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Renewable energy potential and national policy directions for sustainable development in Morocco

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ABSTRACT

Satisfying energy requirements in its most suitable form is the great challenge of the world in the 21st century. Moroccan authorities are fully aware about this challenge, especially with the population and economic growth that causes a sharp increase of energy demand. This paper presents the renewable energy potentials and the national strategy currently underway to pursue low-carbon opportunities in Morocco. The enormous potential identified in the Moroccan renewable energy sector with favorable CO_2 mitigation draw optimistic expectations to build sustained low-carbon economy.

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Contents

1. Introduction

The world is presently facing a double challenge in the energy sector, including the absence of a secure and adequate energy source at accessible prices and environmental damages caused by

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excessive energy consumption and the use of highly polluting energy sources, such as petroleum and coal. The rapid increase in energy prices and recent geopolitical events serves as a reminder of the importance of energy at accessible prices has on economic growth and human development, as well as vulnerability of the global energy system to shortages. The protection of energy sources is often found at the top of the international political agenda [1]. However, the current standard energy sources are accompanied by threats of grave and irreversible damage to the environment, including world climate alterations.

The impacts of climate change are now too evident to be disputed. As the Stern Review [2] points out, it would be too costly to tackle the challenge of climate change if the world procrastinates in taking actions. Several regulatory instruments at global, national and regional levels have been created to reduce GHG emissions [3]. The Kyoto Protocol, an international agreement linked to the United Nations Framework Convention on Climate Change (UNFCCC) [4], sets binding targets for 37 industrialized countries for reducing the GHG emissions. Simultaneously, the Kyoto Protocol provides the possibility to Annex B countries to reach part of their target through three types of flexible mechanisms to reduce GHG emissions: joint implementation (JI), international emission trading (IET) and clean development mechanism (CDM) [5].

While the emissions trading mechanism is the driving force behind the suite of cooperative mechanisms, the CDM gives the possibility for developed countries to receive credits from relatively low-cost emissions reductions. Actually, achieved reductions are translated into Certified Emission Reductions (CERs), and every credit amounts to 1 t of CO_2 equivalent. Once verified and certified, these credits can then be used as one means of meeting the investor's "assigned amount" obligation.

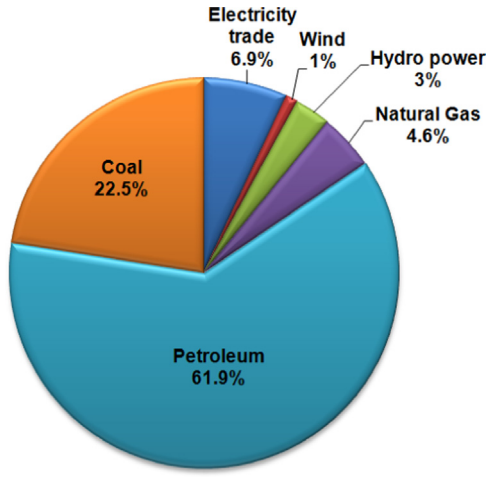

Fig. 1. Distribution of energy consumption [17].

Given the problems associated with identifying promising projects, quantifying the magnitude of the reductions, and monitoring the results, some means of reducing those barriers was clearly called for. In response, the Climate Investment Funds (CIFs) were established in 2008 by the World Bank to serve as an intermediary for encouraging CDM reductions in greenhouse gases [6]. The CIFs are composed of two separate trust funds – the Clean Technology Fund (CTF) and the Strategic Climate Fund (SCF) – each with a specific scope, objective, and governance structure. The SCF aims to help developing countries prepare for climate change by promoting low-carbon, climate resilient development. The CTF seeks to provide financing – principally to larger emerging economies and to regional groups – for demonstrating, deploying, and diffusing low-carbon technologies with the potential for long-term avoidance of greenhouse gas emissions. The fund promotes renewable energy and energy efficient technologies in the power sector as well as energy efficiency strategies in the transportation, building, industrial, and agricultural sectors.

This paper presents an overview of the renewable energy potentials available in Morocco, current status and the national strategy for energy security and low-carbon growth currently underway. Some suggestions are also proposed to increase the renewable energy share in the energy mix of the country.

2. Background of the country

Morocco, officially the Kingdom of Morocco, is a country in the Maghreb region of North Africa [7]. Its eastern border is with Algeria and a relatively narrow body of water separates it from Spain to the north. Prediction of climatic change and global warming studies demonstrated that Morocco is among the countries that are more likely threatened by climatic change [8]. According to IEA, the Morocco's GHG emissions from fuel combustion were estimated at about 42.1 $MtCO_2$ in 2008, and are expected to rise quickly (more than double by the year 2020). This increase is mainly due to the growth of the residential sector and the energy sector. To contribute to the efforts of the international community to reduce the climate change impact, Morocco signed the UNFCCC during the Earth Summit in Rio de Janeiro in June 1992, ratified it in December 1995 and set it into force on 27th March. In the same spirit, the country set up a National Committee on Climate Change in 1996 and a National Scientific and Technical Committee in 2000, while in 2001 Morocco organized the COP-7 and submitted its first National Communication on Climate Change (October 2001). The Kyoto Protocol was ratified on 25th January 2002 and has been entered into force on 16th February 2005 [9].

As mentioned above, a CDM is a key approach to support climate change protection efforts on a global level, including emerging and developing countries like Morocco [10], which traditionally lacks

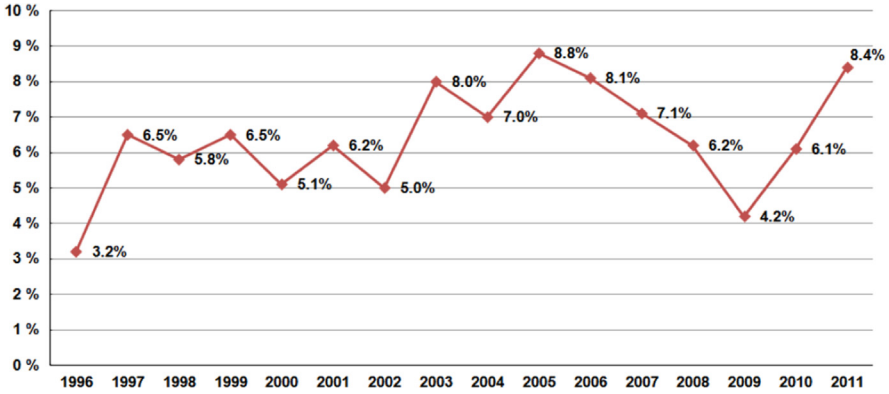

Fig. 2. Evolution of electricity demand in Morocco [17].

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