



A Win-Win Project for the Jordanian Water and Energy Sectors

The PV Roadmap Initiative – Increasing the usage of renewable energies in the Jordanian water sector’s energy mix to secure water supply services and decrease emissions

LOCAL CONTEXT

Jordan is one of the world's water-scarcest countries. On top of this, the water sector is energy-intensive due to its complicated hydrogeology and topography, which require extensive pumping and treatment processes. The water sector is, in fact, one of the largest single consumers of electricity in Jordan the rate lies at 9%^[1] and the trend is rising. This in turn comes at a cost since electricity tariffs are rising on average by two to three times compared to water prices.

Since Jordan’s energy mix is mainly based on fossil fuels, the water sector is one of the main responsible sectors for the country’s greenhouse gas emissions. Despite a high potential for the use of renewable energies (RE) in the water sector (especially wind and solar energy, biogas, and small-scale hydropower), their share in the national energy mix remains small.

APPROACH AND OBJECTIVE

The PV roadmap initiative supports Jordan’s water sector in improving its energy management by promoting an increased share of renewable energy (RE), thus enabling the water sector to move faster towards meeting the national targets for energy-efficiency (EE) and RE while also reducing its operating expenses – of which energy costs represent around 50%. At the same time, increased PV in the water sector’s energy mix holds the potential to reduce 17,200 Ton of CO₂e carbon emissions in the first year of operation alone^[2].

The initiative is coordinated by the GIZ^[3] on behalf of the European Union (EU) and the German Federal Ministry for Economic Cooperation and Development (BMZ). It entails the elaboration of engineering documents, business models and tendering documents^[4] as well as bringing together relevant stakeholders for effective cross-sector coordination and the mobilization of funding opportunities.

[1] According to the [National Water Strategy 2023 - 2040](#)

[2] The factor used to convert is 0.474 ton/MWh, which is taken from the European Investment Bank (EIB) - EIB Project Carbon Footprint Methodologie Report Version 11.3 issued January 2023

https://www.eib.org/attachments/lucalli/eib_project_carbon_footprint_methodologies_2023_en.pdf

[3] A joint initiative by two GIZ led projects: Energy Efficiency in the Water Sector in Jordan and the Nexus Regional Dialogues Programme co-funded by the European Union and the BMZ

[4] This work is being carried out by the consultancy company ECOSOL - Eco Engineering and Energy Solutions

KEY RESULTS AND POTENTIAL IMPACTS

- PV Roadmap has been included to World Bank's funding assigned for energy efficiency and renewable energy measures, constituting a step forward towards its upscaling.
- The three Jordanian water utilities (Yarmouk Water Company, Miyahuna Water Company and Aqaba Water Company) together serve about 1.4 million water and about 985 thousand wastewater subscribers in Jordan. Therefore, an implementation of the PV Roadmap for the water sector will not only help to increase the share of renewable energy in Jordan's water sector and reduce the operating costs for the water utilities but will also benefit their subscribers and the people served per subscribers (in total: more than 10 million people (water) and around 5,56 million (sewage)).[5]
- PV in the water sector's energy mix holds the potential to reduce 17,200 Ton of CO₂e carbon emissions in the first year of operation alone[6].

LESSONS LEARNED

- Targeting water facilities with high land availability and electricity consumption increase the chances of the successful implementation of PV projects
- The process of obtaining permits for renewable energy projects in Jordan requires intensive follow-up[7]
- Opportunities to fund the implementation are available (whether through grants from donor institutions such as Kreditanstalt für Wiederaufbau (KfW), Global Concessional Financing Facility (GCFF), or loans from financing banks e.g. European Bank for Reconstruction & Development (EBRD), World Bank (WB) or through Private Sector Participation (PSP) – they all require detailed techno-economic feasibility studies

Figure 2: PV pilot project on one of the water facilities reservoirs



[5] From the Jordanian Water Utilities – Monitoring Report 2021

[6] The factor used to convert is 0.474 ton/MWh, which is taken from the European Investment Bank (EIB) - EIB Project Carbon Footprint Methodologie Report Version 11.3 issued January 2023

https://www.eib.org/attachments/lucall/eib_project_carbon_footprint_methodologies_2023_en.pdf

[7] Due to the rapid growth of PV project development and implementation in Jordan in the last years, both the grid capacity and that of Electricity Distribution Companies (EDCs) have peaked, which has resulted in the delay of approvals (of project proposals in available grid zones) or even the rejection of proposals for PV projects in full capacity zones.