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A review on the water and energy sectors in Algeria: Current forecasts, scenario and sustainability issues

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ABSTRACT

The water sector in Algeria has to date paid scant attention to the issue of climate change and is often unaware of its impact on future water resources. Studies will be needed to assess the impact and cost of climate change and draw up adaptation solutions.

Forecasts are not optimistic. Models for climate change indicate that rainfall could decrease by more than 20% by 2050, which would result in even greater worsening water shortages in different basins of Algeria. The construction of 70 dams planned will provide only small additional volumes.

The particular challenge for Algeria in the coming decades will be to adapt to a decrease in renewable water resources. The country will have to carefully manage these resources. Mobilization of non-conventional water resources (desalination and wastewater reuse) will be a strategic component of future water policy.

The development of unconventional resources and the management of water demand will increase more the energy consumption of the water sector. This consumption would reach nearly 12% of the country's consumption and must be integrated dice now in the country's energy forecasts.

More coordinated planning and action will consequently be required between the water and energy sectors if further aggravation of the water deficit is to be avoided.

Moreover, the revolution in renewable energy (wind and solar power) in terms of technological development and costs may help reduce the consumption of fossil fuels and ensure reserves for future generations by fostering decentralized renewable energy projects for alimentation of pumping stations.

Algeria has thus set itself by 2030 a share of renewable energy in the national energy balance of between 30% and 40%. The share of renewable power by 2023 will represent about 17% of installed capacity (5539 MW) compared to 4.74% in 2011 (540 MW).

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1. Introduction

Water is something of a rare commodity in Algeria. Renewable natural water resources are estimated at approximately 15 billion m³ per year, that is approximately 404 m³ per capita per year, near the threshold of 500 m³ per capita per year, which is widely recognized as the scarcity threshold that indicates developing scarcity and underlying crises.

As part of its development program and in order to meet the needs expressed by users, Algeria has been working for some time on managing exploitation of its water resources. Since independence its policy in the face of water shortages and uneven distribution has been to ensure that water supply corresponds to the requirements of towns, cities and agriculture by constructing dams, developing large irrigation areas and setting up systems to supply drinking water to inhabitants. This has led to the creation of reliable infrastructure and competent agencies.

Nevertheless, the Algerian water sector is facing several limitations and problems which could, if not properly handled, limit the dynamic of economic growth that Algeria is looking for by launching a huge range of large-scale projects.

These limitations and problems relate primarily to decreased water resources due to the impact of climate change which has

become a reality in Algeria and whose effects on our environment are already visible.

The future development of water resources depends on solutions characterized by high energy consumption, for example sea water desalination, the reuse of wastewater and the introduction of drip irrigation. Development of the water sector will therefore be closely tied to the development of the energy sector.

This sector must conduct a large-scale program of studies to understand the current and future impact of climate change, identify and quantify associated costs and its interactions with water and energy and specify adequate solutions for adaptation.

This report provides for Algeria an inventory on water resources, water demands and energy, presents strategic development of the sectors of water and energy, analyzes the interactions between water and energy (Fig. 1).

2. Water in Algeria

2.1. Resources

Table 1 Across the country, water resources are as follows:

Table 2 From documents of Ministry of Water Resources (MWR), updated in February 2012

- 10 billion m³ in the northern regions: 7.4 (surface water), 2.6 (underground resources);
- 5.37 billion m³ in the Saharan regions: 0.37 (surface water), 5 (underground resources from Albian Water-table).

Structures in sedimentary basins of the Sahara are in favor of large and deep reservoirs which feed back to the rainy periods of the quaternary. The water-table of the continental Terminal (100–400 m depth), and the water-table Intercalary continental called “Albian” (1000–1500 m depth) contain significant reserves (30,000 to 40,000 billion m³) but because their very low turnover (non renewable) the exploitable potential is very limited (5 billion m³/year).



Fig. 1. The 05 hydraulics basins of Algeria.

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