

INVESTING IN SUSTAINABLE ENERGY

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I. INTRODUCTION

Most Arab countries are characterized by high energy consumptions per capita and an immense dependence on fossil fuels. As such, both managing energy demand (particularly through energy efficiency (EE)), and increasing the deployment of renewable energy (RE), are vital for the improvement of energy productivity in Arab countries and the support of national, regional and international goals for economic development, poverty alleviation, improved health and education, improved standards of living and ensuring sustainable development of cities and communities.

Various countries still lack sufficient access to energy, which is in turn exacerbating poverty, hunger and education levels. The heavy reliance on fossil fuel-based technologies has rendered many major Arab cities among the most air-polluted globally. Further, the heavy dependence on energy to secure access to clean water resources (e.g. desalination processes) in the world's most water-scarce region has interlinked efforts to attain energy and water security, and combating the impacts of climate change, whilst also seeking to decouple energy demand from economic growth. As such it is important for Arab countries

to develop more effective political, institutional and regulatory frameworks to enable a wider access to international climate change and sustainable energy funds, as well as to mobilize the private sector's financial resources in the sustainable energy markets.

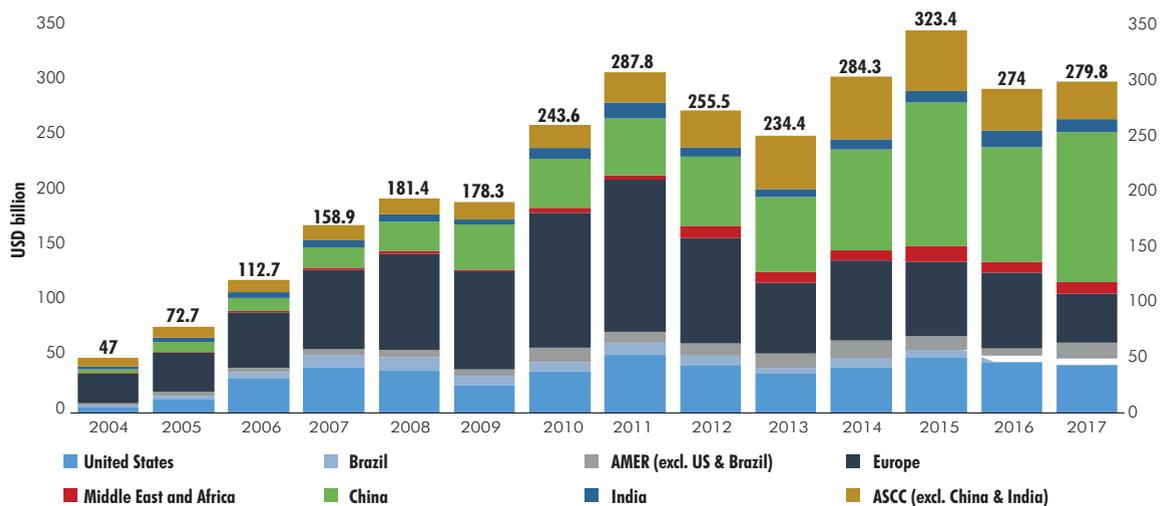
This chapter emphasizes the role of effective, sustainable and adequate funding, policies and measures that seek to attain a sustainable growth of the energy sector in which economic growth and social development are decoupled from rising energy demand. First, we will look at international and regional trends and case studies in financing sustainable energy. In the second part, we will tackle the importance of long-term policies, incentives and other enabling conditions for the expansion of the sustainable energy markets.

II. FINANCING SUSTAINABLE ENERGY

A. International Trends

Investments in RE have an almost fivefold increase between 2004 and 2017, reaching a total of USD 279.8 billion in 2017, with 157 GW of RE installed capacity added during that year (excluding large hydro). Private equity accounted

FIGURE 1 GLOBAL NEW INVESTMENT IN RE BY REGION 2004-2017 IN USD BILLION *



Source: Frankfurt School-UNEP Centre/BNEF, 2018

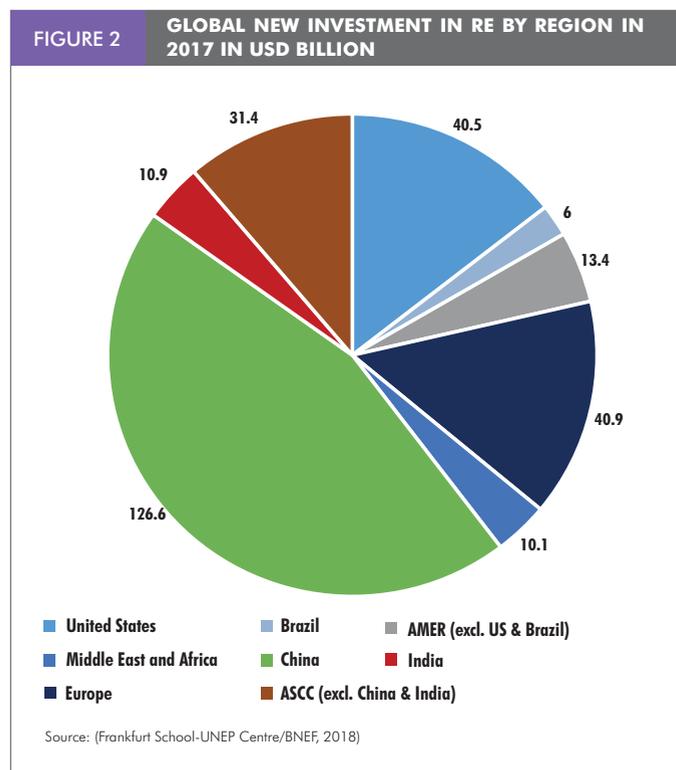
*Asset finance volume adjusts for re-invested equity. Total value includes estimates for undisclosed deals

for only USD 780 million, which is the lowest since 2004 while asset finance grew from USD 215.6 billion in 2016 to USD 216.1 billion in 2017 with distributed solar energy adding another USD 49.4 billion. RE excluding large hydro represented 61 percent of total electrical power capacity added in 2017. China alone accounted for 45 percent of global investment in RE in 2017. Furthermore, the sale of electric vehicles increased by 57 percent in 2017 (Frankfurt School-UNEP Centre/BNEF, 2018). The Middle East and Africa contributed to 3.6 percent of total investment in RE in 2017, as seen in figure 2.

The Arab region is responsible for a significant share of the 30 percent predicted global increase in energy demand. In an effort to keep global temperature rise below 2°C in accordance with the Paris Agreement, investing in RE and low carbon technologies will not be enough. Reducing global demand on energy through investment in EE measures and technologies will play the most important role in cutting down on greenhouse gases while maintaining sustainable growth in global economies and social development. In 2016, global investment in EE reached USD 232 billion up from USD 213 billion the previous year (IEA, 2017).

Nonetheless, SE4ALL, a global initiative led by the United Nations to achieve universal energy access, improve EE, and increase the use of RE, estimates that investments of USD 650 billion for RE and USD 560 billion for EE are required annually during the period 2010-2030 to achieve SDG7 (Leone, 2016).

Public finance institutions have an important role to play in mobilizing private financing sources to the sustainable energy market by mitigating investment risks and barriers. There are different types of public finance institutions such as international financial institutions, which provide funds and de-risking instruments. These institutions include the World Bank Group and the European Bank for Reconstruction and Development (EBRD). Development finance institutions include mostly bilateral development agencies such as the French Development Agency (AFD). Export credit agencies supply government-backed loans, guarantees, and insurance to corporations doing business in developing countries. Finally, climate finance



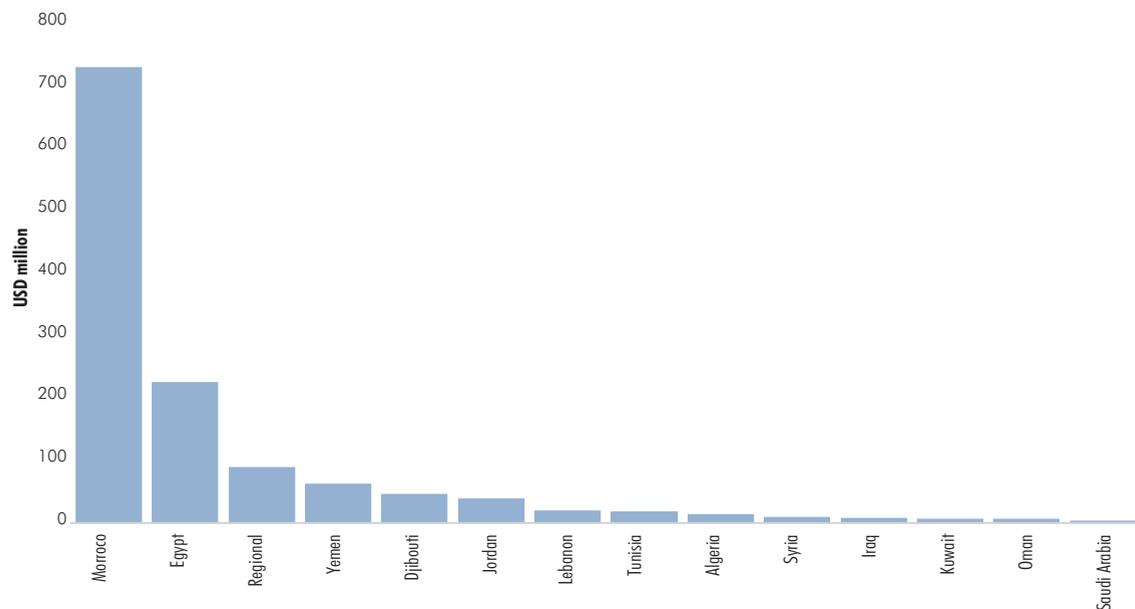
institutions include international climate funds aimed at financing climate change mitigation and adaptation projects such as the Global Environment Facility (GEF) and Green Climate Fund (GCF).

B. Regional Trends

Despite the fact that the MENA region is considered one of the most affected by the severe impacts of climate change, it hardly receives international and regional climate funding (Climate Policy Initiative, 2017). Between 2003 and 2016 the MENA region received USD 1.2 billion for 94 approved projects. Out of this total investment, over three quarters (USD 949.44 million) was dedicated to 50 mitigation projects while the smaller share (USD 175.87 million) was directed towards adaptation projects (Heinrich Böll Stiftung, 2016). In total, USD 375 million was given in the form of grants while USD 800 million in the form of concessional loans.

As seen in Figure 3, Morocco and Egypt received the bulk of financing in 2016 and they are the

FIGURE 3 AMOUNT OF CLIMATE FUNDS RECEIVED BY MENA COUNTRIES (2003-2016)



Source: Heinrich Böll Stiftung, 2016

only countries that received more than the regional average. Concentrated solar power and large-scale wind projects received 84 percent of the funding while about 12 percent was dedicated to sustainable transportation and agriculture, and EE projects. Table 1 further illustrates the sources of climate funds dedicated to the MENA region between 2003 and 2016.

Among the Arab countries, Morocco received the highest amount of climate financing from climate funds and international financing institutions in 2016, totaling USD 960 million (UFM, 2017). Egypt came second receiving USD 680 million, followed by Jordan and Tunisia, as seen in Figure 4.

When leveraging finances, the important factors are well-designed RE and EE policies, the availability of creditworthy off-takers and engineering, procurement and construction contractors, a stable and supporting financial infrastructure, as well as guaranteed access to the grid (Oxford Institute for Energy Studies, 2017). Nonetheless, within the Arab region, access to sustainable energy financing is also linked to the countries' oil and gas reserves and exporting

capacity. The level of a country's fossil fuel reserves has an impact on its financing structures and the willingness of investors to finance sustainable energy projects. Oil-exporting countries, namely in the GCC region, have better credit ratings than non-oil exporting countries. The strong investment climate in the GCC region is also bound to its political stability, stable currency, and project-pipelines which altogether allow easier access to commercial debt financing and private equity (Squire Sanders, 2016).

The UAE, for example, has a credit rating of "AA", which is attractive for investors. The latest success story is the procurement of solar electricity through auctioning for the third phase of the Sheikh Al Maktoum solar park, which resulted in an auction bid of USD 2.99 cents/kWh for 800 MW, cutting the previous world record (USD 5.98 cents/kWh) by half. Besides the well-structured auction procurement system, it was the combination of a debt-to-equity ratio of 86 percent and a low 4 percent interest rate for a 27-year term loan that allowed for the record bidding price (Oxford Institute for Energy Studies, 2017).

TABLE 1 CLIMATE FUNDS IN THE MENA REGION (2003-2016)

Funds	Amount approved	Projects approved
Clean Technology Fund (CTF)	816.05	9
Global Environment Facility (GEF4)	55.57	15
Special Climate Change Fund (SCCF)	48.01	9
Global Environment Facility (GEF5)	31.85	14
Adaptation Fund (AF)	38.62	5
Germany's International Climate Initiative	37.65	8
Least Developed Countries Fund (LDCF)	39.64	9
Green Climate Fund (GCF)	39.3	1
Adaptation for Smallholder Agriculture Programme (ASAP)	23	4
Pilot Program for Climate Resilience (PPCR)	19	1
MDG Achievement Fund	7.6	2
Strategic Priority on Adaptation (SPA) (from GEF4)	6.02	3
Partnership for Market Readiness	4.05	4
Global Climate Change Alliance (GCCA)	3.36	1
Global Environment Facility (GEF6)	13.99	11

Source: (Heinrich Böll Stiftung, 2016)

Multilateral investors and export credit agencies that are willing to invest in RE projects have increasingly supported countries with low credit ratings such as Jordan and Morocco. An example is the Tafila wind project in Jordan (117 MW), for which over USD 190 million in loans were approved in 2013 by the European Investment Bank and the International Finance Corporation (Squire Sanders, 2016).

Green bonds dedicated to energy have been initiated in the region in 2017, with Abu Dhabi issuing USD 587 for climate change and Morocco issuing USD 118 for a 170 MW PV plant as part of the NOOR project (Bloomberg, 2017 & Chestney, 2017).

III. POLICIES AND ENABLING CONDITIONS

In order to promote RE & EE and make it more attractive for investors, Arab countries have set a number of strategies and targets over the past years, and have adopted different mechanisms, pricing policies and fiscal incentives for RE and EE including:

A. RE and EE targets and strategies

Almost all Arab countries have RE targets except for Qatar. These targets differ from country to country according to the already existing RE share in their energy mix (AFEX, Arab Future Energy Index - Renewable Energy, 2016). As for EE, almost all countries have set ambitious targets to reduce their energy consumption in the different sectors by 2020 and 2030 (AFEX, 2017).

With regards to the national plans, 15 Arab countries have adopted and are already implementing their first or second National Energy Efficiency Action Plan. As for the National Renewable Energy Action Plans (NREAP), three countries – Lebanon, Bahrain and Sudan – have led the process in drafting and consolidating their NREAPs. Other countries such as Palestine and Tunisia have their final drafts and are expected to start with the implementation and adoption soon.

B. Auctions

Despite the fact that they are relatively new,

OPINION

USING AID FOR ENERGY SAVINGS TO GENERATE DEVELOPMENT WINS IN JORDAN

Glada Lahn

Opportunities for financing energy access and other SDGs have opened up for some Arab countries as a result of humanitarian aid. With some changes in the way that electricity savings are accounted for and redistributed, governments could harness these to transform their building stock and in turn contribute to health and education as well as energy access goals.

Mass unplanned migration due to various conflicts in the Arab region has put additional stress on neighbouring countries' energy, water and other services, and nominally increased energy poverty. But it has also given way to international attention and new funding streams. In Jordan, as of 2014, the government has specified how aid should be channeled through the Jordan Response Plan – meeting both refugee needs and national development priorities. Energy sits alongside other priorities, with its own taskforce composed of government, NGO and UN parties to set out on a rolling basis where aid should be channeled. The 2018 – 2020 plan seeks USD 172 million for energy interventions with a focus on “utilizing RE&EE technologies and solutions to houses, private and public building, including schools and hospitals, as well as to provide adequate, secure and affordable energy to refugees and host communities.” (more info available on <http://www.jrpsc.org>)

This approach has brought largescale legacy investments such as the solar power plants at Azraq and Zaatari refugee camps, funded by IKEA Foundation and German development bank, KfW respectively. It also attracts new urban approaches. The Norwegian Refugee Council accessed EU funding to install solar panels on 23 schools which have doubled their teaching time, and therefore utility costs, to accommodate Jordanian and Syrian pupils on a two-shift system.

Likewise, hospitals often face high diesel and electricity bills for basic needs such as hot water. The Moving Energy Initiative, funded by the UK Department for International Development (DFID), has upgraded Al Mafraq hospital's water system. Jordanian company Millennium Energy Industries has developed a solar thermal system to do



so, which is expected to save around 32,000 Jordanian dinar (USD 45,133) each year. Water was previously heated with diesel and the hospital manager is now able to redistribute the diesel budget. This money can be used to improve urgently needed health care facilities – the hospital has gone from taking 75 patients per day to over 130 since the refugee crisis and is desperately in need of more funds. Targeted humanitarian grant funding could radically reduce diesel use across all hospitals under pressure from the additional population whilst increasing health care for vulnerable people.

The problem of utilities deficit is one that weighs heavily on the Jordanian government's economic health. At the end of 2017, the debts of the National Electric Power Company (NEPCO) and the Water Authority of Jordan (WAJ), reached JD 7.2 billion – around 2.6 percent of total public debt. Unlike diesel, public sector bills may go unpaid by ministries, which means that while energy savings are great, they only reduce a deficit, rather than making a financial saving.

If year-on-year electricity savings were to be accounted for and ring-fenced either at the ministerial or municipal level (in view of Jordan's shift to decentralization), this money could target development priorities as well as vesting the interest in increasing energy efficiencies. In theory, the

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some JD 10 million that the Ministry of Education spends on electricity each year could be reinvested to help schools cope with their additional intake. The Norwegian Refugee Council (NRC) programme savings totalled JD 93,516 (USD 131,898) over 9 months. The incentive for public investment is clear: the average payback period for each school would be just three years.

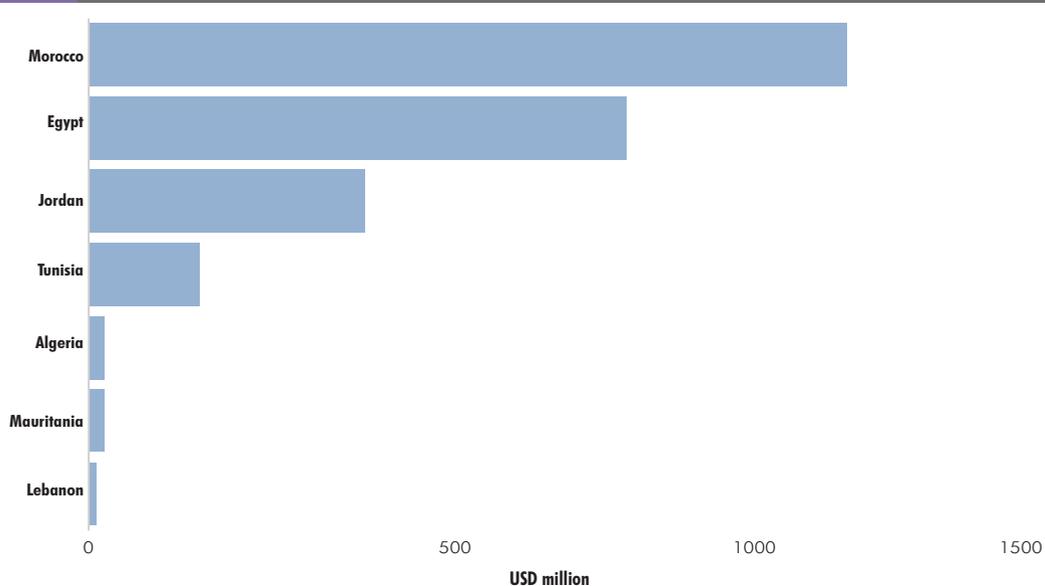
The Jordan Renewable Energy and Energy Efficiency Fund (JREEEF) is one existing government vehicle which can help galvanize these virtuous circles of transformation in public buildings. It is currently building on pilots done on schools to improve classroom conditions and heating. The Princess Alia Foundation and the NRC both continue to work on achieving workable models in the absence of payment for excess generation of solar electricity (at present net metering is the main option for public buildings). Two stumbling blocks to national level scale-up are the unclear costs and process for grid connection for solar systems, and an effective mechanism for redistributing at least some of the savings to the facility, thereby generating engagement and interest at the municipality and community user level.

If done sensitively with the needs of local people in mind, investment in public buildings on a national scale can galvanize a country's transition to sustainable energy future as well as reaping rewards for the fiscal balance.

Many energy investments are feasible with the current tariff for public buildings so incentives to enable scale up should be explored. In the case of houses of worship which are responsible for their own bills, a project by the Jordanian NGO, Future Pioneers for Empowering Communities (FPEC) showed huge benefits if the mosques and churches could access local soft capital. A USAID pilot project has shown that investments in efficiency retrofits for public buildings are generally recuperated within one year. The Ministry of Information and Communication Technology has invested in some of the recommended actions, including renewable energy, from its own budget. Since the baseline measurements were conducted, it reduced its electricity bill by 20 percent in the first year – a saving of over USD 55,000. At this rate, the efficiency interventions paid back on initial investment in eight months. This will take four years for the solar PV system.

With Jordan's strong legal framework for energy and tariffs systems, there is an opportunity for the government to work with donors and multilateral banks now focusing on economic resilience to provide and unlock soft loans for public and non-profit entities – including the large humanitarian and development offices that sit in Amman – to make initial capital investments. They can also help to build revolving loans for sustainable energy investments at the municipal level.

FIGURE 4 CLIMATE FINANCE BY RECIPIENT, 2016



Source: UFM, 2017

RE auctions have become a popular policy instrument, jumping from 9 to over 44 countries adopting them between 2009 and 2013 (IRENA, 2013). The most common types of auctions are sealed-bid and multi-round descending-clock auctions. At sealed-bid auctions, developers submit their bids with an undisclosed offer of the price at which the electricity would be sold under a power purchase agreement (PPA). An auctioneer then ranks and awards projects until the sum of the quantities offered covers the volume of energy being auctioned. At a multi-round descending-clock auction the auctioneer offers a price in an initial round, and developers bid with offers of the quantity they would provide at that price. The auctioneer then progressively lowers the offered price in successive rounds until the quantity in a bid matches the quantity to be procured (IRENA, 2013).

So far, only Morocco and Egypt have implemented the auction scheme. Morocco's auction schemes is more developed and generally runs in two phases: the pre-qualification phase and the evaluation phase and they are usually technology and site-specific auctions (IRENA, 2013).

C. Competitive Bidding

Competitive bidding offers the flexibility of achieving true market prices of renewable energy technologies (RET) and adapting to the dropping RE prices as it reflects current market conditions and investment climate. Pricing under this scheme reflects the economic, financial, political, and social risks in the country as well as the conditions and terms offered in the PPA and the off-takers' credit worthiness.

In the region, at least ten countries (Algeria, Egypt, Jordan, Kuwait, Lebanon, Morocco, Oman, Palestine, Syria, UAE and Yemen) have adopted the scheme. Despite its success in many countries, the tendering process has been delayed or interrupted for various reasons including political instability in some of the countries.

D. Direct Proposal Submission

The direct proposal submission process is usually faster and even more direct than other schemes since it requires less preparatory work from the government. It allows developers to submit unsolicited applications to the government and

then allows for a PPA to be signed based on the initiative of the developer.

Despite it being a simple and speedy process, in our region only three countries – Egypt, Jordan and Palestine – allow direct proposal submission. The level of guidance rather differs in these three countries based on the political stability.

E. Feed in Tariff

Feed-in Tariff (FiT) is considered the best market instrument to use while focusing on increasing investment security for REs, given the fact that it aims at enabling RE prices to be competitive in the market. Around five countries, Algeria, Egypt, Jordan, Palestine and Syria have tried to apply a fixed rate¹ for FiT. This fixation of rates provides certainty for the different investors who know beforehand how much support they will be getting during the lifetime of their investments.

Egypt launched its FiT in 2014 with the goal of installing 4300 MW in two years through the scheme. The PPAs were set at 25 years for PV and 20 years for wind. Although only three 50 MW projects were completed under the first round, the second round witnessed a total of 1500 MW contracted PV projects as of September 2017 due to adjustments in tariff pricing and exchange rates.

On the other hand, the Algerian FiT mechanism is based on a premium price received on top of the market price, rather than a fixed price for the electricity produced. The premium paid under this scheme is guaranteed for the lifetime of the project and does not impose a limit on its capacity. Nonetheless, the government does not offer any priority access to the grid for electricity produced by RE and payments are made in local currency, which poses a significant risk to investors.

F. Net Metering

The net metering mechanism is essentially used to encourage residential or small-scale businesses to install RE technologies (particularly solar PV), primarily for self-consumption.

This scheme allows prosumers² to sell the excess electricity generated from their RE systems to the



government, by feeding this excess to the grid to offset utility electricity consumption. Hence, it usually places the economic burden on the utility itself and at the same time is less costly for the state. This process is mainly achieved through the use of a bidirectional meter that tracks both the electricity consumed from the national grid and the electricity the consumer feeds into the grid from the RE source. This mechanism is an important incentive for countries to increase electricity prices and reduce energy subsidies.

In the region, eight countries, (Bahrain, Egypt, Jordan, Lebanon, Morocco, Palestine, Tunisia, UAE and Syria) have adopted net metering policies. However, only a few of them have implemented it in practice.

Introducing the net metering scheme in Palestine was a particularly important incentive for the development of the RE market, as the electricity prices in the country are among the highest in the region. Projects under the Palestinian net metering scheme have a capacity limit of 1 MW and any excess electricity at the end of each year (March 31st) are transferred to one additional year.

OVERVIEW

RENEWABLE ENERGY ATTRACTS MORE PRIVATE FINANCE

The last couple of years have been of high importance to the private financing of renewable energy projects in the MENA region, especially in mega photovoltaic (PV) projects. Typically, more mature markets and technologies are financed with private finance on commercial terms, whereas grants and concessional finance are often used to stimulate investment in previously untested countries. In the Middle East and Africa region, the total investments in renewable energy reached USD 7.7 billion in 2016, with over 90 percent from private sources.

Globally, private sources accounted for around 87 percent of total renewable energy finance between 2013 and 2016, averaging USD 223 billion annually between 2013 and 2014 and USD 270 billion annually between 2015 and 2016, peaking at almost USD 300 billion in 2015 according to figures published by the International Renewable Energy Agency (IRENA) in 2018.

Commercial financial institutions accounted for an average of 23 percent of the investment share between 2014 and 2016 (up from 14 percent in 2013), hitting a high of USD 69 billion in 2015.

More money was invested in solar power in 2017 than in coal, gas and nuclear power combined, according to a report for the United Nations Environment Programme (UNEP). The report said that global investment in solar rose 18 percent to USD 160.8 billion, driven by the Chinese market, which was responsible for more than half of the world's 98 gigawatts (GW) of new solar capacity. Solar power made up 57 percent of last year's total for all renewables (excluding large hydro) of USD 279.8 billion, and it towered above new investment in coal and gas generation capacity at an estimated USD 103 billion.

Investment reached a comparable milestone in 2015, when renewable power technologies for the first time attracted more finance than non-renewable power technologies – a trend that is expected to continue, according to Buchner et al. (2017).

In March 2018, Saudi Arabia and SoftBank Group Corporation signed a memorandum of understanding to build a USD 200 billion solar power development that is exponentially larger than any other project. At 200 GW, the SoftBank project planned for the Saudi desert would be about a hundred times larger than the next biggest

proposed development and more than double what the global photovoltaic industry supplied in 2017, according to data compiled by Bloomberg New Energy Finance (BNEF). If built, the development would almost triple Saudi Arabia's electricity generation capacity, which stood at 77 GW in 2016, according to BNEF data.

This was the latest in a number of announcements from Saudi Arabia promising to scale up its access to renewables. While the Kingdom has for years sought to get a foothold in clean energy, it was only in 2017 that the government moved forward with the first projects, collecting bids for a 300-megawatt plant in October.

SoftBank is also planning to invest as much as USD 25 billion in Saudi Arabia over the next three to four years. This will be a boost for the Vision 2030 campaign to diversify the Saudi economy away from oil. SoftBank is aiming to deploy as much as USD 15 billion in a new city called Neom, to be built on the Red Sea coast. The Japanese company's Vision Fund will also invest as much as USD 10 billion in state-controlled Saudi Electricity Company as part of efforts to diversify the utility into renewables and solar energy.

In February 2018, ACWA Power, the Saudi global leader in developing, constructing and operating power generation and desalination water plants in 11 countries won the first-ever utility scale renewable energy project in Saudi Arabia. ACWA Power had been selected as the most competitive compliant offer from submissions made by consortiums of eight local and international bidders.

Skaka plant, located at a site on Al Jouf spanning over six square kilometers, will generate 300 MW at an investment of USD 302 million. The 25-year Power Purchase Agreement (PPA) contract was awarded at a new world record tariff of US Cents 2.3417/kWh.

Paddy Padmanathan, president and CEO of ACWA Power, charted the vision of his company on the future of renewable energy in a piece he wrote for the AFED 2017 report: "The coming years will see a large-scale rollout of renewable power plants that will be supplying power around the clock using thermal and battery storage, making them base load plants." He noted that while finding financing for development projects was volatile over the past decade, the situation has changed dramatically, with local and international funding increasingly embracing



the Equator Principles as a benchmark for environmentally and socially responsible lending. Padmanathan said that more companies now comply with the World Bank and International Finance Corporation's Environmental and Social Performance Standards, adding: "This is pushing the region and the supply chain to meet common international standards for financing projects. In addition, in recent years these standards have been included as a minimum requirement in requests for proposals from national utilities. This gradual maturation of environmental and social performance is another notable change that is welcomed as it has win-win benefits for all parties and stakeholders."

In September 2017, the UAE announced the world's largest Concentrated Solar Power (CSP) plant, a milestone in the emirate's ambition to generate 75 percent of its energy needs from renewable sources by 2050. The target will be met by securing private investments and forging public-private partnerships (PPP). In March 2018, ACWA Power signed the Engineering, Procurement and Construction (EPC) agreement with the Chinese Shanghai Electric Generation Group (SEGC) for the execution of the 700 MW CSP plant. The project is the fourth phase of the Mohamed bin Rashid Solar Park, the largest thermo-solar power plant in the world. Under the terms of the contract, the new plant will deliver energy at 7.3 US cents per kilowatt-hour (kWh). The project will have the world's tallest solar tower, measuring 260 meters.

The price of 7.3 cents per kWh for the fourth phase of the solar complex comes in as more expensive on paper than phases 2 and 3 of the project, which delivered prices of 5.84 cents and 2.99 cents respectively using solar photovoltaic (PV) technology. However, the new CSP plant will have the significant advantage of being able to store energy for when the sun has gone down, something which needs extra storage batteries via PV technology.

In 2016, ACWA Power Extended Africa's Renewable Energy Capacity with a PV Facility in Morocco. The NOOR PV I Programme, signed during COP22 in Marrakech, consists of three projects: NOOR Ouarzazate IV with a capacity of around 70 MW, NOOR Laayoune, 80 MW and NOOR Boujdour of 20 MW. ACWA Power submitted the lowest tariff price for the project at 4.8 cents per kWh with a total installed capacity of 170 MW. In collaboration with the Chint Group, Sterling & Wilson and Shapoorji Pallonji, ACWA Power undertook the NOOR PV I Programme, launched by the Moroccan Agency for Sustainable Energy (Masen) under a 20-year build-own-operate-transfer (BOOT) scheme. Masen has entered into a power purchase agreement (PPA) to off-take the output generated electricity and will also act as a shareholder, in addition to sole lender. The NOOR Solar Program aims to deliver 2 gigawatts by 2020.

As part of the finance structure for the NOOR Laayoune and NOOR Boujdour projects, Masen has issued the first sovereign-guaranteed “green bond” in Morocco for the financing of a sustainable energy project. German bank Kreditanstalt für Wiederaufbau will fund the NOOR Ouarzazate IV project.

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Furthermore, in Lebanon the scheme was introduced in 2011. Unlike Jordan, which allows the consumer to sell the excess electricity remaining in his balance at the end of the calendar year, the Lebanese net metering does not allow the sale or transfer of any remaining electricity credits at the end of the year (LCEC, 2016).

G. Energy Funds and Fiscal Incentives

The success and effective implementation of RE and EE measures and initiatives depend on the availability of sustainable and adequate funding mechanisms, as mentioned earlier. Around nine countries in the Arab region have established RE funds, the status of which can be seen in Table 2.

Fiscal incentives are usually implemented to encourage investment in RE and EE by reducing the costs of the overall projects. It usually comes in the form of tax credits, tax reduction, tax exemption and other kinds of preferential treatment in taxation for products that are usually used in the value chain of RE and EE technologies.

Despite the fact that internationally many countries have offered fiscal incentives for RE and EE investments, few countries in the MENA region offer such incentives. Examples include the NEEREA in Lebanon and the Revolving Fund in Palestine, which have played important roles in the development of sustainable energy projects in both countries (RCREEE, 2014).

Other financial support includes fiscal incentives such as VAT and income tax exemptions, import duty concessions, and tax rebates on RE and EE equipment. Some of the countries, such as Jordan, exempt RE & EE equipment from all customs duties and sales taxes (MEMR, 2012).

As for EE, only five countries in the region offer tax incentives: Algeria, Egypt, Jordan, Palestine and Tunisia.

H. Energy Service Companies (ESCOs)

This mechanism is the most well defined third party financing for EE worldwide. It usually finances the EE projects without any up-front investment costs for the local authority, where

TABLE 2 STATUS OF ENERGY EFFICIENCY FUNDS

Country	EE fund	Source of Financing
Algeria	FNME with annual capital of €57 million	<ul style="list-style-type: none"> • Taxes on natural gas (AD 0.0015/btu) and electricity (AD 0.02/kWh) • Initial government contribution of AD 100 million (€1.15 million)
	EU fund of €40 million to support Algeria diversify its economy and improve business climate, €10 millions of which is earmarked for RE and EE projects	EU
Egypt	Green Environment Financing Facility (GEFF) with a €140 million investment	<ul style="list-style-type: none"> • European Bank for Reconstruction and Development (EBRD) • Agence Française de Développement (AFD) • European Investment Bank (EIB)
Jordan	Jordanian Renewable Energy and Energy Efficiency Fund (JREEEF) established by Law on Renewable Energy and Energy Efficiency (2012)	<ul style="list-style-type: none"> • Annual budget allocations • Return on investment from the • Fund's own investment
	Second Programmatic Energy and Water Sector Reforms DPL - USD250 Million loan for a policy program that aims to (i) improve the financial viability of the electricity and water sectors, and (ii) increase efficiency gains in the energy and water sectors	<ul style="list-style-type: none"> • World Bank
Lebanon	National Energy Efficiency and Renewable Energy Action (NEEREA)	<ul style="list-style-type: none"> • Central Bank of Lebanon (BDL) • 15 million EUR from an EU grant for RE projects (2011 - 2014)
	Lebanon Energy Efficiency Global Loan.	<ul style="list-style-type: none"> • European Commission
Morocco	Energy Development Fund (EDF) with a total capital of one billion USD	<ul style="list-style-type: none"> • USD 200 million from Hassan II fund • USD 300 million from UAE • USD 500 million from Saudi Arabia
Palestine	Revolving Fund for EE projects established in 2012	<ul style="list-style-type: none"> • Start-up capital from donor institutions • Funds saved through EE projects
Syria	Fund for residential solar water heaters	<ul style="list-style-type: none"> • Fund provided by the Ministry of Electricity
Tunisia	National Fund for Energy Management (FNME) established by Law 2005-82 (2005) and Law 2005- 106 (2005)	<ul style="list-style-type: none"> • Revenues from taxes on the first registration of cars and import or manufacturing of air conditioners, according to the Law No 2005- 2234 (2005) • Financial savings achieved as a result of EE activities • Private donations
UAE	Dubai Green Fund with AED 100 billion	Founding investors from Dubai, with additional investment from the private sector, international banks and large investment companies

Source: (AFEX, Arab Future Energy Index - Energy Efficiency, 2017)

the energy savings achieved during the project duration cover the initial investment costs and serve to generate profits. It is worth mentioning that they usually provide performance guarantees that can take different forms (JRC, 2010).

Although the ESCO market is still underdeveloped in most Arab countries, the UAE is leading in the region. With the establishment of the Etihad Super ESCO, Dubai targets 1.7 TWh of electricity savings in more than 30,000 buildings and 1 million tons of CO₂ emissions avoided annually by 2030 (Econoler, 2016). (See Chapter 3 paragraph III).

IV. CHALLENGES AND BARRIERS

Sustainable energy in the region still faces various barriers hindering the development of an investment friendly climate that would catalyze the growth of the sustainable energy market. These barriers include:

A. Strategies, Policies, and Regulations

Although most countries in the region have adopted long- and short-term RE & EE strategies, the targets under these strategies are still not legally binding. Furthermore, various strategies lack comprehensive or clear mechanisms to achieve these targets and the measures and initiatives proposed are not always supported or enforced by laws and by-laws. In the eyes of investors, this fact indicates a low degree of commitment from governments to drive and expand their sustainable energy markets, and is hence an investment risk.

B. Funding and Fiscal Incentives

Lack of access to sustainable, reliable and dedicated RE & EE financing sources is considered a major barrier to stimulating the sustainable energy market in the region as well as implementing the various measures and programs proposed under actions plans and strategies. This is mainly due to the high investment risks in the region on the one hand, and the lack of experience in green financing in local banks, not yet familiar with financing EE and RE projects, on the other hand. Even if local banks showed more understanding and willingness to invest, companies have failed to present profitable projects.

C. Energy Market Governance and Institutional Capacity

The existence of effective and dedicated RE & EE governing bodies is essential to successfully developing sustainable energy markets and attracting private investments. Regulatory bodies must have well defined and clear responsibilities to enforce and implement policies, regulation, initiatives and programs. Many Arab countries still lack dedicated EE & RE agencies and sustainable energy units within different ministries as well as cooperation between existing ministries and agencies. Further, most energy markets in the region still witness a high degree of state ownership, monopoly, and vertical integration.

D. Energy Market Risks

Various economic, social, political and environmental risks in the region have rendered sustainable energy projects unprofitable, thus reducing private investments in the market. These risks include the absence of a regulatory body and a transparent mechanism for the sale of electricity and the auctioning process. Low country and electricity off-taker credit ratings reduce the reliability of the electricity buyer. The political instability, economic turmoil, and fluctuating currency faced by multiple Arab countries have diminished opportunities to attract foreign investors. Finally, the unreliability of the electricity grid has created a technical challenge to connect RE projects to a country's transmission and distribution lines.

E. Energy Subsidies

The energy market in the region remains one of the most subsidized globally, reaching USD 92 billion in 2015, which is equivalent to 28 percent of world energy subsidies (IMF, 2015). These subsidies have resulted in having energy prices that do not reflect the true price of production. Although the region recently underwent an unprecedented wave of energy subsidy reforms mainly driven by the drop of oil prices in 2014, energy prices remain well below the world average in most of the region. These extremely low prices render energy production from fossil fuels more attractive and hence have reduced incentives to invest in RE&EE technologies and measures that tend to have high capital costs.



V. CONCLUSION AND RECOMMENDATIONS

It is vital for Arab countries to improve and increase their institutional capacity in order to push for the implementation of policies and improve the monitoring and evaluation process. Further, to decrease the lack of suitable funding for their sustainable energy projects, governments should set stricter regulatory frameworks to avoid technical and regulatory difficulties occurring through the otherwise favorable opening of the markets. In order to put improved laws and legislative regulatory frameworks into action, innovative “implementation accelerators” need to be created. These include operational tools or mechanisms similar to the Green Financing Facility in Egypt, Lebanon, and Morocco for SMEs RE projects, as well as the GCF’s Framework Program for Egypt. Consequently, unlocking finances requires developing the knowledge and skills to design projects that blend different financing sources and financial instruments.

Furthermore, it is necessary for countries to mainstream sustainable energy actions and finance into the different sectors’ strategies and action plans, in order to build and mobilize the required capacities and financial sources on the international as well as the domestic level. In 2017, USD 10.1 billion was invested in the Middle East and Africa, which constituted as little as 3.6 percent of global investments.

Despite the fact that the Arab countries have similar geographic and climatic conditions and are to a certain extent similarly affected by the impacts of climate change, some of them have successfully managed to access climate funds whereas other countries still have difficulty attracting such funds. Cooperation between countries that have better technical and financial infrastructures and governance frameworks – such as Morocco and Egypt – can initiate and improve regional cooperation by organizing knowledge exchange missions and capacity building activities.

Moreover, it is imperative for the Arab region to implement extensive reform to their energy

subsidy systems and to render energy prices more reflective of the true price of supply. Nonetheless, as the aim of energy subsidies is to improve the welfare of low-income communities, reforms must be effectively implemented by establishing social safety nets in order to minimize any negative impacts on these communities. Increasing energy prices, as well as implementing well targeted and effective awareness campaigns on the benefits of RE & EE, would help customers reduce their energy bills and support the government to reduce its spending on expanding electricity capacity.

Furthermore, governments must establish policies to promote and catalyze the use of RET and assure their integration to the national energy market such as guaranteed access to the country's national grid and priority dispatch of

electricity originating from RE sources. As there are still many Arabs with no or low access to the grid, governments must promote the use of decentralized RET to ensure the quality of living and economic development for this part of the population.

Finally, providing additional funding and support for universities and research centers is necessary to develop the region's local technical expertise and to establish a local market for the manufacturing and development of RE & EE. Governments should introduce fiscal incentives to reduce the price of investing in sustainable energy, which is important for establishing a net metering mechanism for Arab countries that have significantly low electricity tariffs which make it unprofitable to invest in RE.

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NOTES

1. Depending on the type of scheme and technology, some of these fixed rates are revised during the programs, but always according to pre-defined price levels and not according to market fluctuations (except with the FOREX rate fluctuations)
2. A prosumer is a person who consumes and produces a product at the same time