

Market analysis for Autonomous Desalination Systems powered by renewable energy in southern Mediterranean countries. Case study on Turkey

Michael Papapetrou^{1*}, Christian Epp¹, Senem Teksoy², Seval Sözen², Vicente Subiela Ortín³, Ulrike Seibert⁴, Gisela Vogt⁴

¹WIP – Renewable Energies, Sylvesteinstr 2, 81369 Munich, Germany
Tel. +49–89–720 12 735; Fax +49–89–720 12 791; email: michael.papapetrou@wip-munich.de,
christian.epp@wip-munich.de

²Istanbul Technical University (ITU), Faculty of Civil Eng'g, Department Of Environmental Eng'g, 34469 Maslak, Istanbul, Turkey

³Canary Islands Institute of Technology (ITC), Playa de Pozo Izquierdo s/n, Pozo Izquierdo, E-35119 Santa Lucía, Gran Canaria, Spain

⁴Fraunhofer Institute for Solar Energy Systems (ISE), Department EES, Heidenhofstr. 2, 79110 Freiburg, Germany

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Abstract

This paper presents research results on the market potential for Autonomous Desalination Systems (ADS) in Turkey. Seven representative municipalities in South–West Turkey have been selected and water, energy, environmental and socio-economic data have been collected. Additionally, the constitutional actors responsible for the water supply on a national and a local level have been identified and their role has been analysed. The results revealed water and energy shortages, especially during the summer months. Water quality is deteriorating because of pollution. These problems will become severe in the near future as demand is increasing triggering competition over the available resources. A win-win situation for the end users and the governmental authorities was identified in the use of ADS. Still, it was concluded that the market needs support from the governmental authorities with actions ranging from information supply to legislative reforms. The study was carried out within ADIRA. In this EU funded project the other research target countries were Morocco, Jordan, Egypt and Cyprus where similar conclusions were reached. Thus, the regional size of the market is quite large and the

*Corresponding author.

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critical mass for attracting private funds and the interest of governments, development organisations and the private sector can be formed.

Keywords: Market analysis; Turkey; Rural water supply; Renewable energy; Desalination

1. Introduction

In recent years, the research community worked intensively on coupling desalination systems with renewable energy technologies in robust and cost-effective autonomous desalination systems (ADS). Many pilot plants have been built and operated with encouraging results (see for example [1]). A comprehensive overview of the technological status quo is given by Tzen and Morris in [2].

The technology is well developed and some products have already reached the market [3]. Further technological developments and cost reduction potentials could be achieved through the competition that would be created by wide-scale implementation around the world. There are barriers however, impeding the deployment of desalination based on renewable energy. The most suitable regions are usually poor or underdeveloped and lack information and resources to initiate ADS projects. Additionally, governmental control over water supply structures favours large-scale approaches, like water conveyance, and does not support locally planned autonomous solutions.

In the Middle East and North Africa (MENA) region, per-capita availability of freshwater has fallen by 60% between 1960 and 1995. Today it is the lowest in the world and is predicted to fall by another 50% by 2025 [4]. Most of the arid rural areas in the MENA region however, are blessed with abundant renewable energy resources such as sun and wind. Meanwhile, many of them have access to sea or brackish water resources. Hence, the MENA region has a

good potential to cover part of its pressing water needs by autonomous desalination units. In order to identify the size and peculiarities of that market, extended research is required.

In an effort to contribute to a better understanding of the market and faster commercialisation of ADS in that part of the world, areas with a good potential for ADS installations have been identified in the ADIRA project and the administrative structures in the water sector have been analysed in five countries of the MENA region (Cyprus, Egypt, Jordan, Morocco and Turkey).

In this paper, the results for Turkey are presented after a short introduction of the ADIRA project and a description of the methodology of data collection and analysis. Finally the results are discussed and conclusions are drawn.

2. The ADIRA project

The paper is based on research carried out within the ADIRA project (*Autonomous Desalination System Concepts for Seawater and Brackish Water in Rural Areas with Renewable Energies – Potentials, Technologies, Field Experience, Socio-Technical and Socio-Economic Impacts*).

ADIRA aims to develop optimum concepts for fresh water supply in rural areas derived from salty water (sea water and brackish water). Units powered by autonomous, renewable energy systems, with fresh water output in the range of 0.1 m³/day to 10 m³/day, are the focus of this project.

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