MENA SELECT

Project: **M**iddle **E**ast **N**orth **A**frica **S**ustainable **ELEC**tricity **T**rajectories (**MENA-SELECT**)

Summary:
Country Fact Sheet Morocco

Energy and Development at a glance 2016

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As a result of stable economic growth rates and boosted shared prosperity, Morocco has significantly improved its human development status. In regards to GDP by sector, the Moroccan economy is currently shifting toward a new growth model based on increasing shares of higher value-added industries and services. However, agriculture remains one of the most important pillars of the Moroccan economy. Notwithstanding its recent progress the kingdom still faces considerable socio-economic challenges, such as unemployment rates among the youth and women, a lack of competiveness in non-primary sectors, trade deficit, regional disparities, and gender inequalities.

Socio-political background and challenges

Morocco is a constitutional monarchy, where the King, despite the constitutional revision in July 2011, remains the pre-eminent state authority with extensive powers. The parliament consists of two chambers: the *Chamber of Counsellors*, whose members are indirectly elected for nine years, and the *Chamber of Representatives*, whose members are directly elected for five years. Notwithstanding that the Government of Morocco (GoM) has made progress in pursuing political reforms, Morocco still faces substantial socio-political challenges in the fields of good governance and corruption as well as for balancing political power and democratic demands.

Socio-environmental background and challenges

Morocco's principle geographic features, i.e., a large sea front, high altitude mountainous areas and its large extension in latitude, result in great spatial-temporal temperature and precipitation variations with strong impacts on the country's water resources, plant canopy, and agricultural production. Defined as a "water scarce" country that is characterized by an overall lack of productive arable land, the environment in Morocco is subject to strong pressure due to demographic growth, urbanization and climate change impacts. Socio-environmental challenges include in particular: decreasing and more erratic precipitation, increasing temperatures, decreasing water quantities and quality, soil degradation, air pollution, and solid hazardous waste.

THE ENERGY BACKGROUND

The present status and future projections

Morocco's *Total Primary Energy Supply (TPES)* has grown considerably over the last decades and reached 18.8 Mtoe in 2012. Today, the country's energy mix is dominated by oil (67.6% of TPES), followed by coal (16.1% of TPES), biofuels and waste (7.4% of TPES), and natural gas (5.7% of TPES). Morocco's *Total Final Consumption (TFC)* was 14.3 Mtoe in 2012 and increased drastically since the 1970's. The largest consumer of energy in Morocco is the transport sector (33.2%), followed by the industry (26%), and the residential and commercial sectors (20.4%).

Morocco's electricity generation grew by 6-7% per year between 2002 and 2012 to satisfy the demand. The country's total installed power generation capacity of 7,994 MW generated 28 TWh of electricity in 2014. Morocco also imports electricity from abroad (Spain and Algeria). The industry sector is the biggest consumer of electricity in Morocco (43.6%), followed by the residential sector (32.8%) and the commercial sector including agriculture (22.4%), while the transport sector accounts only for 1.2% of the electricity demand. According to *Morocco's Ministry of Energy, Mines, Water and the Environment (MEMEE)*, future primary energy demand could reach 26 Mtoe in 2020 and 43 Mtoe in 2030 (between 36.6 and 54.5 Mtoe). Estimates for Morocco's future electricity consumption differ but *MEMEE* estimates that national consumption could reach 49 TWh/y by 2020 and 65 TWh/y by 2025.

With regard to renewable energy (RE) sources, Morocco has huge potential and favourable conditions – especially for wind and solar energy, but there exist also a great potential for bioenergy, because of the huge generation of agricultural, animal, and municipal waste. In spite of its great RE potential the country is currently turning its attention to domestic unconventional fossil fuel deposits and progressively exploring the extraction of oil shale both on- and offshore as well as nuclear energy.

Energy challenges

Apart from enforcing an enabling investment and institutional environment the energy/electricity system in Morocco is characterized by four challenges:

\ *Increasing CO_2 emissions:* Despite the country's efforts in RE policy-making, its national energy consumption is still highly dominated by fossil energy carriers. As a consequence total CO_2 emissions are anticipated to closely follow the rising energy demands and increase substantially in the mid-long term.

\ *Electricity system stability:* Meeting Morocco's growing demand will require substantial investments in additional power generation capacity, transmission and distribution infrastructure as well as storage. Additionally, the integration of large amounts of intermittent RE capacities with different load types will create challenges for maintaining grid stability, power balancing and reliability of supply.

\ *Electricity prices and subsidies:* While subsidies for gasoline, diesel and kerosene were almost eliminated since 2007, electricity prices in Morocco do not represent the real costs as they are below average costs of production and transmission. This creates a significant financial burden on the national budget.

\ *Energy import dependence:* Unlike some of its neighbors in the region, Morocco is highly dependent on imported hydrocarbon energy. These energy imports negatively affect Morocco's trade balance and make Morocco's economy and political stability vulnerable to global price fluctuations.

THE POLICY BACKGROUND

From sustainable development to green growth

Morocco's overall vision towards sustainable development is defined as "reaching a low-carbon and climate change resilient development" that encompasses all sustainability dimensions. The operationalization of this vision follows a hierarchical structure: the *National Constitution* of 2011, which contains two Articles that have reference to sustainable development, is followed by the *National Charter for Environment and Sustainable Development (CNEDD)* and its corresponding *Framework Law 99-12* which explicitly consider all sectors and address all responsible authorities in order to mainstream sustainable development in Morocco. For the implementation, two levels can be distinguished: The first level is characterized by rather comprehensive, national strategies and initiatives that aim at achieving poverty-reducing sustainable development, whilst taking steps to preserve the environment. The second level is characterized by several rather specific, sector-based strategies, plans and programs to which Morocco has committed major public investments.

Morocco's National Energy Strategy

Morocco adopted its *National Energy Strategy (NES)* with corresponding targets for 2020 in 2009 and renewed it in 2015/2016 with targets until 2030. The targets of reaching 42% installed RE capacity by 2020 and 52% by 2030 respectively were complemented by numbers for envisioned power capacities (see fig. 1 and 2).

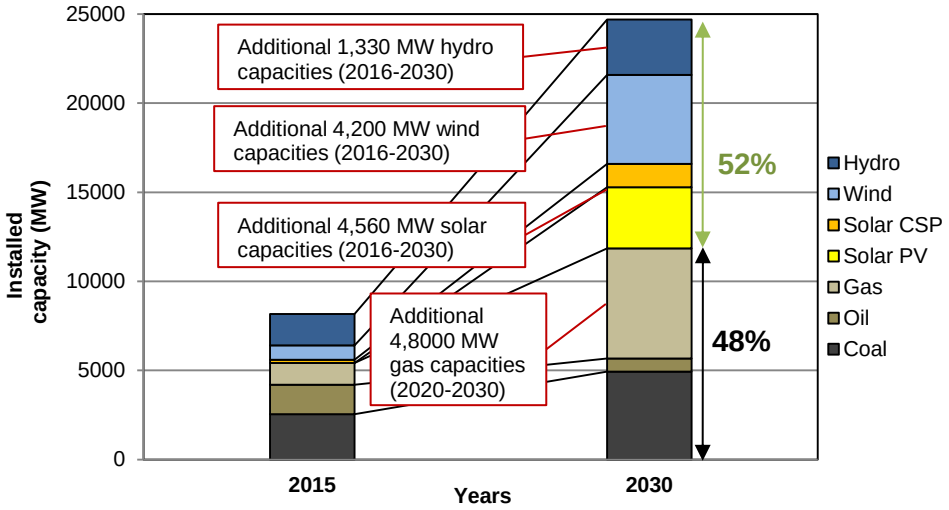

Figure 1: Total and assumed installed capacity in Morocco for 2015 and 2030 (Authors' calculations based on *ONEE* and *MEMEE* data).

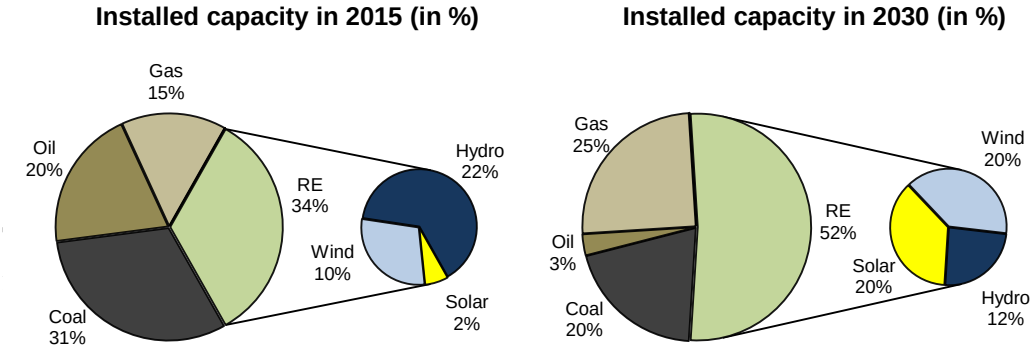

Figure 2: Shares of installed capacity in Morocco for the years 2015 and 2030. (Authors' calculations based on *ONEE* and *MEMEE* data).

However, Morocco has not simply prioritized its renewable ambition out of concern for the climate or for energy security reasons, but rather as a "green stimulus" to achieve multiple development objectives, such as, long-lasting dividends in terms of economic growth, job creation and skill development, through integrated solar and wind development projects along the renewables value chain.

Morocco's Solar Plan and Wind Programmes

While hydro-electric power capacity has been a crucial element of the kingdom's energy system for many decades and is expected to reach 2,000 MW by 2020 and up to 3,100 MW (additional 1,330 MW from 2016-2030) by 2030, two ambitious programs were developed to boost Morocco's solar and wind development. The *Moroccan Solar Plan (Noor)* aims to reach 2,000 MW installed solar power capacity (PV and CSP) by 2020 and roughly 4,800 MW by 2030 (additional 4,560 MW from 2016 to 2030). The *Moroccan Integrated Wind Program* aims to achieve 2,000 MW installed wind power capacity by 2020 and up to 5,000 MW by 2030 (additional 4,200 MW from 2016 to 2030). In light of these plans, multiple large- and medium-scale solar and wind projects will be installed in different sites.

Regulatory framework regarding the electricity sector

Over the past two decades, many different decrees and laws have been issued that shape the current structure of Morocco’s electricity sector. In general, increasing steps towards liberalisation of electricity and towards the use and support of RE within Morocco’s legal framework can be recognized. Most notably, in 2010, law 13-09 was promulgated (“renewable energy law”) that sets out the legislative framework for the promotion of RE.

Market structure of the electricity sector

The national utility *Office National de Electricité et de l'Eau Potable* (*ONEE*) has a dominant role in Morocco’s electricity market as it operates throughout the whole value chain (generation, transmission and distribution). There exist several ways to generate electricity in the Moroccan market: a) electricity directly generated by *ONEE*, b) IPPs selling electricity to *ONEE* with individually negotiated PPAs, c) self-production, and d) IPPs selling RE based electricity to large consumers via PPAs.

Legislative conditions for participatory governance in the electricity sector

In response to the demands of the Arab Spring in 2011, Morocco has made substantial efforts in strengthening democracy and rebalancing powers towards an inclusive development model based on a more open and decentralized system of governance. As stated in the preamble of the *National Constitution* of 2011, the kingdom is pursuing the process of consolidating and reinforcing the "principles of participation, pluralism and good governance" in its legislative framework in order to construct a state of democracy and the rule of law. Although the legislative framework required for ensuring procedural and distributive justice in developing utility-scale power projects in Morocco is still being shaped, important aspects aiming to promote participatory governance are already enshrined in different national documents and international documents that Morocco has ratified.

CONCLUSION

While Morocco's approach to sustainable development was mainly related to environmental protection at the beginning, the GoM explicitly set low-carbon and climate change resilient development as its strategic development priority after the millennium. As a result, numerous sectoral strategies, plans and programs have been initiated over the last decade in order to achieve poverty-reducing sustainable development whilst taking steps to preserve the environment. Additionally, Morocco put in place its *NES* aiming to reach a share of 52% of installed power capacities from RE sources by 2030. Although considered a role model for RE policy-making and despite the Moroccan context being favorable for establishing a low-carbon economy, room for improvement yet remains. Even greater leaps forward towards a low-carbon development pathway could be achieved if existing sectoral development policies were to be aligned closely with the RE policy framework towards an integrated *Low-Carbon Development Strategy* based on high shares of RE.

RECOMMENDATIONS

Morocco's recent progress towards low-carbon development is commendable. Nevertheless important challenges still need to be addressed in order to unlock the full development potential of a sustainable electricity system. The following recommendations are provided to shed light on different political aspects that should be improved in order to arrive at a integrated and coherent *Low-Carbon Development Strategy* based on high shares of RE.

1. **Improve institutional set-up and policy coherence:** For bridging the existing sectoral divides and harmonizing the often non-convergent interests at the institutional and policy level two recommendations are given to the GoM:

    a. Improve the sectoral interplay between and within relevant governmental institutions to jointly work on RE by promoting transparency and collaboration as well as minimizing institutional fragmentation (especially between institutions dealing with energy, education, industry and employment, such as e.g., *MEMEE, MoE, MoI, ONEE, MASEN* and *ADEREE*);

    b. Create an integrated energy and development policy framework (including a framework for private finance in RE) by removing inconsistencies, providing clarity (particularly on a) status of self-consumers, and b) role of the low-voltage grid), as well as accompanying energy policies with affirmative development initiatives geared towards the country's overall development objectives;

2. **Extend efforts to achieve sustainable growth through RE policy-making:** In order to avoid a new form of import dependency that would substitute fossil fuel dependency with reliance on imports of RE technologies two recommendations are given to the GoM:

    a. Apply lessons learned from the automotive and aeronautic industries to the RE sector by coupling national industrial policies to RE policy-making for boosting the productivity of domestic industries and allowing them to become internationally competitive in international markets;

    b. Explicitly consider existing areas of expertise and "learning by doing" effects in project tenders by mandating project bidders and developers to promote job creation, domestic supply chains and rural uplift through ambitious, yet realistic, *Local Content Requirements (LCRs) and mechanisms of horizontal technology transfer*;

3. **Phase out fossil subsidies in the power sector:** For unlocking the full potential of centralized and decentralized RE technologies to contribute to electricity generation two recommendations are given to the GoM:
    a. Adopt a cost-based approach to gradually replace electricity subsidies and set electricity tariffs for residual and industrial consumers that match production with sale prices in order to encourage higher penetration of RE into the grid (including medium and low voltage) as well as the take-off of energy efficiency practices amongst consumers;
    b. Accompany the phase out of electricity subsidies with improvements in social services, such as health, education and infrastructure, that are targeting poor households in particular;
4. **Increase absorptive capacities and R&D in RE deployment:** In order to match national curriculums to RE market requirements and build up a knowledge base that is able to absorb foreign expertise and technologies two recommendations are given to the GoM:
    a. Establish a market orientated research framework by linking vocational training and university programs (especially in science, engineering and technical studies) with activities of the RE-industry, for example through joint education-industry clusters (R&D platforms) or partnerships (joint lectures, internships etc.);
    b. Increase the role of universities and its researchers of transferring international knowledge to the domestic labour market by fostering exchange programs with the international scientific community

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