Morocco's Renewable Energy

Due to its substantial economic growth and demographic progression, Morocco's demand on energy increased proportionally. Yet given the lack of conventional energy resources such as oil and gas, Morocco depends entirely on importing its energy needs from international markets. Since the beginning of the third millennium, the development of renewable energies has become the heart of Morocco's national strategy in terms of energy policy in an attempt to increase the diversification of energy sources. By 2020, Morocco had sourced 42% of its electrical power from green energy. So far, Morocco leads the African continent in several aspects in this industry as it witnessed a remarkable transition to renewable energy and energy efficiency. Nevertheless, there are still challenges regarding policy implementation.

Transition to Renewable Energies

The United Nations launched the 'Sustainable Energy for All' (SE4ALL) initiative mainly aiming to double the proportion of renewable energy. Morocco has oriented its transition strategy towards sustainable energies in order to achieve global energy mix by 2030 that relies on green energy as a major source of power generation. In 1995, Morocco adopted the National Strategy for Sustainable Development and Environment with a key strategic objective to minimize fossil fuels in generating electric power. In 2008, the National Energy Strategy was established to orient energy transition towards production of renewable power. With this strategic choice, Morocco's driving forces for this transition lies specifically in securing its energy demand through alternative sources, and in mitigating and shrinking emissions. Morocco renewed the strategy with a target of reaching 52% installed renewable energy souerces by 2030.

In 2010, Morocco established the Moroccan Agency for Solar Energy (MASEN) which is a limited corporation in charge of piloting and managing solar energy and ensuring energy efficiency. Since its creation, MASEN has launched a variety of mega-projects in Morocco's 45 cities. In 2016, MASEN extended its activities to cover hydropower and wind energy. Nowadays, this corporation leads the renewable energy sector under the supervision of the Ministry of Energy in coordination with the National Agency for the Development of Renewable Energy and Energy Efficiency (established in 2010), The Energy Investment Corporation (created in 2009), and The Research Institute for Solar Energy and New Energy (created in 2011). Noticeably, the Noor Ouarzazate solar complex is considered the world's largest concentrated solar power station with a total installed capacity of 160 megawatt (MW) by 2016 where 280.000 tons of CO2 was avoided annually. This project alone accounted for about 460 MW out of the projected goal of 3000 MW in 2020.

To demonstrate its readiness to fight climate change, Morocco hosted the Conference of Parties 'COP 22' in 2016 which was the operationalizing version of the Paris Climate Change Agreement (COP21). Hosting this conference shows the world about Morocco's significant role in deploying clean energy technologies. Morocco's geographic position and its engagement with Africa offer important perspectives to draw on its energy transition experience through supporting other African countries in sustainable development and energy access under the umbrella of south-south cooperation. After COP22, Morocco stands as a pioneer advocate for Africa and least developed countries in helping them with the renewable energy sector.

Facts and Implementation

Morocco's energy infrastructure depends primarily on hydrocarbons which represent a total of 70% of installed electricity and is based on fossil fuels, mainly heavy oils and coal. As reported by the Ministry of Energy and the International Energy Agency, Morocco reached more than 20 million tons of oil-equivalent (Mtoe) supply in 2017. This represents a 32% increase from 15.6 million tons in 2007 which yields an annual growth rate of energy supply of 2.4%. Meanwhile, Morocco's total final consumption surpassed 16 Mtoe in 2017, an increase of 34% compared to 2007. Consumption is mainly dominated by three sectors: transport (36%), housing (25%), and industry (24%). Since 2007, consumption increased by 58%, 26%, and 16% in transport, housing, and industry sector respectively. Oil dominates fuels accounting for 74% of total energy consumption in 2017 followed by electricity (17%), and biofuels (8%). In the same year, oil consumption had increased by 43%, electricity by 54%, and natural gas by 215%.

Morocco is vulnerable to climate change although the country's CO2 emission is considerably low. 67.752

megatons CO2 emission were produced in 2020 which constitutes less than 0.2% of global carbon emission. Since 2009, Morocco set out the National Energy Strategy as a priority to develop and implement power capacity based on renewable energy. The forecasts were expected to meet the total of 2000 Megawatt (MW) of solar energy, 2000 MW of wind energy, and 2000 MW of hydropower by 2020. In fact, the output of power generation in terms of solar energy attained a record 3000 MW by 2020 which encouraged the government and other energy-oriented agencies to invest more in clean energies.

Opportunities and Challenges

The number of investments dedicated to renewable sources of energy are immense. Ranging from African Development Bank, World Bank, European Union, to European Investment Bank; opportunities to assuring energy transition have increased considerably. As mentioned earlier, Morocco's geostrategic location with important weather parameters has harnessed different types of green energies. For instance, the northern and southern regions particularly witnessed several installation of wind turbines with a total capacity of 3000 MW by 2020. Furthermore, center and eastern regions receive intense solar irradiation with 6200 hours total annual sunshine, equivalent to 5.3 kWh/m^2. With high security and political stability levels, investors become encouraged to rely on business environment and boost capitals for prospective outlooks. Beside those opportunities, Morocco had also established a very strong and decisive framework with keen and unconditional political support to better enhance implementation of the National Energy Strategy (NES).

On the contrary, several challenges need to be re-evaluated and overcome in the short and long-term. For instance, the World Economic Forum suggested in 2011 that lack of experience was one of the obstacle in the implementation of the NES. This argument is no longer valid for the short-term since Morocco has accumulated noticeable expertise in clean energies. What is required is to keep learning from others' experiences such as Germany and China in order to meet the NES' long-term objectives - transforming Moroccan expertise to other African countries under the framework of south-south cooperation. Another challenge is the insufficient coordination between MASEN and other bodies especially the Office of Hydrocarbons and Mining because investing in such mega-projects is associated with several technical challenges and a steep pricetag. Moreover, the rapid economic growth and the increasing demand on energy should be faced by optimization of balancing energy sources and storage capacities.

Although Morocco has made a name for itself as one of the climate leaders on the globe, the country still needs improvements as it moves ahead to rely on renewable energies. The North African Kingdom has been criticized for benefiting mostly foreign countries instead of its own population which suffers from side effects of mega-projects such as high electricity bills. Another critic is that focusing on those mega-projects like the Ouarzazate solar complex has affected local small-scale projects. This has badly affected the entrepreneurship spirit among young graduates as well as small investors in pursuing their business activities. In relation to climate change, those projects have been criticized for the over-use of scarce resources, mainly water. Therefore, policymakers should wisely address these criticisms and overcome obstacles that hinders the strategic implementation of Morocco's energy transformation strategy. Being one of the largest importers of energy in north Africa, Morocco has actively been making concerted efforts to develop and implement its strategy aiming to be among the premiere exporters of renewable energies in the not-so-far future.

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