

Morocco's Renewable Engine of Change

Abstract

Throughout the 1980s and 1990s, the Kingdom of Morocco underwent an economic transformation, but with scarce oil reserves, they relied on the mass importation of oil from neighboring countries to fuel this development. To battle this energy dependence, King Mohammed VI proposed *The Moroccan Renewable Plan* which called for 52% of energy to be produced by renewables by 2030. This catalysed the construction of solar, hydroelectric, and wind power plants throughout the country. Morocco's now decade old goal to establish renewable energies has provided the necessary tools to empower the state and its people through enhanced socio-economic stability, the creation of mutually beneficial relationships across the region, and increased domestic political legitimacy. Renewables have furthered socio-economic stability by providing thousands of jobs, public works, and a novel energy industry. Renewables have also helped Moroccan international relations by opening up opportunities for collaboration on energy projects in the Mediterranean basin and across the African continent. Lastly, development of renewable energy has branded King Mohammed VI as a forward-thinking leader, thus securing his role as monarch. Evidence used in this paper was sourced from the United Nations, African Union, World Bank, JSTOR energy journals, *Forbes*, *The Washington Post*, and also interviews with staff members from the Moroccan Agency for Sustainable Energy (MASEN). Morocco's strides in renewable energy have given the nation expertise in a niche industry which allows for a leadership position on the African continent and the possibility of energy exportation to Europe, thus redefining the power structure in the region.

Question: How have Morocco's renewable energy developments, beginning in 2009, contributed to state stability?

Introduction

Beginning in the early 2010s, Morocco, the largest energy importer in North Africa, sought to achieve energy independence by sparking its renewable energy sector. Prior to these developments, the nation imported 97% of its energy.¹ The energy projects aimed to establish a

¹ Michael Hochberg, *Renewable Energy Growth in Morocco: An Example for the Region* (n.p.: Middle East Institute, 2016), 1, https://www.jstor.org/stable/resrep17602?seq=2#metadata_info_tab_contents.

future rubric for energy independence, but it unexpectedly led to many political and social benefits. Socially, the expansion of renewable energy in rural areas has increased the quality of life and empowered the local population by granting them access to essential utilities, services, and employment opportunities. Economically, Morocco's investment in renewable energies fostered energy independence and economic diversification, ensuring sustained and affordable electrification in Morocco's emerging cities. With the great domestic success, the Kingdom used its extensive knowledge of the sector as a bargaining chip in building and establishing foreign relations. Morocco's efforts to use energy development to foster better relations with other nations in Europe and Africa has not only furthered regional and continental security, it has allowed the Moroccan monarchy to bolster its own legitimacy as a successful and modern form of leadership. Morocco's now decade old goal to establish renewable energies have provided the necessary tools to empower the state and its people through enhanced socio-economic stability, the creation of mutually beneficial relationships across the region, and increased domestic political legitimacy.

Historical Context:

In the early 1980s and 1990s, under King Hassan II, the Kingdom of Morocco was a struggling country with an unemployment rate of 17% and 40% of the economy was reliant on agriculture.² In 1993, King Hasan adopted the IMF and World Bank's structural adjustment programs which started to transform the economy and sparked an industrial revolution. This revolution catalysed the rise of the garment and manufacturing industries. In 1999, King Mohammed VI took up his father's mantle and continued the economic growth by building massive infrastructure programs like an extensive road network that spanned most of the nation including a network of highways that connected most of the major cities. As a result, the unemployment rate dropped to 11.84% in 2004³ and the urbanization rate jumped to 56.32% in 2007.⁴ As the country's industries began to grow, the nation's electrification rate increased from 76% in 1993 to 85% in 2007. Morocco has no native oil or gas reserves, so in order to fuel the

² Bertelsmann Stiftung, *BTI 2018: Morocco Country Report*, 4-5, January 31, 2017, accessed February 12, 2020, <https://www.bti-project.org/en/reports/country-reports/detail/itc/mar/>.

³ H. Pleacher, "Morocco: Unemployment Rate from 1998 to 2018," chart, *Statista*, September 17, 2019, accessed January 19, 2020, <https://www.statista.com/statistics/502794/unemployment-rate-in-morocco/>.

⁴ H. Pleacher, "Morocco: Urbanization from 2007 to 2017," chart, *Statista*, June 19, 2019, accessed January 20, 2020, <https://www.statista.com/statistics/455886/urbanization-in-morocco/>.

development, the nation had to import its energy from Algeria and Spain in the form of crude oil. It was not feasible for Morocco to continually import energy because the importation costs would be too high due to Morocco's rampant electrification and development rate. Between 2007 and 2009, Morocco's energy importation cost the nation between 8 and 10 billion dollars. In 2009, King Mohammed VI was at a crossroads: either continue energy importation and continue to hurt his country economically, or find another solution.

Mohammed VI chose to develop renewables and in 2009 with the ambitious Moroccan Renewable Plan that called for 42% renewable energy make up by 2020 and 52% renewable energy by 2030. The regulatory framework that enabled this undertaking to occur was Energy Law 13-09. This piece of legislature enabled the development of renewables and allowed renewable energy plants to complete on the national grid. Additionally, the law allowed for newly created, government-funded energy lines solely dedicated to transfer power generated from renewable plants which made them more appealing to clean energy developers. The Moroccan Agency for Solar and Renewable Energy (MASEN), a government backed renewable advisory board, was created to oversee the development of domestic renewable energy. MASEN radically changed Morocco's method of developing renewables by creating a competitive financing model which decreased the cost of energy generation and spurred the increase of foreign direct investment from regional and pan-continental organizations like the African Development Bank, German Developmental Bank, Saudi Arabia's ACWA Power, and France's Voltalia.⁵ Under its ambitious king, efficient renewable energy structure, and intelligent energy agency, Morocco is positioned to meet its ambitious goal to attain carbon neutrality.

Section 1: Rural Development Through Renewables

The Moroccan Renewables Energy Plan is an initiative for the people, breathing life in regions of the country that have suffered from economic disparity and hardships. Renewables have helped rural communities by providing employment through the construction of various renewable plants, increasing electrification through Morocco's Global Rural Electrification Program (PERG), and also, instituting public works initiatives like a medical caravan and extension of the highway system. The implementation of renewables has fostered economic development, in addition to infrastructure projects in rural areas, which has empowered the local

⁵ Hochberg, *Renewable Energy*, 1-3.

population by granting them access to essential utilities, services, and employment opportunities providing economic and social advancement.

By developing renewable energy, the Moroccan government has created thousands of jobs aimed to bolster the domestic economy in rural areas. The Noor-Ouarzazate solar panel, located in Southern Morocco, which became functional in 2016, created 9,000 jobs in the surrounding region. These jobs were either in installation or maintenance of the large solar plant.⁶ By providing jobs, these projects increased the quality of life for rural villagers in the Ouarzazate region by providing them with a stable salary. Previously, villagers of the Ouarzazate region relied on traditional subsistence farming which is an unstable source of income as it is predicated on the climate. With the development of renewables, these individuals who work in the industry are provided with a steady income. Similarly, in the northern Moroccan region of Tangier, the Al Badia Koudia hydro plant, which is part of the state's renewable energy plan, has helped to curb rural unemployment because the National Agency for Employment and Capacity Program required the plant to meet a quota of 85% rural employment, which they meet.⁷ The region of Tangier faced an unemployment increase of 3.3% between 2016 and 2018, so the 4,200 jobs generated by the hydro plant granted individuals a steady source of income.⁸ By reducing unemployment through this initiative, the renewable plant illustrates the positive effect it has had on the region and the economic advancement it brings. Similar to Ouarzazate, renewable energy provides a fraction of the population with job security that contributes to the stability of the area. The creation of renewable plants have allowed the Kingdom to further economic development by employing its rural workforce.

In addition to the economic benefits, the energy plan has helped empower local villages through public works projects which have increased basic living standards. The Moroccan Solar Agencies (MASEN) social aid efforts provide support beyond solar energy, positively impacting rural villages and underdeveloped regions by increasing the accessibility to public goods, which provide more community security and greater interconnectivity between previously isolated

⁶World Bank, *International Bank for Reconstruction and Development Project Paper on a Proposed an Additional Loan in the Amount of \$100 Million and a Proposed Clean Technology Fund Loan in the Amount of \$25 Million to the Moroccan Agency for Sustainable Energy for a Morocco NOOR Solar Power Project Additional Financing*, by Moez Cherif and Sameh I. Mobarek, 87, May 15, 2018, accessed November 24, 2019, <http://documents.worldbank.org/curated/en/138481528687821561/pdf/Morocco-Noor-AF-project-paper-P164288-May17-clean-05212018.pdf>.

⁷ Ibid.

⁸Article 19, "Morocco: Unemployment Rate Drops 8.5% in 2019 Q2," Article 19, last modified August 8, 2019, accessed January 21, 2020, <http://article19.ma/en/index.php/2019/08/08/morocco-unemployment-rate-drops-to-8-5-in-2019-q2/>.

regions of Morocco. In addition to building solar plants, the state has a strong philosophy of service; the organization invests money into empowering local communities through public works programs like road expansion, medical caravans, and education projects. After completing the construction of the NOOR-Ourzazate solar plant, MASEN arranged an annual medical caravan to ensure that the surrounding communities could access medical care. The medical caravan provides vaccines, minimally invasive procedures such as suturing, and medical checkups to everyone in the community.⁹ As these rural villages do not have access to a robust medical system (there is one small clinic in Ouarzazate) the medical caravan provides villages with essential products that help the well being of the population. The initiative helps maintain community security as individuals stay healthier with quality medical care. Under a joint effort between the World Bank and MASEN, an initiative was put forth not only to expand the road way to reach the newly built renewable energy plants, but also expand all weather roads to isolated villages and communities.¹⁰ Previously isolated areas are now connected to large cities through the highway system. This facilitated the transportation of goods from the cities to the countryside and allowed villagers to take their products to larger marketplaces and cities. This can be seen as at the inception of the project in 2009, 54% of rural communities had access to roads. Ten years after the pilot program of this initiative, 80% had access to roads.¹¹ By streamlining transportation, MASEN has not only promoted renewable energy, but demonstrated its commitment to the Moroccan people with development strategies that stimulated economic growth to this region.

Morocco's Global Rural Electrification Program (PERG), which has partially backed by MASEN, has empowered local communities by granting them access to electricity which increased the potential for productivity. Under the initiative, 1,047 independent homes in over 19 provinces were newly connected to the national grid.¹² By supplying energy to these villages, the PERG program has provided the essential electrification to develop local communities by providing the framework for future economic activity, safety, and education efforts in the rural

⁹ MASEN, *Who Are We?* (Rabat, n.d.), 14, accessed January 23, 2020, http://www.masen.ma/themes/custom/masen/assets/files/Brochure__Fiches_Ang.pdf.

¹⁰ African Development Bank, *National Rural Roads Program*, 3, May 2007, accessed December 30, 2019, https://www.afdb.org/fileadmin/uploads/afdb/Documents/Project-and-Operations/Morocco_-_National_Rural_Roads_Programme_-_Appraisal_Report.pdf.

¹¹ The World Bank Group, "Road to Opportunities: Building the Future for Morocco's Rural Population," *The World Bank*, last modified August 7, 2018, accessed January 13, 2020, <https://www.worldbank.org/en/news/feature/2018/08/07/road-to-opportunities-building-the-future-for-morocco-s-rural-population>.

¹² African Development Bank, *Strategic Environmental*, 2.

areas. Due to the fact that work in these areas can now be performed after sunset, the program hopes that villagers become more economically productive, provide enhanced security to the villages, and give children the opportunity to study after sunset. In 2019, the rural electrification rate reached 99.85%.¹³ The wide geographic scope of the project and the electrification attempts reflect the great success of the initiative, which had a tremendous impact on the people and community. One specific village that was helped by this initiative was the village of Id Mjhadi. Before construction, the villagers could only afford an hour of light by candlestick, lacked funds for schooling, and had to burn bark for heating. The village received 32 large PV panels that created 8.32 kW of electricity and has provided electricity for 50 residents. With the new panels, they have a constant, clean and low cost supply of energy that increases productivity. Most notably, the villagers have used the money saved from the panels to cultivate argan plants, which has created a new stream of income for the community.¹⁴ The village has used the argan profit to pay for utilities like water and an educational system. This has had a stimulating effect on the local economy as it moved away from cash intensive kersino oil and has an essentially free energy source.

The Moroccan renewable plan has created state stability by improving both the economic and social aspects of the rural population through employment, like at the Noor-Ouarzazate plant and Al Badia Koudia Plant. MASEN initiatives like the medical caravan and road expansion projects have empowered local villages and increased the quality of life. Lastly, electrification initiatives, such as the one in Id Mjahii, have provided stability and security to small villages all over the country. In addition to the sector helping the social welfare of the Kingdom, Moroccan Renewables are helping the Moroccan economy prosper by adding a novel industry.

Section 2: Emergence of New Energy Sector

The mark of a dynamic economy is diversification of its industrial sector and the regionally advanced and infant renewable energy sector has helped the Kingdom continue on this path. Its robust renewable energy sector has attracted foreign investment and inspired the creation of a native technological base driving the sector forward. With more attention, the

¹³ Boris Ngounou, "Morocco: Renewable Energy Will Bring Rural Electrification to 99.85%," *Afrik21*, last modified January 14, 2019, accessed November 24, 2019, <https://www.afrik21.africa/en/morocco-renewable-energy-will-bring-rural-electrification-to-99-85/>.

¹⁴ Yahia Hatim, "Morocco Builds First Solar-Powered Village in Africa," *Morocco World News*, last modified October 23, 2019, accessed November 29, 2019, <https://www.morocoworldnews.com/2019/10/285212/morocco-builds-first-solar-powered-village-in-africa/>.

Kingdom has seen a resurgence in domestic research and development. Morocco's investment in renewables has fostered the creation of a novel industry which creates state stability by creating another pillar to support the Moroccan economy.

Morocco's investment in developing its renewable energy sector has stimulated foreign direct investment from a multitude of countries and organizations which has helped the emergence and further expansion of the sector. The Saudia Arabian utility company, ACWA Power, invested 170 million dollars to the creation of the Khalladi Wind Plant in Tangier.¹⁵ Saudia Arabia's backing of renewable plants, enables sustained growth in the renewable sector by allowing forgein money to bolster the expansion of the industry. These types of investment are significant because it opens up a whole different wing of the Moroccan economy, a "renewable sector", which leads to economic diversity in the Kingdom. Economic diversity coupled with increased employment, which was discussed above, benefits Morocco's economic sector allowing for cash flow. The chairman of ACWA Power, Mohammed Abunayyan, touched on Morocco's lure, "Morocco's energy sector offers attractive investment opportunities due to a well-established regulatory framework put in place by the Moroccan government and due to the country already having already attracted significant investments in solar and wind energy."¹⁶ The quote equates ACWA's investment to Morocco's robust renewable sector, which shows that the Kingdom's efforts to bolster the sector have been successful as they attract forgein direct investment. Another example of international investment into the sector is the French utility company, Voltalia In 2018, Voltalia, was approved by the Morccan government to construct two hydro plants in the same region of Tangier.¹⁷ Having various streams of forgein monetary and technological investments stabilize and expand the sector ensuring its future prosperity. The emergence of the renewable energy sector, aided by foreign FDI like Voltalia, has added a novel industry to the Moroccan economy providing opportunities to increase employment and research seen in an increase in research and development opportunities.

By creating a new, domestic industry, Moroccan renewables have stimulated a resurgence of domestic research and opportunity in the energy sector, which have curbed the

¹⁵ "ACWA Power Khalladi Inaugurates \$170m Wind Farm in Morocco," *Renewable Technology*, last modified July 2, 2018, accessed January 6, 2020, <https://www.renewable-technology.com/news/company-news/acwa-power-khalladi-inaugurates-170m-wind-farm-morocco/>.

¹⁶ Ibid.

¹⁷ Marie De Lauzon, "Two Hydropower Plants Authorized in Morocco," news release, February 15, 2018, accessed January 14, 2020, https://voltalia.com/uploads/08_Not%c3%adcias/Press_Releases/2018/180215-CP-Voltalia-Morocco-VENG-final.pdf.

brain drain and led to a more educated workforce, thus stabilizing the Kingdom. Historically, Morocco faces a brain drain that has deprived the country to its most talented individuals. A 2016 study found that 43,000 students left to study or work in France and the creation of a new energy sector has the potential to provide a solution to the drain on local talent.¹⁸ In 2011, the Third InnovAct, which was launched in Morocco, recruited students to go into the renewable energy sector. The success of this project was seen in its large number of applicants and extreme selectiveness.¹⁹ Moreover, the Hassan II Academy of Science and Technology located in Rabat has seen an increase in enrollment in students which has led to the inauguration of over 8 new research projects specialized in renewables in 2018 amid to push the limits of renewable technology.²⁰ The Moroccan renewable sector has sparked interest in domestic research and development efforts in the field of energy. The efforts to research the field of renewables allows the sector to grow in the future. The large amount of research opportunities and programs as a result of the inauguration of Mohammed VI's renewable energy vision illustrates that this industry has opened up domestic opportunities for the nation's youth. By creating opportunities for student enrollment in projects offered at the Hassan II Academy of Science and Technology, the Kingdom is proactively creating a framework to combat the brain drain.

In addition to the educational initiatives and research opportunities supported by the Kingdom, the shift to renewables has spurred a resurgence in domestic research and development. The state funded Moroccan Institute for Research in Solar and New Energy (IRSEN) allocated 1.9 million dollars for six research projects attempting to push the boundaries of renewable energy technology.²¹ The program has funded the work of 200 engineers and 47 PhDs in the field of sustainable energy.²² Morocco's substantial investment in the research and development of cutting edge technologies in the renewable energy sector has spurred domestic efforts to further indigenous solar technologies. These initiatives helped train future local

¹⁸ Johan Sävström, "Brain Drain of North African Scholars," *The Nordic Africa Institute*, last modified June 13, 2017, accessed January 14, 2020, <https://nai.uu.se/news-and-events/news/2017-06-13-brain-drain-of-north-african-scholars.html>.

¹⁹ Flavia Schlegel, *UNESCO Science Report* (Paris, France: United Nations Educational, 2017), 457, https://unesdoc.unesco.org/in/documentViewer.xhtml?v=2.1.196&id=p::usmardef_0000235406&file=/in/rest/annotationSVC/DownloadWatermarkedAttachment/attach_import_871d5667-bd86-4feb-a045-f802628d2f48%3F_%3D235406eng.pdf&locale=en&multi=true&ark=/ark:/48223/pf0000235406/PDF/235406eng.pdf#%5B%7B%22num%22%3A3676%2C%22gen%22%3A0%7D%2C%7B%22name%22%3A%22XYZ%22%7D%2Cnull%2Cnull%2C0%5D.

²⁰ Schlegel, *UNESCO Science*, 458.

²¹ Natural Sciences Sector, "Green Technologies a Focus of Innovation in Morocco," *United Nations Education, Scientific, and Cultural Organization*, last modified October 11, 2016, http://www.unesco.org/new/en/natural-sciences/science-technology/single-view-sc-policy/news/green_technologies_a_focus_of_innovation_in_morocco/.

²² Ibid.

workers with high value skills and stemmed the loss of talented youth who are vital in achieving industrial production in high value added sectors such as solar energy. Morocco has also seen an increase in spending of renewable research, which increased from 0.64% of its Gross Domestic Product to 0.73%, which is the second highest in the Arab world.²³ By investing in its workers and creating a technologically competent workforce who can sustain and enhance a modern renewable energy infrastructure, Morocco is trying to be an innovator and leader in this new industry.

The emergence of a new renewable sector has contributed to state stability by strengthening and diversifying the Moroccan economy. The robust renewable energy sector has attracted foreign direct investment from Saudi Arabia and France, which helps the viability of the new sector with an injection of funds. The new sector has contributed to the strength of the economy by providing research opportunities and projects which curbs the deleterious brain drain straining the country. Lastly, by having relative energy independence, Morocco is strengthening its economy through reinvestment of saved money. Morocco's investment in renewables has granted the nation energy independence, which helped that nation save an annual of 1.4 million dollars.²⁴ The money saved is reinvested in future renewable and infrastructure projects. By controlling a large portion of its energy portfolio, the Kingdom's economy is prospering through a new industry and commands its energy important costs better.

Section 3: Renewable Diplomacy and Legitimacy

In addition to both social and economic advantages of the renewable projects, it has also helped the nation politically by fostering international relations and improving the image of the monarchy. MASEN has exported its unique and effective method of building renewable energy to Sub Saharan countries. The Desertec Initiative has helped Morocco strengthen relations with Spain and Algeria. The modern and economically beneficial renewable project has shed a positive light on the Moroccan monarchy, thus strengthening his rule. Morocco's efforts to use energy development to foster relations with other nations in Europe and Africa has not only furthered regional and continental security, but it has allowed the Moroccan monarchy to brand itself as a modern regime, thus establishing legitimacy for its continued rule.

²³ Ibid.

²⁴ "Morocco Firmly Engaged on Path of Energy Efficiency," *The North African Post*, last modified April 8, 2018, accessed January 22, 2020, <http://northafricapost.com/29690-morocco-firmly-engaged-on-path-of-energy-efficiency.html>.

The Desertec Initiative, put into action in the early 2000s, has revolutionized the energy geopolitics of the Mediterranean region by calling for North Africa to power Europe which has linked the two previously isolated regions. Morocco has three interconnections with Spain via submarine cables. The first interconnection has a capacity of 700 MW. The second, built in 2016, also has the same technical capacity. Spain and the Kingdom have signed a memorandum of understanding regarding the construction of the third interconnection. The agreement was between MASEN and Spanish national operating grid RED.²⁵ The Desertec initiative has fostered an energy relationship between North Africa and Europe. This connection has created the potential for Morocco to export its renewable energy to Spain and beyond. These interconnections are a testament to renewables' power to develop international relationships. In addition to connecting Morocco with Spain, the Desertec Initiative also has provided the opportunity for Morocco and Algeria, two warring nations, to cooperate. Desertec provided the two nations a unique opportunity to reconcile in the midst of an ongoing insurgency and the scramble for resources in Western Sahara, which finds these two power players of the Maghreb on opposing sides. Western Sahara has one of the highest solar irradiance levels in the world and both nations want to exploit it to generate clean energy.²⁶ With Desertec, instead of competition between the two nations, there will be cooperation as energy is distributed throughout the Mediterranean Basin. Morocco and Algeria were the only two countries in North Africa to approve the Desertec project.²⁷ The promise of renewable energy and its potential exportability has forced the two nations to cooperate and find a common strategy to export energy to Europe as devised in this blueprint. These cross border commercial ties balance the potential for conflict between these two fierce competitors and allows them to imagine a future where regional cooperation leads to mutual development, which can be seen as Morocco has inspired Algeria's own renewable energy revolution. After viewing Moroccan success, Algeria has launched its own project, the National Renewable Energy Strategy, which has set a 5% renewable goal by 2030.²⁸

²⁵ Energy Reporters, "Spain and Morocco Sign Interconnector Deal," *Energy Reporters*, last modified March 3, 2019, accessed January 4, 2020, <https://www.energy-reporters.com/transmission/spain-and-morocco-sign-interconnector-deal/>.

²⁶ "Map of Algerian Energy Grid," Global Energy Network Institute, accessed December 25, 2019, https://www.geni.org/globalenergy/library/national_energy_grid/algeria/index.shtml.

²⁷ Brett Prior, "Desertec Update: Coordinating 40 Countries, 200 Km of Undersea Cables, and €400B in Funding," *Greentech Media*, last modified August 3, 2010, accessed December 31, 2019, <https://www.greentechmedia.com/articles/read/desertec-update-funding>.

²⁸ Bernhard Brand and Jonas Zingerle, *The Renewable Energy Targets of the Maghreb Countries: Impact on Electricity Supply and Conventional Power Markets*, 6, May 2010, accessed February 11, 2020, <https://www.ewi.uni-koeln.de/cms/wp-content/uploads/2015/12/EWI-WP-10-02-Renewable-Energy-Maghreb.pdf>.

MASEN is establishing links between developing countries and enhancing continental security by transporting its unique expertise to other countries in Africa such as Zambia and Senegal, which creates strong socio economic connections with other African states. In Zambia, MASEN and Zambia's national renewable agency, ZESCO LTD., partnered to develop 450 MW of solar, wind, and hydroelectric power in 2017.²⁹ According to a member in MASEN's operation department, "MASEN effectively kickstarted Zambia's renewable sector with an influx of cash and knowledge."³⁰ Morocco has capitalized on MASEN's effective renewable process by exporting it to Zambia in order to build relations. As seen in the quote by Kenza Taoufik, the kick starting of Zambia's renewable sector has built a cooperative partnership with the two counties because of Moroccan technical assistance and aid, which bolsters Morocco's position as a renewable leader in Africa and establishes a mutually beneficial relationship between the two nations. Despite this merely being an economic partnership, it has led to increased cooperation between the two nations as later in 2017, Morocco established its first embassy in the Zambian capital of Lusaka.³¹ Morocco's Minister of Foreign Affairs, Mounia Boucetta stated that, "Morocco's opening of its embassy in Lusaka was in part due to Morocco's continual support of Zambia's socio-economic development and the relations of the two countries in various fields, like energy."³² Morocco's diplomacy through renewables has borne great success because after nine months of the energy deal, Morocco opened an embassy in Zambia, which strengthened the relationship between the Kingdom and Zambia. Boucetta attributes the opening of the embassy with the nation's relationship over renewable energy. This strong relationship positions Morocco in a favorable position on the continent as they are seen as helping developing nations like Zambia.

Elsewhere on the continent, Morocco attempted to strengthen ties with Senegal. A contractor with MASEN, The Office National de l'Electricité et de l'Eau Potable (ONEE)³³, made its first inroads into rural electrification via hydroelectric power in Senegal, and is now

²⁹ Ministry of Energy, *Scaling-Up Renewable Energy Program Investment Plan for Zambia*, 54, December 2018, accessed December 16, 2019, https://www.moe.gov.zm/wp-content/uploads/2018/12/Draft_SREP_IP_Zambia.pdf.

³⁰ Kenza Taoufik, telephone interview by the author, McLean, VA, January 1, 2020.

³¹ Chomba Musika, "Morocco to Establish Embassy in Zambia," *Zambia Daily Mail Limited*, last modified July 18, 2018, accessed January 8, 2020, <http://www.daily-mail.co.zm/morocco-to-establish-embassy-in-zambia/>.

³² Musika, "Morocco to Establish," *Zambia Daily Mail Limited*.

³³ Loubna Flah, "Morocco-Senegal Bilateral Relations, an Ancestral Alliance," *Morocco World News*, last modified July 28, 2013, accessed January 4, 2020, <https://www.moroccoworldnews.com/2013/07/99200/morocco-senegal-bilateral-relations-an-ancestral-alliance/>.

active in a number of African countries.³⁴ The strengthening and preservation of this relationship is imperative as Senegal is Morocco's largest trading partner in West Africa, generating 122 million dollars.³⁵ Morocco's efforts to aid the Senegalese renewable industry creates a mutually beneficial relationship between the two countries, with Morocco providing expertise in renewables and Senegal providing a large amount of trade. ONEE, a major factor in Morocco's domestic energy shift, is using its skill set to aid Senegalese villages in electrification. By strengthening economic and political ties, Morocco is continuing to strengthen relationships with key African countries which cements its place on the continent by positioning the nation as a renewable energy leader.

King Mohammed VI's development of the renewable energy sector has legitimized his role as a monarch by portraying him as a modernizer, as the plethora of benefits economically and socially have brought political stability. Morocco's great strides at cultivating renewable energy have gained international recognition by the United Nations. Morocco is one of a handful of countries that is exceeding the 2016 Paris Climate Agreement goals. Countries are measured on a scale from critically insufficient to being a role model in carbon emissions and Morocco lies in the second best category through its carbon mitigation efforts.³⁶ The UN has commended Morocco's efforts to reduce greenhouse gases by implementing large scale renewable plants like the NOOR Ouarzazate plant.³⁷ Morocco's vigilant adherence to the goals set in the 2015 Paris Climate agreement has transformed the Kingdom into an exemplary model for carbon reduction in the developing world. Morocco's renewables have played a great role in reducing carbon emissions as the Kingdom strives to meet 52% renewable energy development by 2030, which was applauded by the United Nations. These efforts also looked impressive for King Mohammed VI, as it branded the sovereign as a progressive leader transforming his nation into a clean energy leader. These goals yielded great success in its international standing as it led Morocco to host the United Nations framework Convention for Climate Change in November 2016 (COP22), where 115 countries were present.³⁸ According to Kenza Taoufik, "One of the biggest

³⁴ Luchelle Feukeng, "Niger: Moroccan ONEE Wants to Promote Rural Electrification," *Afrik*, last modified October 11, 2019, accessed January 4, 2020, <https://www.afrik21.africa/en/niger-moroccan-onee-wants-to-promote-rural-electrification-in-the-country/>.

³⁵ Flah, "Morocco-Senegal Bilateral," Morocco World News.

³⁶ Amanda Erickson, "Few Countries Are Meeting the Paris Climate Goals. Here Are the Ones That Are." *The Washington Post*, last modified October 11, 2018, accessed January 17, 2020, <https://www.washingtonpost.com/world/2018/10/11/few-countries-are-meeting-paris-climate-goals-here-are-ones-that-are/>.

³⁷ Ibid.

³⁸ Brittlebank, "Summary of UN Climate," *ClimateAction*.

reasons why Morocco was awarded the COP22 meeting in Marrakech was its efforts in reducing carbon via its robust renewable sector.”³⁹ The Convention for Climate Change provided King Mohammed VI the opportunity to showcase Morocco’s strides in carbon reduction. The hosting of the convention legitimized Morocco’s position as an energy leader as they led the discussion and execution of climate reform for over 105 countries. This gave King Mohammed VI the international stage to recognize his efforts, which contributed to his image as a progressive leader. At COP22, King Mohammed VI had an international stage to highlight his success and vision for Moroccan renewables. He first stated that, “the fact that the city of Marrakesh is, today, hosting this conference is evidence of the great importance we attach to issues associated with the environment and the climate, as part of the Kingdom’s priorities.”⁴⁰ This quote shows that Morocco under the leadership of the King prioritizes climate betterment and executes projects to curb the effects of climate change like renewable energy plants. The King also declares, “Our commitment to addressing the problematic issue of climate change through the implementation of the Paris Agreement, reflects our shared desire to enhance intergenerational solidarity.”⁴¹ The quote highlights King Mohammed VI’s desire not only to achieve energy independence and social betterment creating a unique relationship with different generations of Moroccan people. This solidarity has the potential to preserve unity in the Kingdom, which is the cornerstone of state stability. King Mohammed’s acceptance of credit for Morocco’s renewable commitments and achievements serves the Monarchy’s push to present itself as dynamic and progressive leadership in a sea of stagnant autocrats in the MENA and Sahel regions.

Morocco’s efforts to become a leader in renewable energy in the Mediterranean region and on the continent of Africa have ensured international stability as these initiatives have helped build and preserve relations. Morocco has become a leader of renewables on the continent of Africa by aiding the renewable sectors of Zambia and Senegal with an influx of cash. In the Mediterranean Region, the Desertec initiative has given the Kingdom an opportunity to strengthen their relationship with Spain and reconcile with its warring enemy Algeria through mutual energy development. Lastly, the forward thinking initiative like the Moroccan

³⁹ Taoufik, telephone interview by the author.

⁴⁰ King Mohammed VI, "Full Speech of HM the King on COP22 High-Level Segment" (speech, United Nations Climate Change Conference, Marrakesh, Morocco, November 15, 2016).

⁴¹ Ibid

Renewable Project has shown the king to be a modernizer, which has brought legitimacy to his rule.

Conclusion

Morocco's relentless efforts of investing in and nurturing its renewable energy sector has brought both internal and external stability to the last Kingdom in North Africa. The expansion of renewables has empowered the rural populus by providing employment, utilities, economic programs, and social programs. The spike in employment due to the Ourzazate solar plant and the many social projects launched by MASEN help increase economic stability and opportunity, as well as economic safety in isolated regions of the country. This expansion has helped the nation become increasingly energy independent, which has created a blueprint that can be reproduced throughout the country in order to promote urbanization and electrification. By having renewables comprise 42% of the energy supply chain, Morocco is able to cut out 14 billion dirhams worth of energy importation, which has lessened the previous burden placed on the Moroccan economy. This has allowed for the reinvestment of these funds into educational and infrastructure projects. Furthermore, Morocco has used its renewable technologies to achieve both internal and external stability by branding King Mohammed VI as a modernizer and cooperating with nations of the mediterraeen region and continental Africa through collective renewable energy development projects. By working with Zambia and enrolling in the Desertec initiative, the Kingdom is using renewables to develop relationships with other nations. This places them on the avant-garde of states pursuing renewable energy in the search of international relationship building, peace and prosperity.

Morocco is redefining the role of a developing nation in a multitude of ways ranging from trailblazing a path for the world to achieve a future of reduced carbon energy emissions to establishing South-South trade and technology transfer to developing nations. The lack of fossil fuels, naturally high solar irradiance, and a forward thinking monarch with the powers of a command economy have coalesced into a dynamic energy and foreign policy which is propelling Morocco to the head of the pack in addressing the climate crisis. As this renewable technology, production capacity, and energy transportation system matures, Morocco will truly be in a unique position straddling the energy users of the north and the producers in the south which will continue to transform the relationship from one of dependence to one of interdependence. The

creation of a vibrant Moroccan economy based on technology which enhances its regional leadership position and leads to a transafrican common market of ideas may generate enough gravity to draw in international investments and technological talent and retain the domestic brain power in their home bases. This sea change in the structure and interconnectivity of southern economies may rewrite the flow of human migration and erase forever the images of pontons crossing the Mediterranean.

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