Valley farmers. The economic feasibility of the off-grid connected RO-PV (to operate the desalination unit) was compared to Diesel generator and electricity network, environment cost was included. Comparison was tested on operating desalination plant in Marj Najeh. The economic calculation has shown that the average produced water cost estimated to be 0.183 USD/m³, compared to 0.166 and 0.346 USD/m³ estimated if electricity network or Diesel generator. Might the feasibility could disseminated, and 162 agricultural well of different capacities and quality can benefit of this study after further investigation of the desalination design capacity, and efficiency.

Keywords: Jordan Valley, desalination, Reverse Osmosis, Solar PV, produced water cost