

ARAB RENEWABLE ENERGY INDEX: INVESTIGATING THE INVESTMENT CLIMATE FOR RENEWABLE ENERGY IN THE ARAB REGION

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The paper presents results of the assessment of current conditions for development of renewable energy (RE) and progress to date in the Arab region. The study has been conducted in the framework of a new analytical benchmark tool developed by the Regional Center for Renewable Energy and Energy Efficiency (RCREEE) – the Arab Future Energy Index⁴ – which has two components: renewable energy and energy efficiency. The renewable energy component of the index assesses and ranks countries according to four major categories: (1) power sector structure with a special focus on difficulties of accessing the electricity market by the private sector in the Arab countries, including grid access-related issues; (2) institutional and regulatory barriers to large-scale deployment of RE projects, including the long-standing practice of subsidizing energy products; (3) the attractiveness of incentive schemes; and (4) level of financial risk in deployment of large-scale RE projects.

RCREEE is an independent regional intergovernmental organization that aims to increase the share of renewables in the Arab region. RCREEE's membership includes 13 countries: Algeria, Bahrain, Egypt, Iraq, Jordan, Lebanon, Libya, Morocco, Palestine, Sudan, Syria, Tunisia, and Yemen.

FIGURE 1: RCREEE MEMBER STATES



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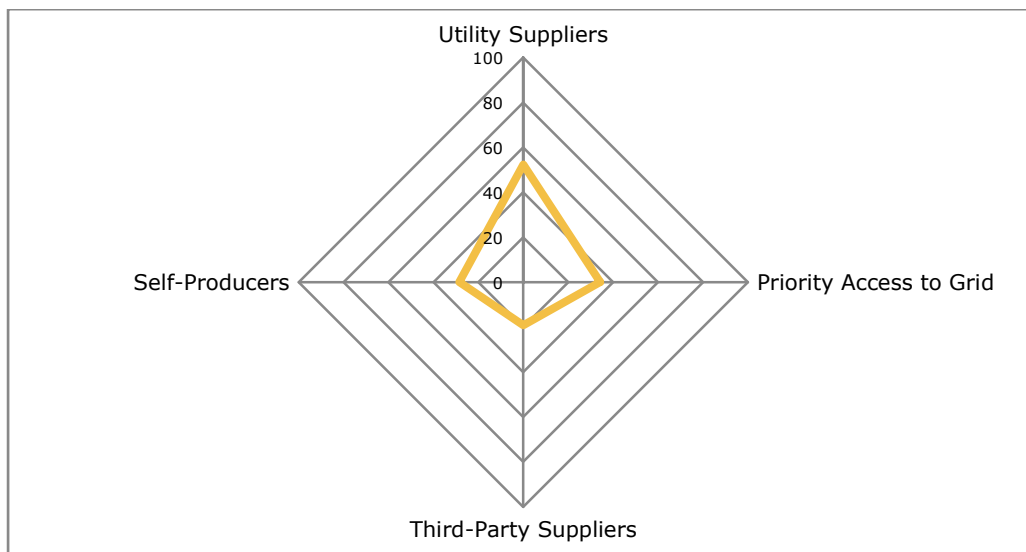
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⁴ Full report of the Arab Future Energy Index 2013 is available at <http://www.rcreee.org>

Market Structure:

Openness of the electricity market for private power generation is one of the key pre-conditions for enabling private investments in RE. Many countries in the world have authorized entry of independent private producers (IPPs) to their electricity markets in order to mobilize private investment. The aim is to support meeting rapidly growing electricity demand and to improve both efficiency and quality of service. Although reform of the power sector has been initiated in almost all countries in the Arab region, the overall electricity market still remains state-dominated with little participation from the private sector. The Arab Future Energy Index assesses three forms of private participation in power generation – utility suppliers, self-producers and third-party suppliers. The aggregate results for the RCREEE member states are scored on a 100-point scale. As illustrated in Figure 2, of the three types of power generation, the utility supplier option appears to be relatively more developed.

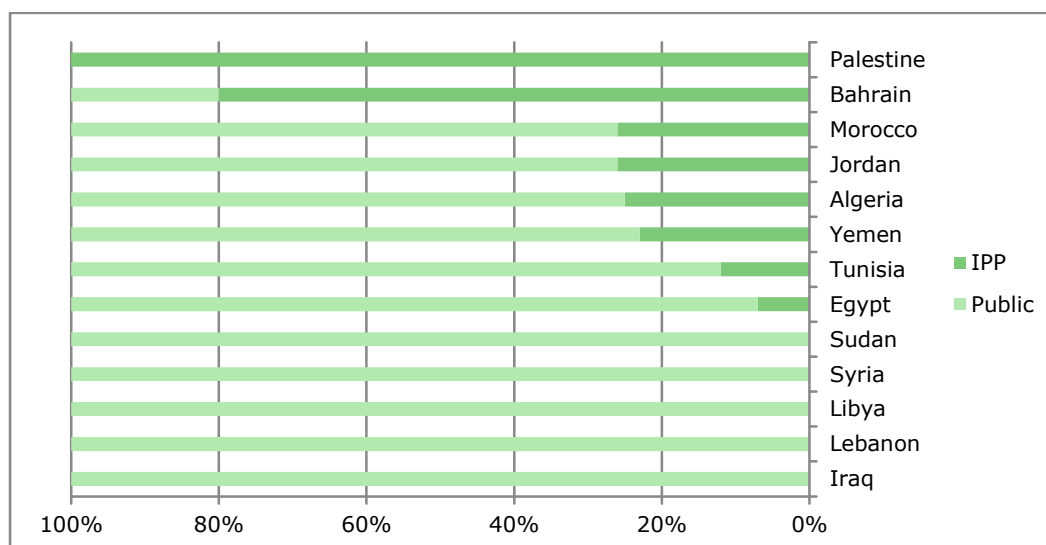
FIGURE 2: PARTICIPATION OF INDEPENDENT POWER PRODUCERS IN THE POWER SECTOR



Source: RCREEE

Figure 3 shows the most liberalized electricity market in the region exists in Bahrain, where 80% of its electricity is produced by IPPs. Although the figure indicates that Palestine supplies 100% of its electricity by IPPs, this refers only to the local portion of its electricity supply, which amounts to 7% of domestic consumption. The remainder is imported from Israel and Jordan. Although legislation authorizing private power generation exists in Sudan, Syria and Iraq, currently no IPPs in these countries exist in practice.

FIGURE 3: SHARE OF INSTALLED CAPACITIES BY IPPS AND PUBLIC UTILITIES



Source: RCREEE

Among eight countries with an IPP presence, only one country, Morocco, has IPPs producing RE; the rest are active in conventional supply sources. In Egypt, the first private 250 MW wind project in the Gulf of Suez is currently under a public competitive bidding process. Third-party supply of electricity is the least available option, which indicates that private developers are still limited in their ability to provide business-to-business energy services. This option appears to be formally authorized in four countries, but so far exists only on paper.

Guaranteed access to the grid is crucial for the viability of RE projects. Since RE electricity technologies rely on natural sources, the electricity generation is prone to fluctuation. The lack of dispatchability of RE introduces technical challenges for balancing the electrical grid. This has to be considered particularly for wind and PV technologies, as currently few storage options are available that can be complemented with wind and PV power plants. As all RE technologies are still in an early stage of market penetration worldwide, priority dispatch and grid access are important to increasing competitiveness of RE sources and for guaranteeing transmission and distribution of RE electricity at time of production. Currently only two countries in the region – Jordan and Algeria – provide a statutory guarantee of priority access for RE to the grid, which is an important building block for successful private participation.

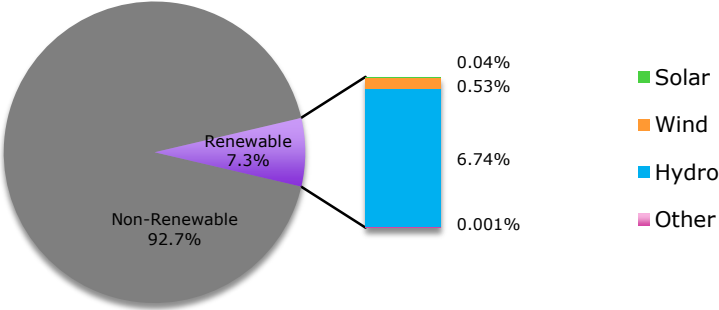
Policy Framework:

The policy framework category reports on practices that both support and impede the development of renewables. Creating a secure investment environment is a fundamental precondition for any private investment occur, especially when the market is still immature. This requires demonstrating clear political commitment for pursuit of RE through announcing ambitious and credible targets, setting up a predictable and transparent regulatory framework, streamlining administrative procedures, integrating RE strategies into an overall energy strategy

and mobilizing funds for deployment of demonstration projects. Almost all countries have shown commitment to RE by adopting long-term technology-specific targets. However, efforts and progress of these countries in meeting their targets vary greatly.

The current share of RE remains relatively low within the region. The energy generation mix of the countries has not changed substantially over the last five years. Countries continue to generate power predominantly from fossil fuel sources. The RCREEE countries, in aggregate, generate about 7.3% of their electricity from renewable sources. Figure 4 breaks down the generation sources: hydro dominates with 6.74%, followed by wind at 0.53%, solar at 0.01%, and all others at 0.001%. Hydro is a mature industry, with most generation having been built several decades ago. It is not generally being looked to for appreciable amounts of new generation, while the others have significant growth targets attached.

FIGURE 4: RE SOURCES AS SHARE OF ALL ELECTRICITY GENERATION FOR RCREEE MEMBERS (2012)



Source: RCREEE

Table 1 below provides an overview of each country’s renewable mix (excluding hydro) in terms of both volume of installed capacity. The leader for each type is highlighted. This makes clear the dominant generation position of Egypt in wind and PV, with Algeria leading in CSP. In percentage terms, however, the leader is Morocco.

TABLE 1: SHARE OF RENEWABLE ENERGY IN THE RCREEE MEMBER STATES (2012)

	Wind		PV		CSP		Other RE		Total RE	
	MW	%	MW	%	MW	%	MW	%	MW	%
Algeria	0	0.00	0	0.00	25	0.22	0	0.00	25	0.22
Bahrain	0.5	0.01	0	0.00	0	0.00	0	0.00	0.5	0.01
Egypt	550	1.77	15	0.05	20	0.06	0	0.00	585	1.88
Iraq	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
Jordan	1.45	0.05	1.6	0.05	0	0.00	3.5 ⁵		6.55	0.10
Lebanon	0.5	0.02	0.6	0.03	0	0.00	0	0.00	1.1	0.05

⁵ Biogas

Libya	0	0.00	5	0.06	0	0.00	0	0.00	5	0.06
Morocco	290	4.50	15	0.23	20	0.31	3,000 m ³⁶		325	5.08
Palestine	0	0.00	1.5	1.06	0	0.00	0.023 ⁷	0.02	1.523	1.06
Sudan	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
Syria	0.15	0.00	2	0.02	0	0.00	0	0.00	2.15	0.02
Tunisia	154	3.81	4	0.10	0	0.00	0	0.00	158	3.91
Yemen	0	0.00	1.5	0.10	0	0.00	0	0.00	1.5	0.10

Source: RCREEE

Currently there are more than 15 large-scale projects under construction with total capacity exceeding 1,550 MW, which is more than double the current installed capacity in the region. However, more than half of these projects are happening in just one country – Morocco. Eight of the 13 countries do not have any renewable energy projects currently under construction. This means that in upcoming years, most likely no additional generation of renewable energy can be expected from these countries, aside from small-scale PV projects.

In the region, competitive bidding for power purchase agreements has become a most favored approach to RE development. Seven of the 13 countries have identified resources for private development through a public competitive bidding process. Two countries – Morocco and Egypt – have even set targets for the total installed capacity of renewable energy to be developed through this approach. Morocco plans to develop 1,000 MW of wind power and 1,000 MW of solar using this approach. It has already made substantial progress in meeting the wind energy target and is underway with developing solar. Egypt has officially approved a policy on public competitive bidding on 26 July 2009 by the decision of the Supreme Council of Energy. According to this decision, Egypt plans to install 2,500 MW of wind generation through their public competitive bidding process. The tenders are planned to be issued in blocks of 250 MW. The first private large-scale wind project of 250 MW is currently in the tendering process. However, in contrast to Morocco, the process of public competitive bidding in Egypt has been lengthy. The pre-qualification documents for the first wind project were issued in 2009 and until today the winning bidder has not been announced.

Feed-in tariffs have been adopted by only three countries – Jordan, Palestine and Syria. However, since these feed-in tariffs were only introduced in 2012, not many projects have been deployed yet. In Syria particularly, with the ongoing conflict, almost all activities related to RE development have stopped.

Almost half of the countries have adopted a net metering policy. In Egypt and Lebanon excess electricity is fed to the grid and deducted from the bill for the following month. In Jordan, Palestine, Syria and Tunisia the excess electricity is purchased at preferential prices. It is important to note that net metering is more effective as an incentive mechanism for RE in

⁶ Biomass

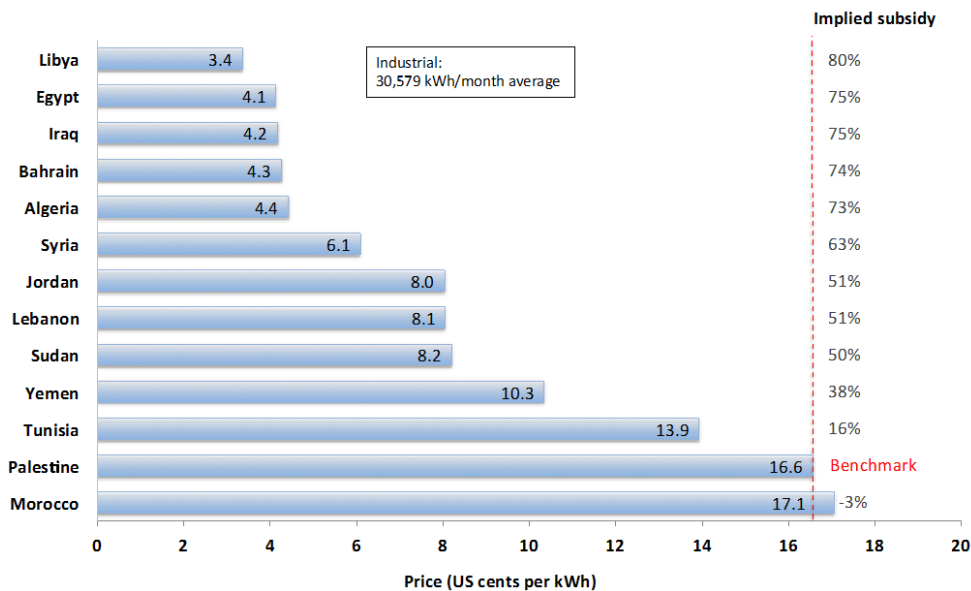
⁷ Geothermal

markets with unsubsidized electricity prices. In countries with low electricity prices, net metering has a small effect as an incentive mechanism due to the wide gap between investment cost and potential for electricity savings.

Energy subsidies are high in the Arab region for both oil exporting and importing nations. Subsidies on average constitute more than 20% of governments’ expenditures (ESMAP, 2009). In Egypt for example, energy subsidies accounted for 21% of the 2010 fiscal year budget and 73% of total subsidies (Castel, 2012). All countries in the region subsidize fossil fuel products, and most subsidize electricity (ESMAP, 2009; RCREEE, 2010). Fossil fuel consumers worldwide continue to receive much higher subsidies than RE industry. According to IEA Chief Economist Faith Birol, global fossil fuel subsidies in 2011 amounted to USD 523 billion, five times higher than subsidies for renewables of USD 110 billion (EWEA, 2013). Considering that almost 50% of global fossil fuel subsidies take place in the Middle East and North Africa, and that the RE industry in this region receives very little support from governments, this subsidy difference is much higher in the region (IMF, 2013).

To illustrate the approximate magnitude of energy subsidies, RCREEE has compared average retail industrial electricity prices against the one country in the region that has unsubsidized energy prices – Palestine. Palestine has very little power generation capacity and imports substantially all of its electricity. Electricity prices in Palestine are close to international prices and represent the approximate true retail cost. The results for all countries in Figure 5 show industrial electricity prices for 2011, and the implied subsidies in relation to Palestine’s benchmark prices.

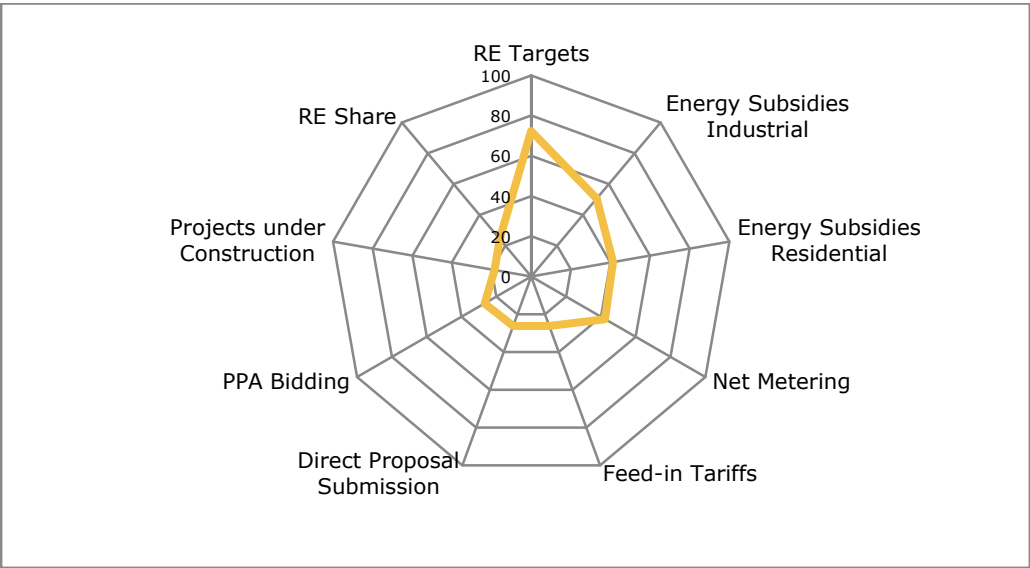
FIGURE 5: INDUSTRIAL ELECTRICITY PRICES AND SUBSIDIES BENCHMARKED TO PALESTINE (2011)



Source: RCREEE, based on data from Arab Union of Electricity (2011)

Figure 6 presents a summary of policy framework for RE in the Arab region. Overall the average performance of the region is poor at creating an attractive policy framework for RE. Although all countries in the region have adopted long-term RE targets, the supporting policies in most countries are still absent or ineffective. Most countries continue to subsidize electricity generation from fossil fuels, keeping alive the fossil-dependent energy systems. Only Morocco can be highlighted as a country that has demonstrated progress and commitment towards RE. In the region it generates the largest share of electricity from renewables and has the greatest number of renewable projects under construction. Morocco pursues a market-driven approach to its energy development by keeping its prices almost unsubsidized. This creates a competitive marketplace for RE, without entailing a heavy burden on the government budget. The combined effect of these efforts has attracted more investments to Morocco than other countries in the region.

FIGURE 6: POLICY LANDSCAPE FOR RENEWABLE ENERGY



Source: RCREEE

Institutional Capacity:

Institutional setup requires both organization and implementation. This means that institutions need to be organized to effectively support the goals of the state, and also that the processes must align with the goals to deliver adequate results. The institutional capacity category assesses the capacity of states to design RE policies and provide institutional support to deployment of renewables. Strong institutional capacity is critical to ensure meeting RE targets.

Stable, reliable and transparent management of the power sector plays an important role in ensuring investor confidence and trust. This requires establishment of a well-functioning independent regulator with sufficient competencies in key areas such as tariff-setting, license issuance, power sector monitoring and sanctioning (Bjork et al, 2011; Dii, 2013). Despite the fact

that IPPs are authorized in most countries and already exist in half of them, only a few countries have established independent regulatory authorities. Currently independent regulators exist in five countries: Algeria, Egypt, Jordan, Palestine and Sudan. However, the level of independence of these regulators from state authorities and political processes leaves room for improvement. Regulatory authorities in these countries often do not have clearly defined power and are not entirely independent. For example, in Algeria the Ministry of Energy can decide to overrule the regulator and subsidize projects (Dii, 2013). In countries where independent regulators do not exist, the functions are usually performed by national utility operators or transmission systems operators.

Almost half of the countries have established dedicated agencies to promote RE; however these institutions vary greatly in their technical and human capacities. Some countries such as Morocco have established more than one agency to promote renewables.

TABLE 2: DESIGNATED RENEWABLE ENERGY AGENCIES IN THE RCREEE MEMBER STATES

Country	Designated agency to promote renewable energies
Algeria	Compagnie d'Engineering de l'Electricité et du Gaz (CEEG), filiale du Groupe Sonelgaz Sharikat Kahraba Takate Moutajadida «SKTM», filiale du Groupe Sonelgaz
Bahrain	Non existent
Egypt	New Renewable Energy Authority (NREA)
Iraq	Non existent
Jordan	Non existent
Lebanon	Lebanese Center for Energy Conservation (LCEC)
Libya	Renewable Energy Authority of Libya (REAoL)
Morocco	Moroccan Agency for Solar Energy (MASEN) Agency for the Development of Renewable Energy and Energy Efficiency (ADEREE) Société d'Investissements Energetiques (SIE)
Palestine	Palestinian Energy and Environment Research Centre (PEC)
Sudan	Non existent
Syria	National Energy Research Center (NERC)
Tunisia	Agence Nationale pour la Maîtrise de l'Energie (ANME)
Yemen	Non existent

Source: RCREEE

Aside from technical factors directly relating to RE, there are many other factors that can present a serious risk to investors and can influence their decisions. These factors include political stability, security of investment and risk of expropriation, regulatory environment, competitive landscape, war and civil disturbance. Table 3 provides results of assessment of two global initiatives: World Bank's ease of doing business index and the Bertelsmann Stiftung's Transformation Index (BTI). On their own, the rankings or scores under these two indices provide an incomplete view of the state of Arab institutions. However, due to the complexity and effort of conducting this type of research, for the time being these sources must be relied upon for guidance.

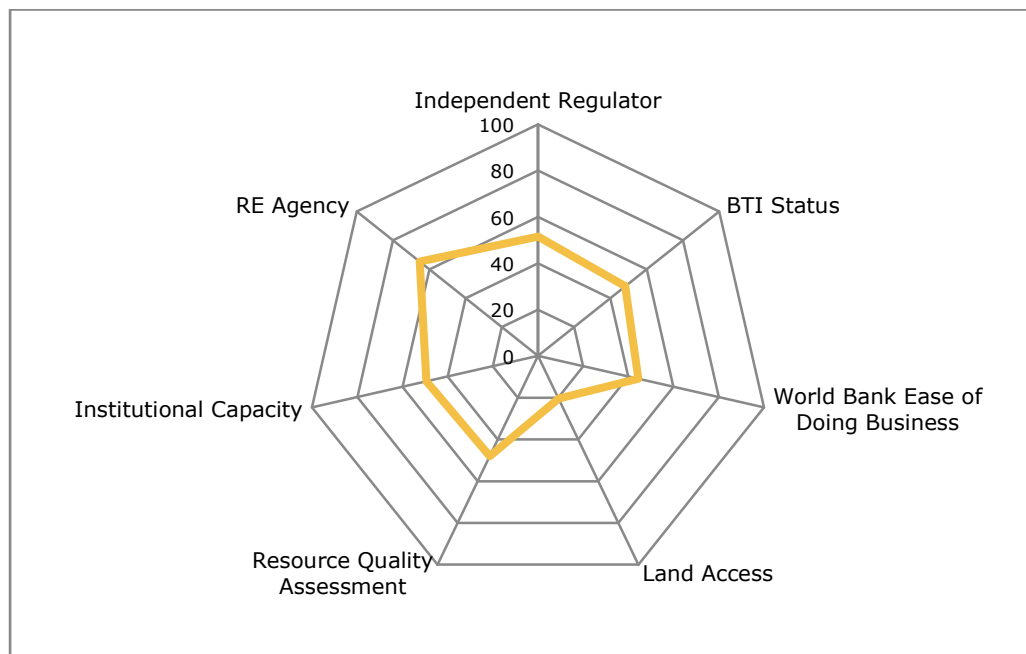
TABLE 3: WORLD BANK EASE OF DOING AND BTI STATUS INDICES

World Bank Ease of Doing Business Index		BTI Status Index	
38	Bahrain	Lebanon	6.2
46	Tunisia	Bahrain	5.9
94	Morocco	Jordan	5.0
96	Jordan	Tunisia	5.0
99	Yemen	Algeria	4.8
104	Lebanon	Egypt	4.8
110	Egypt	Morocco	4.5
131	Palestine	Libya	4.5
135	Sudan	Iraq	4.2
134	Syria	Syria	3.9
148	Algeria	Yemen	3.9
164	Iraq	Sudan	3.3
-	Libya	Palestine	-

Source: World Bank, 2012; Bertelsmann Stiftung, 2012

Figure 7 presents a summary of RE institutional capacity of the Arab countries. Those countries that have established independent regulators and designated agencies for RE have taken an important step towards building a strong institutional base. However, this is only a beginning and major focus should be placed upon these institutions streamlining administrative procedures, eliminating institutional barriers and assisting in deployment of RE projects. Currently this has not occurred in most Arab countries. Existing RE institutions have been primarily focusing on leading public and demonstration RE projects.

FIGURE 7: INSTITUTIONAL CAPACITY OF THE RCREEE MEMBER STATES



Source: RCREEE

Finance and Investment:

Unlike fossil fuel-based power generation plants, RE projects require intensive upfront capital investments. This is one of the biggest challenges to developers, especially in developing countries. With higher political, regulatory and macroeconomic risks, investors also require higher premiums on their investments. In these circumstances, to make an RE project viable it is essential that governments mitigate investment risks by providing support in accessing financing and creating a secure investment environment. In the region, many countries have established, or are in the process of establishing, RE funds to administer various subsidy schemes for RE projects. RE funds *per se* do not ensure financing of RE projects, however, they are helpful in mobilizing all existing funds and streamlining financing activities.

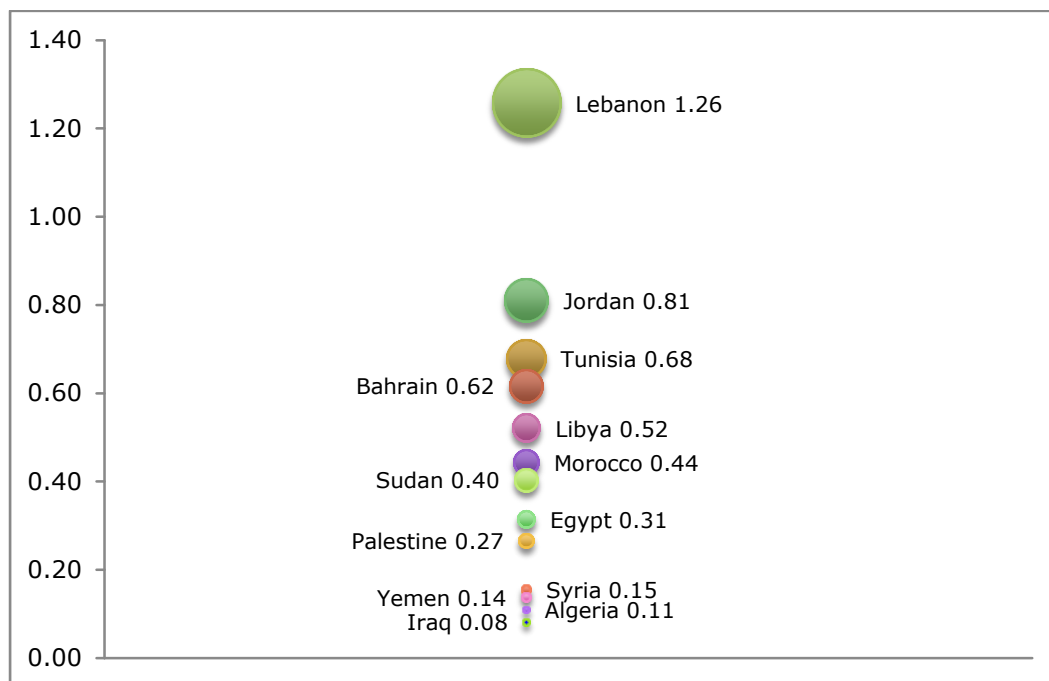
TABLE 4: RENEWABLE ENERGY FUNDS IN THE RCREEE MEMBER STATES

Country	Renewable energy funds
Algeria	National Fund for Renewable Energy and Cogeneration established by executive decree No. 11-423 in December 2011
Bahrain	None
Egypt	Renewable Energy Fund established by Cabinet in 2012
Iraq	None
Jordan	Jordanian Renewable Energy and Energy Efficiency Fund (JREEEF)
Lebanon	National Energy Efficiency and Renewable Energy Action (NEEREA) established by Central Bank of Lebanon in 2010
Libya	None
Morocco	Energy Development Fund (EDF) with a total capital of one billion USD
Palestine	None
Sudan	None
Syria	None
Tunisia	National Fund for Energy Management (FNME) established by Law 2005-82 (2005) and Law 2005- 106 (2005)
Yemen	None

Source: RCREEE

Figure 8 illustrates the inflow of foreign direct investment (FDI) in the form of the ratio of inward FDI stock to nominal and real GDP. Larger values indicate a stronger flow of foreign investment into countries in relation to domestic GDP. This provides some insight into the investment climate on a macro scale. A ratio of greater than 1 is possible and exists for Lebanon, since FDI measures investment and GDP reflects value added to an economy.

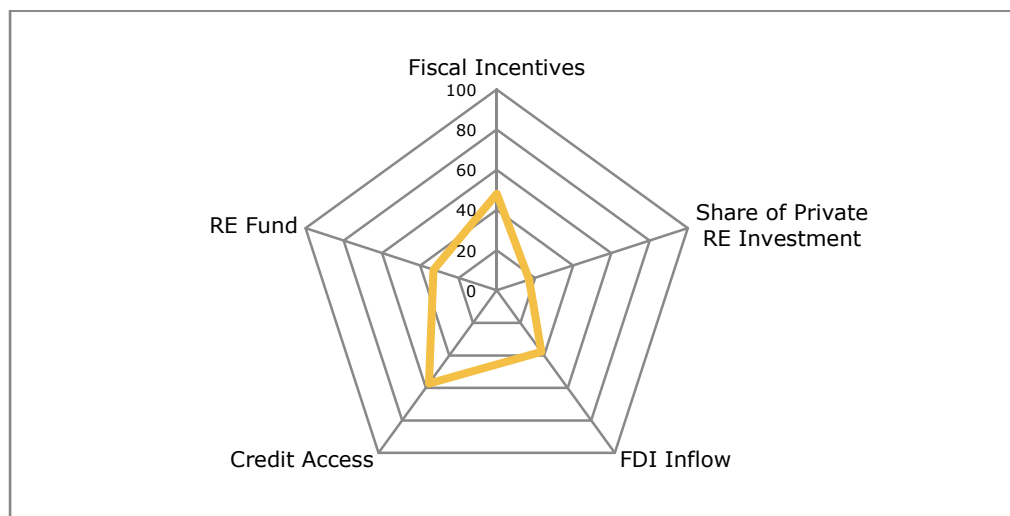
FIGURE 8: RATIO OF INWARD FDI STOCK TO GDP



Source: UNCTAD, 2011

Figure 9 provides summary of finance and investment situation in the Arab region. Again, the region overall performs poorly in the finance and investment section, especially in the field of private investment in RE. To this day, among 13 countries, only Morocco has been able to attract private investment in renewables. RE projects in other countries have been built by public authorities, mostly with the support of donor institutions. This indicates that overall the Arab region still has not created an attractive environment for private investment.

FIGURE 9: FINANCE AND INVESTMENT



Source: RCREEE

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