	**Title: Performance Test and Techno-Economic Evaluation ofa PV Powered Reverse Osmosis Brackish Water Desalination System in West Bank**
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Abstract:

Brackish WaterReverse Osmosis(BWRO) desalination technology powered by solar PV system is considered as one of the mostpromising technology in producing potable water from both brackish and sea water.Even such small systems located in remote areascan break the dependence on conventional desalination by fossil fuels, reduce the costs of potable water, and improve the environmental sustainability.

This thesis discusses the energy required, thetechno-economic issues, and environmental analysis of the first BWRO desalination system operated by solar electric power (PV) in West Bank- Palestine. This system is built in village–Jordan valley to demonstrate the applicability of solar energy in water desalination and to provide the inhabitants with the desalinated drink water.

AzZubeidatsystem produces 10 $m^3$of potable water per day, fromBrackish Water(BW) with TDS of 2680 mg/L using RO technology powered by solar PV generator of 5.2 kW_p. Energy analysis shows that 1 $m^3$of produced potable waterneeds 2.3 kWh of electrical energy, which corresponds to 450 W_p PV modules. Economic analysis shows that the cost of 1 $m^3$of potable water produced by this system is 3.17$ when usingbattery bank and 2.33$ without using battery.

This result is very reasonable compared with 5.07$/$m^3$as costof potable water delivered by trucks.The annual savings byusing such system amount to17740$. Investigations on varying the recovery has shown that higher recovery results in higher power requirement of the high pressure pump,and thereby higher energy consumption of the system,it increases also the TDS of permeate which results in higher probability of membrane scaling. Environmental analysis shows that using such a small system preserves the environment of production 4195 kg of CO_2per year