ENERGY POLICIES BEYOND IEA COUNTRIES

EXECUTIVE SUMMARY

Morocco

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International Energy Agency
Secure Sustainable Together

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INTERNATIONAL ENERGY AGENCY

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1. Executive summary

Energy and climate policy in Morocco has seen major developments since the first International Energy Agency (IEA) in-depth review (IDR) of the country in 2014 and the IEA Clean Energy Technology Assessment of Morocco in 2016. Since 2014, the government of Morocco has proceeded with energy reforms based on the priorities outlined in its 2009 National Energy Strategy to enhance energy supply diversification; foster the development of Morocco's industry and economy in the sectors of renewable energy and energy efficiency; integrate with regional and international markets; make energy efficiency a national priority; and encourage the development of indigenous resources.

The government has stepped up its role in international action on climate change, ratifying the Paris Agreement, setting a new national climate policy and hosting the United Nations Conference of Parties (COP22) summit in Marrakesh in 2016.

The development of renewables is helping to improve energy security as well as deliver on Morocco's clean energy and climate change commitments. Morocco is making strong progress towards affordable, reliable, sustainable and modern energy in line with the United Nations Sustainable Development Goals (SDG 7). The government has achieved almost full access to electricity for its rural population, and it is developing the country's significant renewable energy resources. However, progress in reducing the energy intensity of Morocco's economy is more difficult to achieve. While the share of renewables in electricity is progressing fast, its share in total final consumption (TFC) decreased considerably over the past decade, given the expanding energy demand. Morocco has only renewable energy targets for electricity. With a view to meet SDG 7, which seeks a substantial increase in the share of renewable energy in the global energy mix (measured in TFC) by 2030, the government is encouraged to set targets for the use of modern renewables in residential and transport. This will strongly promote the reduction of fossil fuel use across the economy. As Morocco continues to rely on coal, oil, and gas imports for most of its energy needs, opportunities abound to reduce imports by developing domestic energy resources to reduce oil and coal use.

In this context, the phase-out of energy subsidies is an important step in encouraging more efficient energy use and reducing GHG emissions. Morocco is to be commended for taking advantage of a period of low oil prices in 2014-15 to successfully phase out fossil fuel subsidies – petrol and diesel fuels are free now (formed by international prices) – with the exception of butane, which remains heavily subsidised.

Climate policy and renewable energy deployment contribute to the development of the economy, attract foreign investment, create employment, and boost its industrial sector. With its ambitious clean energy transition, Morocco is attracting international green finance and is becoming a partner in the Mediterranean region and in Africa. Morocco needs substantial investment in the energy sector in the years ahead, an estimated

USD 30 billion alone is needed to reach its renewable target for 2030. The government is aiming to improve the investment climate to attract private investors to the energy sector. Nevertheless, challenges remain in implementing policies and measures to enhance energy efficiency, in creating an open power market with an independent regulator, and in unbundling the electricity utility ONEE (Office National de l'Électricité et de l'Eau Potable) in favour of an independent transmission system operator.

Institutional reforms supported the implementation of the National Energy Strategy, notably the creation of the national regulatory authority (ANRE) and the Moroccan Agency for Sustainable Energy (MASEN). MASEN acts as a major actor dedicated to the development of integrated renewable energy projects, which create synergies of pre-operational R&D, capacity building, training, industrial competitiveness and local development. The Institute for Research in Solar Energy and Renewable Energies (IRESEN) carries out a broad range of energy RD&D activities in close collaboration with the private sector. The Agence Marocaine pour l'Efficacité Énergétique (AMEE) is now in charge of implementing energy efficiency programmes. Human and financial resources and good co-ordination across government will be critical for tracking progress, delivering the National Strategy, and ensuring the success of Morocco's energy transition. The change in the status of the Energy Investment Company (SIE) as an ESCO adopted at the Board of Directors' meeting on 4 October 2018 progress to be made in the control of energy efficiency for government projects.

Energy system transformation

Under the Paris Agreement, Morocco's government is committed to reducing GHG emissions by 17% below business-as-usual (BAU) levels by 2030. If international support is available, Morocco aims to reduce emissions by an additional 25% by 2030 compared with BAU, taking the total to 42%. This is an ambitious pathway for 2030 and the government is also beginning work on a long-term low-carbon development strategy to 2050. Thanks to the appropriate implementation of the national energy strategy and the enthusiasm of private investors and developers for renewable energy projects, the government has increased its ambitions over time.

Morocco has excellent prospects for the cost-effective expansion of the share of renewables in and beyond the power sector, to replace oil and coal use and move to sustainable industrial growth. The National Energy Strategy of 2009 envisaged an expansion of renewable electricity to a share of 42% of installed capacity by 2020, an ambition which was raised in 2015 to 52% by 2030. Today, Morocco aims to reach beyond 52%.

The MASEN tenders attracted private developers and investors to invest in renewable energy projects through a model of public debt, state guarantees, and concessional loans. New financing models and the diversification of financing sources (green bonds) are critical to boost private investment and commercial bank loans. The country has made good use of the best available technologies in its large-scale concentrated solar power (CSP) projects, and pioneers innovative hybrid solutions, with photovoltaic and thermal solar storage. Moreover, the prospects for renewables will benefit from cutting-edge technologies such as battery storage, hydrogen technologies and waste-to-energy or desalination plants powered by renewables.

The government is to be commended for the work done so far to open the electricity market to competition and investment in renewables. A regulatory framework to allow grid access has been established by law, notably with the creation of the National Electricity Regulatory Authority (ANRE) in 2016 and the appointment of its Director in 2018. The privatisation of electricity distribution in large cities has improved efficiency. Further progress will depend on the regulatory authority being empowered to engage more broadly with the distribution sector, which is largely public, on access to the grid, grid codes, and a clear roadmap for tariff design and reforms.

A national policy priority since 2009, energy efficiency is perhaps the policy area that is facing the most significant implementation challenges. From an institutional perspective, it requires close collaboration between several ministries and good overall co-ordination as well as adequate budgetary allocations for energy efficiency programmes. Residential electricity demand (cooling, appliances and cooking) is expected to drive future energy use, thus, new policies and compliance and implementation of existing policies remain critical. Total final energy consumption has increased by 32.4% since 2006. In the light of this fast growth, Morocco targeted initially energy savings of 12% for 2020 and of 15% for 2030. The National Energy Efficiency Strategy for the period out to 2030 was presented to the Council of the Government on 22 June 2017, complemented by an action plan of AMEE. The government will also look at revising the implementing rules of the Law 47-09 on Energy Efficiency and boost the public procurement of energy services. In the light of the new strategy and related action plan, the government aims to scale up the target for 2030 to 20%, which is a strong commitment to a more robust energy efficiency programme: the challenge now is to deliver on it.

Morocco has been able to transition to more efficient products and appliances, thanks to its ban of the import of old cars, improved thermal regulations for new buildings, and local awareness raising initiatives such as the Green Mosque Programme, which targets the promotion of increased energy efficiency and increased use of renewable energy in Mosques and other public buildings. Current energy efficiency measures will however not be enough to meet energy and climate objectives. Turning AMEE into a fully-fledged energy efficiency agency, equipped with programmes and financial resources, will make a step change. A new energy efficiency programme is being developed by the government in consultation with several key ministries and AMEE, which presents an opportunity. The government should swiftly implement actions for 2020 and present the National Energy Efficiency Strategy 2030.

Energy security

Heavy reliance on imports for all fossil fuels has clear implications for Morocco's energy security and on its economy. Morocco's energy mix is composed largely of fossil fuels, which account for almost 90% of total primary energy supply (TPES) and 80% in electricity supply. Oil accounted for 62% of TPES in 2017, followed by coal (22%) and natural gas (5%). The country's energy import bill rose to MAD 69.5 billion in 2017 (USD 7.3 billion, EUR 6.3 billion). To date, indigenous production is negligible but the oil and gas exploration programme managed by the *Office National des Hydrocarbures et des Mines* (ONHYM) promotes upstream investment. The discovery of gas in the Tendrara permit area by the United Kingdom's Sound Energy and the offshore deepwater exploration by Italy's Eni are promising developments.

Besides crude oil imports, Morocco is now importing all of its oil products needs. In 2015, the only remaining oil refinery in Morocco, Samir, was placed into judicial liquidation. The non-use of oil product storage facilities of the Samir refinery, together with the non-respect of oil distributors to comply with their oil products stockholding obligations for several years, points to the need to improve oil products security. The government introduced oil products stockholding obligations on industry decades ago, but compliance has been low in spite of the different financing mechanisms (levies, taxes, etc.) used in the past. The closure of the country's only refinery, Samir, has clear implications for the security of oil supply. Morocco's exposure to global supply chain risks is thus increasing, and its stock cover falls far below the legal requirements for all products. The government is to be commended for working to increase oil products storage capacities and for its monitoring mechanism of all oil products supplies, including the quantity and quality of the products. In order to strengthen oil security arrangements, the government needs to improve oil stocks data collection, while securing the future use of oil storage tanks at the Samir refinery and improving the resilience of port infrastructure.

Supplies of natural gas from Algeria will depend on the decision that will be taken to maintain the arrangements on the Maghreb–Europe Gas Pipeline and extend the current contract beyond 2021. Morocco plans to expand the share of natural gas in the longer term. Several new gas supply routes are being discussed, including imports of natural gas from a gas pipeline with Nigeria, and the construction of an LNG terminal, which can provide access to contract and source flexibility. The investment case would need to be justified by volumes much higher than the current gas demand in Morocco of over 1 bcm/y in 2017. The regulatory framework, which forms a fundamental basis for all actors in the sector, will be crucial for the business case. The Government's draft law on gas has been submitted to the General Secretary of the Government.

Electricity demand is expected to grow on average by 5% per year to 2021, notably peak demand amidst hotter summers and growing cooling needs. While capacity margins are robust at 10%, the power system has to withstand seasonal droughts and rising peak demand in summer (with high demand from air conditioners). As larger shares of the population are increasing electricity use, Morocco is likely to face a more important rise in demand from air conditioners and appliances in the future and the quality and stringency of energy efficiency standards for products and demand-side management will play a critical role in managing peak demand in a sustainable and climate-friendly manner.

Commendably, Morocco's power system has strong flexibility options, thanks to pumped storage hydropower, CSP plants with integrated storage and power imports (which have doubled over the past ten years). Morocco is planning a third interconnector with Spain and a new one with Portugal. However, power system balancing needs will increase, with the share of variable renewables expected to rise to 15% by 2030 in electricity generation as a result of the government's ambitious wind and solar programmes. There are opportunities to increase power system efficiency and remove constraints on operations. The government should support ONEE in improving the independent system operation and balancing, with more demand-side response, flexible thermal power plants, and more investment in grids and interconnections. ONEE is encouraged to develop energy system-wide planning, under the guidance of ANRE, in co-ordination with MASEN and other stakeholders, to improve the common vision for the medium-term power sector outlook.

Morocco is making inroads in addressing the socio-economic impact of climate change given its exposure to water scarcity, coastal storms, and erosion. The focus has been on agriculture, fisheries, and tourism with a range of solar energy applications (cooling, solar water pumps in agriculture). A major improvement comes with the installation of dry cooling technologies in the new CSP plants. The government should assess overall progress in addressing the energy-water nexus to improve the resilience of energy infrastructure (ports, grids, and power plants).

International and regional energy partnerships

Morocco, an active international energy partner, has developed a broad range of partnerships, with a focus on energy transitions, renewable energy, climate change, and regional trade. Morocco has been able to attract climate finance and technical assistance. Commendably, the government is active in advancing regional market integration with Europe and Africa.

At the COP22, Morocco held the Africa Action Summit that brought together African heads of state which led to the establishment of three dedicated sub-regional committees: the Sahel Region, the Island States Commission, and the Congo Basin Commission. As a member of both the League of Arab States and the African Union, Morocco's engagement with Africa offers perspectives for South-South cooperation, trade and economic development. Based on its close bilateral and multilateral co-operation (with the African Energy Commission and Economic Community of West African States), Morocco can draw on its own energy transition experience with a view to supporting clean energy transitions in the countries of Sub-Saharan Africa, supporting their sustainable development, energy access, and resource development.

Morocco wants to establish links with the energy markets of oil-rich and gas-rich African countries, and it concluded an agreement with Nigeria for the construction of a gas pipeline. Equally, Morocco seeks to facilitate the trade in renewable electricity (and hydrogen) with Europe and its regional neighbours in Africa. The roadmap for sustainable electricity trade between Morocco and the European internal energy market was signed between Morocco and Germany, France, Spain and Portugal on 19 December 2018 in Brussels. With Africa, regional collaboration opportunities may arise with the creation of the West African Power pool.

Key recommendations

The government of Morocco should:

- ☐ Drive the implementation of the country's clean energy transitions and increase private investment in clean energy by completing electricity and gas market reforms and by making operational the planned regulatory authority.
- ☐ Make energy efficiency a priority by implementing existing legislation, adopting cost-effective energy efficiency policies and standards, and moving quickly to agree and implement a national energy efficiency strategy for 2030 to deliver the government's 2030 targets, supported by the financial resources necessary to deliver it.

- ☐ Strengthen energy security to manage risks from import dependency by revising policies for oil stockholding, taking steps to secure future natural gas imports and to strengthen power system operation and energy system planning in a system with higher shares of variable renewables.
- ☐ Accelerate renewable technology development and innovation beyond the power sector to drive sustainable cooling and heating, transport, and water management.
- ☐ Focus on ensuring effective governance and inter-ministerial co-ordination, on prioritising the most important and urgent actions, and on ensuring that planned commitments are translated into delivery on the ground, underpinned by analysis to identify the most cost-effective solutions and data to measure progress.

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The International Energy Agency (IEA) regularly conducts in-depth peer reviews of the energy policies of its association countries, a process that supports energy policy development and encourages the exchange of international best practices and experiences. This report on Morocco discusses the advancements made as well as the challenges faced by the country's ambitious domestic energy transition pathway to 2030.

With an impressive track record in solar technologies, Morocco is leading the deployment of renewable energy in North Africa. Further progress, however, can be made in commercial or industrial applications that continue to rely on fossil fuel imports. Although successful in providing electricity access to its rising population, Morocco also faces the challenging task of keeping energy demand in check.

In this report, the IEA provides recommendations for how to strengthen Morocco's energy efficiency policies to help the country continue to transform its energy sectors in order to meet the renewable energy and energy efficiency targets.