Arab Future™ Energy Index

AFEX 2015

Renewable Energy

RCREEE

Regional Center for Renewable Energy and Energy Efficiency

المركز الإقليمي للطاقة المتجددة وكفاءة الطاقة

About RCREEE

The Regional Center for Renewable Energy and Energy Efficiency (RCREEE) is an independent not-for-profit regional organization that aims to enable and increase the adoption of renewable energy and energy efficiency practices in the Arab region. RCREEE teams with regional governments and global organizations to initiate and lead clean energy policy dialogues, strategies, technologies and capacity development in order to increase Arab states' share of tomorrow's energy.

Through its solid alliance with the League of Arab States, RCREEE is committed to tackle each country's specific needs and objectives through collaborating with Arab policy makers, businesses, international organizations and academic communities in key work areas: capacity development and learning, policies and regulations, research and statistics, and technical assistance. The center is also involved in various local and regional projects and initiatives that are tailored to specific objectives.

Having today 16 Arab countries among its members, RCREEE strives to lead renewable energy and energy efficiency initiatives and expertise in all Arab states based on five core strategic impact areas: facts and figures, policies, people, institutions, and finance.

RCREEE is financed through its member state contributions, government grants provided by Germany through the German Development Cooperation (GIZ) GmbH, Denmark through the Danish International Development Agency (DANIDA), and Egypt through the New and Renewable Energy Authority (NREA). RCREEE is also financed through selected fee-for-service contracts.

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Foreword

HOW DO WE MEASURE THE PROGRESS OF OUR MEMBER STATES TOWARDS ENABLING RENEWABLE ENERGY AND ENERGY EFFICIENCY PRACTICES? HOW DO WE GUIDE OUR INTERVENTION STRATEGY IN SUPPORT OF OUR MEMBER STATES IN IMPLEMENTING THESE PRACTICES?

These were the questions that my colleagues and I in the Center got busy with when I first joined RCREEE in summer of 2012. Naturally there were opinions and views inside RCREEE expert team on the leading and lagging countries in the Arab region when it came to sustainable energy practices. However, the reading of the landscape was mostly based on anecdotal views from experts' interactions with the member states, and at best limited to a set of facts and indicators.

This dynamic motivated us to develop a product that can provide fact-based and consistent analysis of the progress made by our member states and to quantify it through an indexing and ranking exercise.

Late 2012, and once the analytical framework was in place, we entertained a worry about our governmental stakeholders receptiveness to a ranking exercise. However, with the issuance of AFEX first report in 2013, we were positively surprised with the feedback from our governmental stakeholders including those that ranked in the lower quartile. Our worry turned out to be ill-founded. The overall feedback from our stakeholders pointed to two values. Many found value in having a simple, yet comprehensive picture of their countries' progress for internal and external communication and planning purposes. In other cases, our stakeholders at the country level found value in the results to motivate internal change processes. Furthermore, the response to our first edition from the practitioners and development community was overwhelmingly positive. This made us determined to continue with the exercise and enable a periodical issuance of AFEX reports.

With this background, it gives me great pleasure to introduce to you the second edition of AFEX Renewable Energy and Energy Efficiency reports. Despite the many political and security challenges our region as a whole experienced last year, a high level reading of the results points to noteworthy progress across the region. In one aspect, we witnessed serious efforts among energy dependent countries (such as Jordan, Egypt, Tunisia and Morocco) toward gradual removal of energy subsidies, where we started to see feasible payback markets for renewable energy and energy efficiency investments. In energy independent countries, we started to see more use of regulatory instruments to enforce mandatory energy performance standards and some phase out policies of inefficient products/devices in selected end-use markets. Overall the changes are encouraging, but much more can and needs to be done. One area that urgently needs attention is strengthening of the institutional capacity for enforcement and implementation of renewable energy and energy efficiency measures. This weakness is prevalent across the region with the exception of a couple of countries.

For this edition of AFEX, we have been privileged with the partnership and kind support of UNDP's Arab Climate Resilience Initiative as well as the World Bank Group. Both programs enabled us to increase our research capacity to extend the coverage in this edition of AFEX 2015 to more sectors and more countries. I take the opportunity to acknowledge their kind support and to thank all those who contributed to this work including RCREEE staff and experts, our corresponding focal points in the member states, our reviewers, and external contributors. In whatever capacity you might be reading this, I sincerely hope you find it useful and we welcome your feedback.

Tareq Emtairah

Executive Director, RCREEE

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About AFEX

The Arab Future Energy Index (AFEX) is the first native Arab index dedicated to monitoring and analyzing sustainable energy competitiveness in the Arab region. AFEX offers both quantitative and qualitative analysis for key renewable energy and energy efficiency market dimensions. Countries are ranked under 30 indicators that illustrate key energy market aspects including policies, institutional capacities, strategies, and investments. AFEX data is collected through both international and local resources to guarantee accuracy and transparency.

AFEX is published periodically and consists of two components: AFEX Renewable Energy and AFEX Energy Efficiency. This year, AFEX Energy Efficiency ranks 17 Arab states and provides tailored recommendations for countries to help improve their sustainable energy development.

Countries of assessment include: Algeria, Bahrain, Egypt, Iraq, Jordan, Kuwait, Lebanon, Libya, Morocco, Palestine, Qatar, Saudi Arabia, Sudan, Syria, Tunisia, UAE and Yemen.

AFEX is a product of the Regional Center for Renewable Energy and Energy Efficiency (RCREEE), an independent not-for-profit regional organization that aims to enable and increase the adoption of renewable energy and energy efficiency practices in the Arab region.

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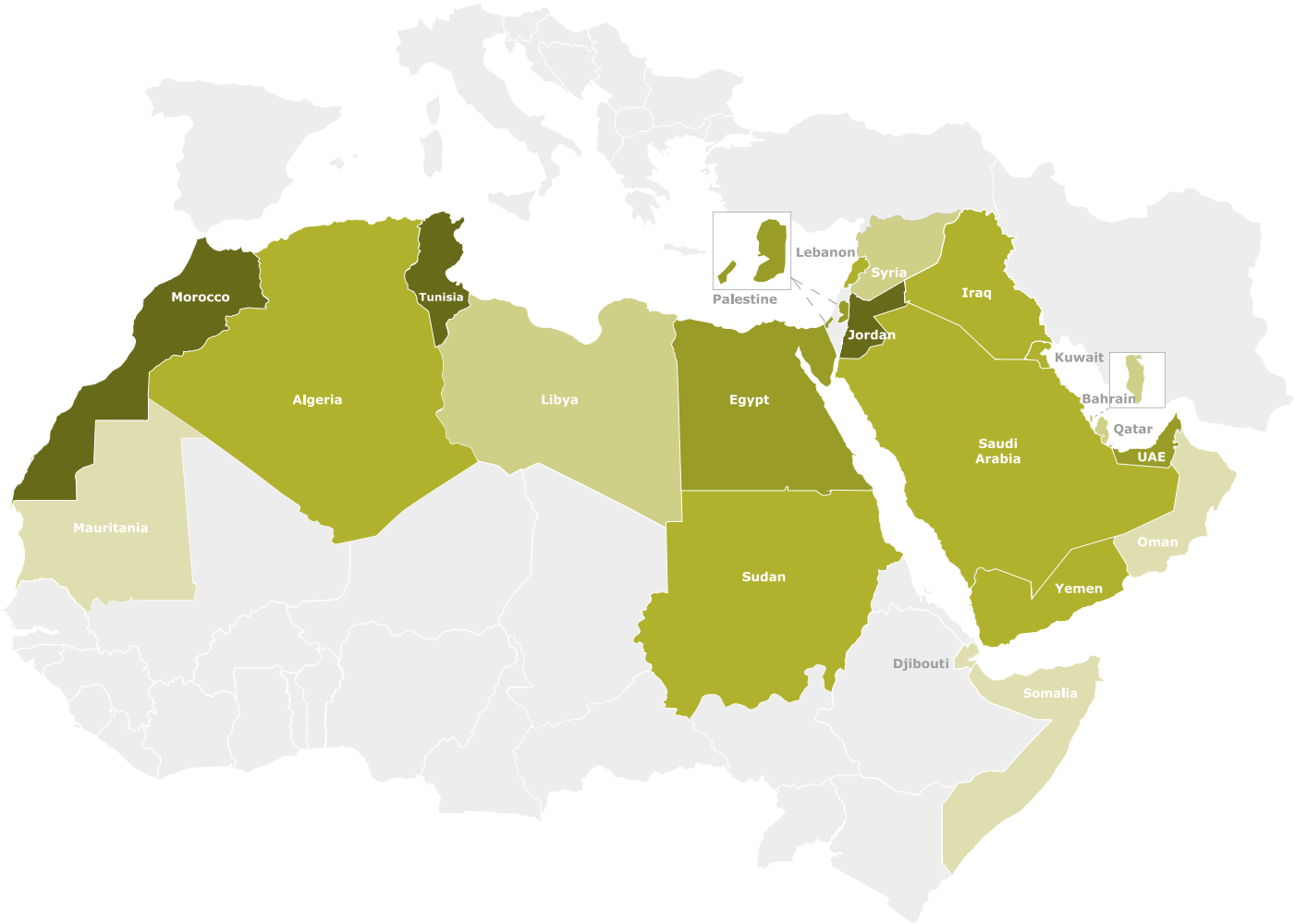
Arab Future™ Energy Index

AFEX 2015

Renewable Energy



Green colors indicate overall ranks

- 80-100
- 60-80
- 40-60
- 20-40
- 0-20
- Other Arab states
- Rest of the world

Key Findings

Regional

A shift to renewable energy sources is finally gaining momentum in the Arab Region. Since the first edition of AFEX Renewable Energy in 2013, many countries in the region have made great progress towards creating better conditions for the uptake of renewable energy investments. Two countries, Algeria and Egypt, adopted feed-in tariff schemes to promote renewables. Jordan finalized the first round of its direct proposal submission scheme, and signed 14 power purchase agreements for the development of utility-scale renewable energy projects. Morocco and UAE advanced their IPP public competitive bidding processes and awarded contracts for the development of large-scale solar projects.

Tunisia and Jordan moved forward with the implementation of net metering schemes and collectively installed around 30 MW of small-scale distributed renewable energy systems. Three countries, Egypt, Jordan and Tunisia implemented energy subsidy reforms in the electricity sector. Lebanon successfully leveraged private funds for the development of small-scale renewable energy projects through its innovative national financial mechanism. Iraq established a Renewable Energy and Energy Efficiency Department within its Ministry of Electricity.

The installed capacity of renewable energy increased in at least ten countries. In total, there are more than 2,500 MW of renewable energy projects under construction and another 2,500 MW under tendering. The policy pathways vary between countries, but the results show that the region's renewable energy markets are becoming more mature. At least three countries have designated vast areas for the development of renewable energy projects, and almost all countries have dedicated institutions to promote the development of renewable energy. Five countries are working on developing grid codes for renewable energy projects.

Despite this progress, certain challenges remain. Overall, private investment in renewable energy still remains poor. Two interrelated challenges are grid capacity and grid access. Many countries in the region have insufficient grid infrastructure. Countries are often uncertain about the capacity of their grids to absorb renewable energy, and detailed grid feasibility studies need to be undertaken. Only a few countries in the region have specified grid access details in their regulations, and Algeria and Jordan are the ones that currently include the most preferential grid access conditions for renewable energy projects. In most countries detailed grid maps are still not easily available to private developers, which creates a hurdle in calculating investment costs.

Another challenge lies in land access. Often, private developers face difficulties in obtaining and securing land for the development of large-scale renewable energy projects. In some cases, the ownership structure is unclear and developers view the negotiation process as a major project risk. Countries must increase their efforts in identifying appropriate land for development of renewable energy projects and, most importantly, facilitate land access.

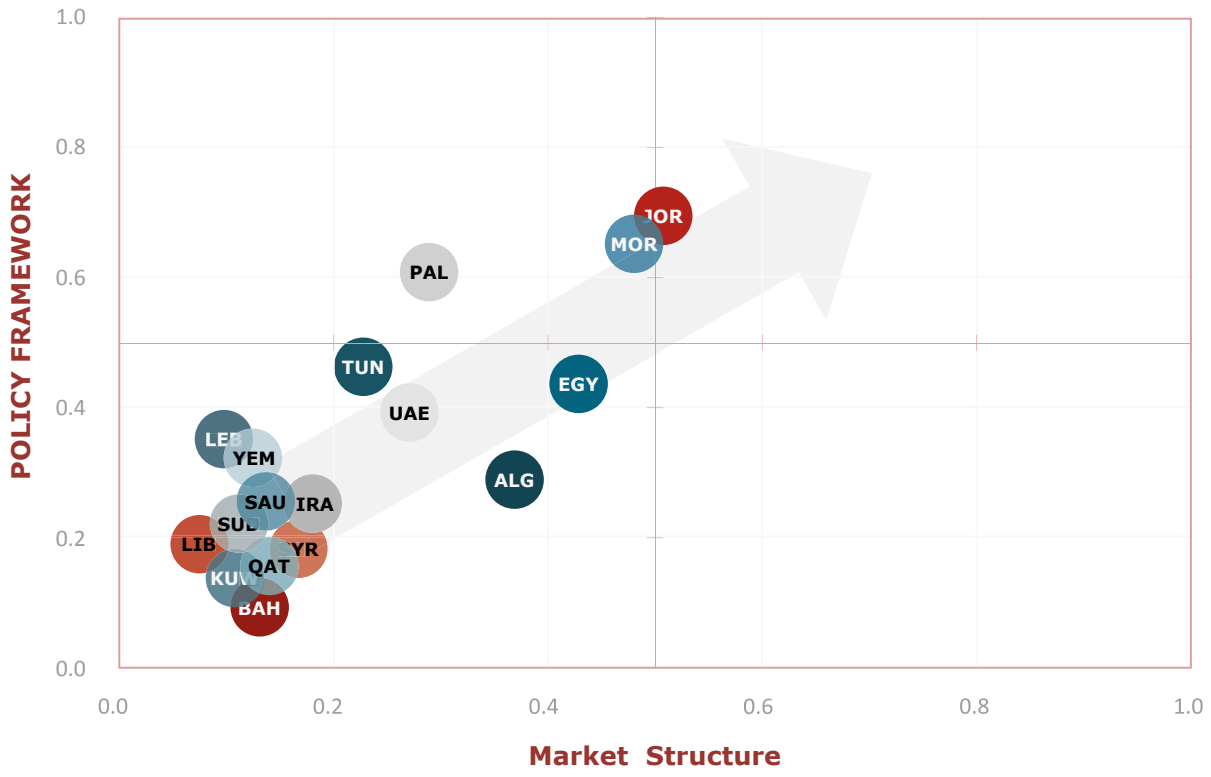
It is clear that private-public partnerships will play a role in the successful large-scale development of renewable resources. With this in mind, all countries need to improve their efforts in providing better institutional support to the private sector for the deployment of renewable energy projects. This includes streamlining administrative procedures, enhancing coordination mechnanisms and establishing institutions to facilitate land access and obtaining all required permits.

The following two charts show each country's performance along two dimensions: (1) market structure and policy framework in the first chart; and (2) policy framework and institutional capacity in the second. The upper right quadrant indicates countries with the most favorable conditions for the uptake of renewable energy investments. In the first chart, no country is in the upper right quadrant. This indicates that no country has both conditions in place: an open power sector structure and a favorable policy environment. Palestine, Morocco and Jordan have more favorable policy environments, but all underperform in market structure category, mostly due to grid related issues.

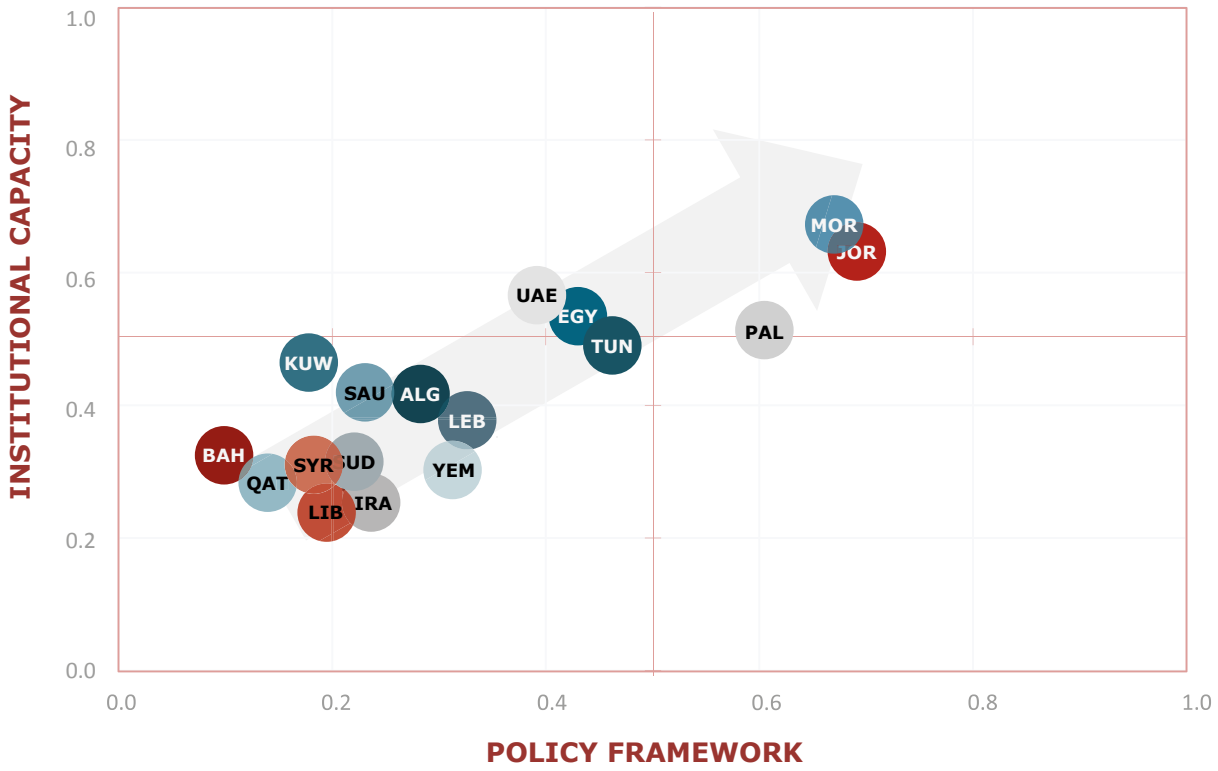
In the bottom chart, Morocco and Jordan perform the best. This indicates that these countries have better policy frameworks in place and relatively stronger institutional capacities. UAE performs well in institutional capacity, mostly due to the general favorable business environment, but needs to improve its performance in policy framework to attract more investments in renewable energy.

Although the majority of countries are still in the lower left quadrant, some countries are close to transitioning to upper right quadrant by implementing slight improvements.

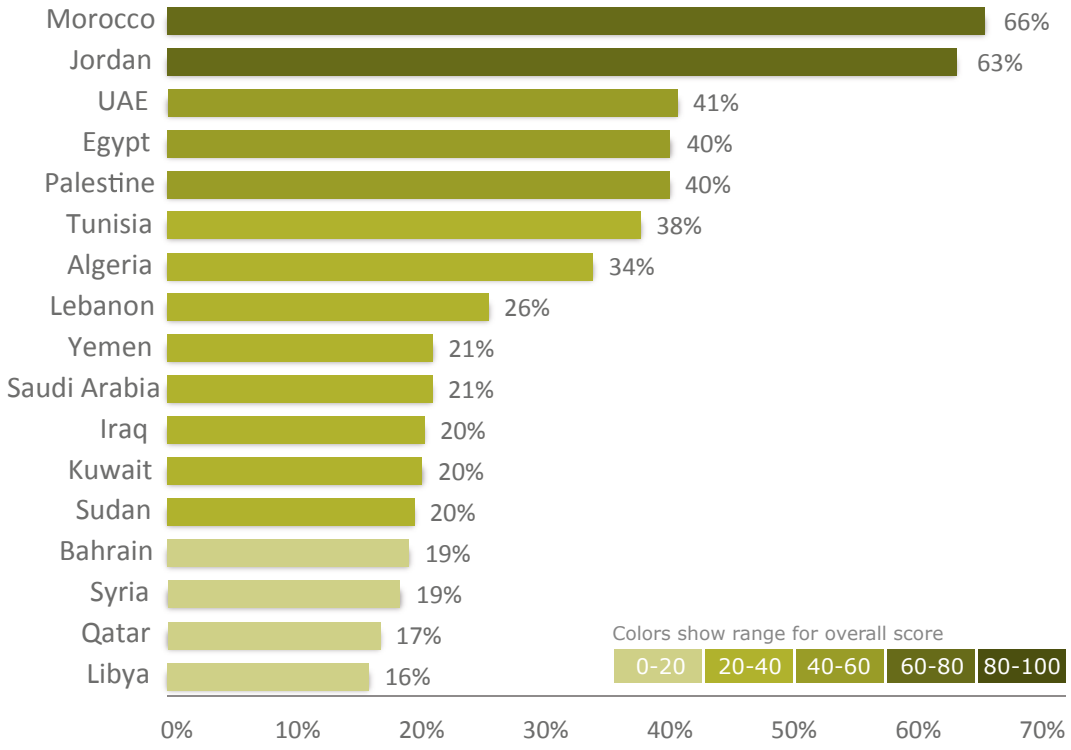
Countries' Two-dimensional Performance



Countries' Two-dimensional Performance



AFEX Renewable Energy 2015 Results

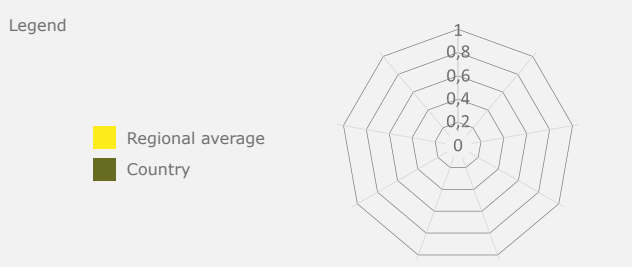


	Final Score	Market Structure	Policy Framework	Institutional Capacity	Finance and Investment
Morocco	66	48	66	62	87
Jordan	63	51	68	58	77
UAE	41	28	38	58	40
Egypt	41	43	43	50	26
Palestine	40	29	60	49	24
Tunisia	38	23	46	46	37
Algeria	34	36	29	39	33
Lebanon	26	11	33	36	23
Yemen	21	12	33	29	12
Saudi Arabia	21	12	23	39	10
Iraq	21	17	24	26	16
Kuwait	20	12	16	44	10
Sudan	20	12	21	29	16
Bahrain	19	12	11	31	23
Syria	19	16	20	29	10
Qatar	17	12	17	30	10
Libya	16	10	20	24	10

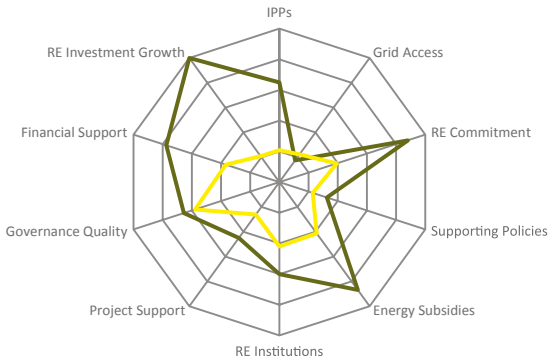
By Country

AFEX Renewable Energy 2015 provides an assessment of countries' progress in renewable energy according to four evaluation categories: Market Structure, Policy Framework, Institutional Capacity, and Finance and Investment. Under these categories, countries are assessed according to nine different factors and 30 quantitative and qualitative indicators.

The following diagrams illustrate total scores attributed to each country assessed. The countries are presented in order according to their final ranking.

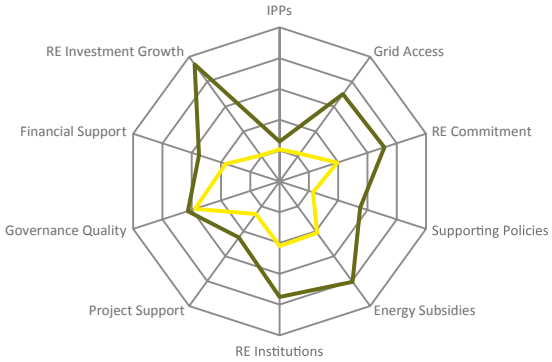


MOROCCO SCORE 66



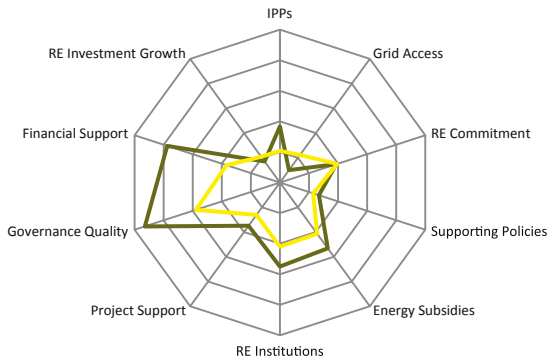
Morocco continues to lead this edition of AFEX Renewable Energy due to its success in several areas. It has made significant progress towards meeting its ambitious targets by installing additional wind power capacity and issuing tenders for more projects. Morocco's renewable energy installed capacity has more than doubled since AFEX Renewable Energy 2013, now accounting for ten percent of its energy mix exluding hydro. This is by far the highest installed capacity in the region. In 2014, Morocco moved forward with implementing wind and solar programs and has tendered more than 1,000 MW of large-scale renewable energy projects through its IPP public competitive bidding process. The year 2014 included three important developments: commissioning of the largest wind farm in the Arab region, the 300 MW Tarfaya wind project; commissioning of the first private wind project under the third-party supply model overseen by the Law 13-09; and awarding a USD 2 billion contract to the Riyadh-based ACWA Power for the development of 300 MW of CSP plants. However, the market for small-scale distributed renewable energy generation in Morocco remains restricted. Morocco should move forward with opening up its power market for small-scale generation of renewable energy and let small and medium enterprises enter into the business of renewable energy development. This reform will help Morocco to improve the socio-economic impacts of renewable energy.

JORDAN SCORE 63



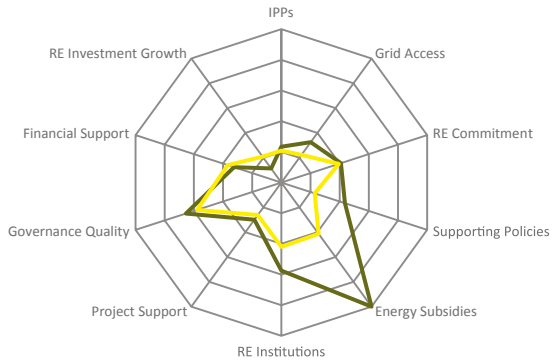
Jordan ranks second after Morocco. Jordan has made substantial progress in the past year in attracting private investment for renewable energy development. It has successfully completed the first round of its direct proposal submission scheme, whereby it signed 13 power purchase agreements with different private consortia for the development of more than 200 MW of PV projects and one agreement for the development of the country's largest wind project, the 117 MW wind farm in Tafila. Presently, Jordan has attracted one of the most diversified pool of investors in the Arab region. Energy prices in Jordan are also among the highest in the region, which allowed Jordan to move forward with implementation of its net metering scheme. In just one year, more than 700 small-scale PV systems with a total capacity of over 13 MW have been installed throughout the country, mostly in the commercial and public sectors. Additionally, in June 2013, Jordan's Cabinet approved a plan to increase electricity tariffs for most segments until 2017, to better reflect cost of generation. This pricing reform, together with the supporting policies will continue to attract investments in renewable energy. However, two major challenges remain: grid capacity and land access. Jordan should continue its efforts in reinforcing the grid to allow greater integration of renewable energy, and strengthen its institutional support to better facilitate the deployment of private renewable energy projects. Jordan should also open its power generation market to allow private-to-private sale of electricity from renewable sources.

UNITED ARAB EMIRATES SCORE 41



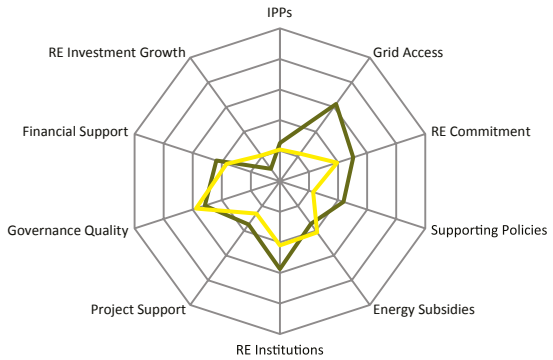
UAE ranks third, and the highest among GCC countries. The main accomplishments of UAE in 2014 include adoption of a net metering scheme in Dubai to attract investments in small-scale renewable energy generation; awarding a contract to the consortium led by ACWA Power for the development of the second phase of the Mohammad Bin Rashid Al Maktoum Solar Park; and announcing tenders for the development of the 800 MW third phase of the solar park. Of note, phase two's 200 MW PV project will be delivered at one of the lowest global prices of 5.84 USD cents per kWh. In general, UAE has favorable conditions for business operations, including liberal fiscal and trade policies. UAE should focus on creating more options for the private sector to enter the renewable energy market and expand its renewable energy policies to all UAE emirates.

PALESTINE SCORE 40



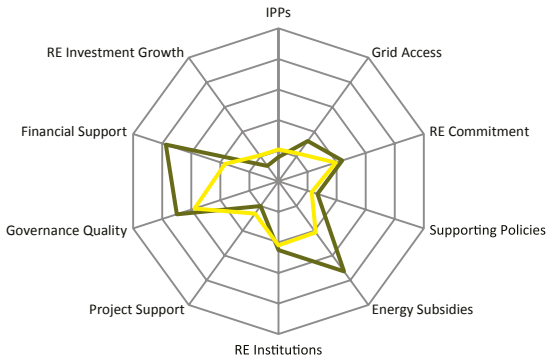
Palestine ranks fourth. Palestine has a unique set of market conditions: it has essentially no local power generation; it has very limited physical space; and it lacks the resources to offer energy subsidies. Palestine has sufficiently attractive renewable energy policies in place: the net metering scheme and direct proposal submission process. However, Palestine needs to focus on ensuring the functionality of these schemes. Key barrier comes from lack of support for these schemes from the more powerful distribution companies relative to the regulatory agency.

EGYPT SCORE 41



Egypt also appears third in the ranking. Egypt presents an attractive market for the development of renewables due to its market size and strong natural resource potential. In 2014, Egypt made substantial improvements to its renewable energy policy framework and attracted the attention of private investors. In December 2014, Egypt enacted the Renewable Energy Law, which establishes different schemes for the private development of renewable energy projects, including the IPP public competitive bidding process, feed-in tariffs, and private-to-private sale of electricity from renewables. With the adoption of this law and feed-in tariff scheme, Egypt made an important step in shifting away from only state-led renewable energy projects to privately financed projects. It is important that Egypt concentrates efforts on streamlining its administrative procedures, ensuring the functionality of these schemes and strengthening the institutional support to facilitate the deployment of private renewable energy projects. This requires commitment from all concerned state authorities and effective coordination among all participants, including financiers, government and supporting institutions.

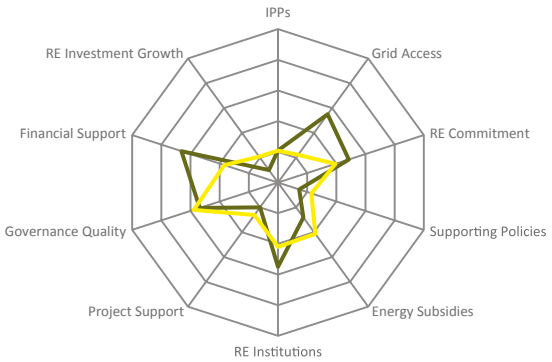
TUNISIA SCORE 38



Tunisia increased its non-hydro renewable energy installed capacity from 158 MW in 2012 to 265 MW in 2014, reaching a six percent share of its energy mix, the second largest after Morocco. The smartly designed Tunisian net metering scheme has led to the deployment of small-scale PV projects in the residential sector with a total capacity of 15 MW. Also in 2014, Tunisia adopted and partially implemented a stepwise strategy to phase out subsidies for electricity. However, the Tunisian power market still remains closed for large-scale private generation of renewable energy. The new Renewable Energy Law that entered into force at the end of April 2015 is expected to change this situation. Tunisia has the potential to attract investments in renewable energy based on its generally favorable business conditions. Once the new Renewable Energy Law enters into effect, Tunisia should focus on implementing the provisions of this law and creating a pipeline of private renewable energy projects. Since energy prices in Tunisia are relatively high, the next consideration should be further opening the power generation market to allow private-to-private sale of electricity from renewable sources.

ALGERIA

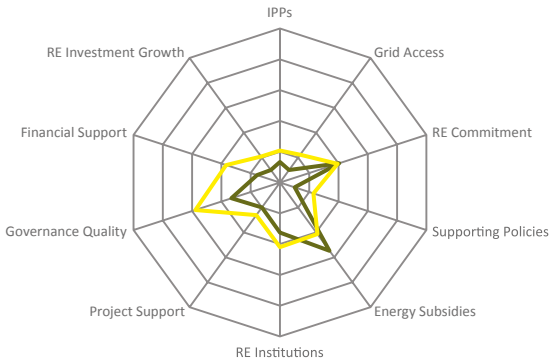
SCORE **34**



Similar to Egypt, Algeria presents an attractive market for development of renewables due to its market size and strong natural resource potential. The key accomplishments of Algeria in 2014 include the adoption of the feed-in tariff scheme, and creating a series of renewable energy projects. Currently, there are about 400 MW of solar projects under construction, a major development compared to last year. However, the pool of investors in Algeria remains limited. Most of the projects are currently led and developed by a subsidiary of Sonelgaz Group, a state-owned utility. The Algerian investment framework can be improved to allow participation of more foreign investors.

YEMEN

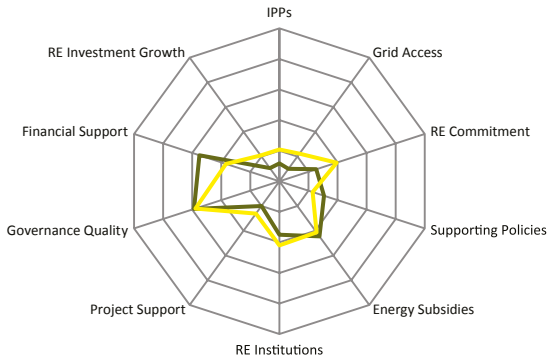
SCORE **21**



Yemen faces the challenge of delivering electricity to a larger portion of its population. Diesel is largely used for power generation and water pumping. In 2014 Yemen has substantially increased the prices of diesel, which led to tension and frustration in society. Switching from diesel to solar can help the people improve their livelihoods. Yemen should focus on exploring the opportunities of designing innovative energy systems based on decentralized small-scale power generation. Microgrids could enable power supply to remote areas at lower costs than required by traditional infrastructure. Due to the deteriorating political situation, Yemen has not been able to make progress in attracting investments in renewable energy.

LEBANON

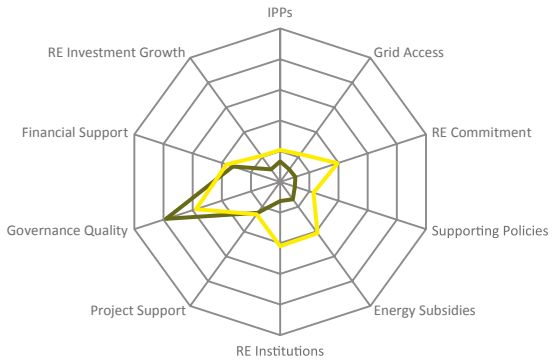
SCORE **26**



Lebanon's biggest accomplishment in 2014 is the leveraging of private funds for financing small-scale PV projects through its innovative financing mechanism "National Energy Efficiency and Renewable Energy Action" (NEEREA). However, NEEREA's potential has not been fully unlocked since private sector in Lebanon still cannot legally enter the power generation market. The country still lacks the required independent regulatory authority to grant power generation licenses to private developers. This has largely prevented the country from substantially increasing its renewable energy capacity. Having the 30 percent of the power supplied by unofficial private diesel generators, Lebanon presents a great market for the development of distributed solar projects. Lebanon should introduce legal channels to allow private sector participation in at least small-scale power generation projects.

SAUDI ARABIA

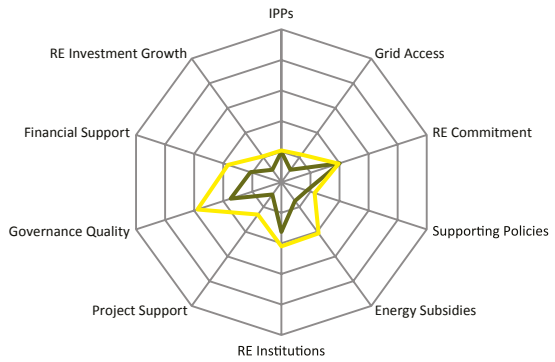
SCORE **21**



Similar to Egypt and Algeria, Saudi Arabia presents an attractive market for renewables due to its market size, resource potential, land availability and high energy demand. Saudi Arabia has shown commitment for renewable energy by adopting ambitious targets and establishing a dedicated institution for development of renewable energy. However, it has shown little progress in deploying renewable energy projects and attracting private investment. Currently, there are no viable options for private developers to participate in renewable energy power generation. The government has not announced yet any tenders for private development of renewable energy projects and there is no other scheme in place to attract third parties to participate.

IRAQ

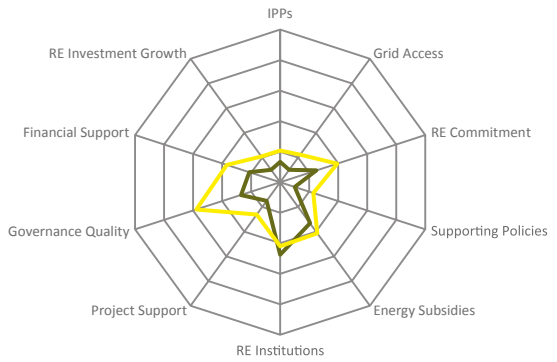
SCORE 21



Iraq's political situation has limited its ability to make substantial progress in renewable energy. Nevertheless, in 2014, Iraq announced tenders for the first four pilot renewable energy projects through an IPP public competitive bidding process. Potential investors are invited to submit expressions of interest by mid May 2015. Another accomplishment of Iraq is establishing the Renewable Energy and Energy Efficiency Department within the Ministry of Electricity. The Department has already initiated implementation of a 1 MW PV project on the roof-top of the Ministry of Electricity. Iraq should continue enhancing its institutional base and exploring opportunities for the most suitable renewable energy applications.

SUDAN

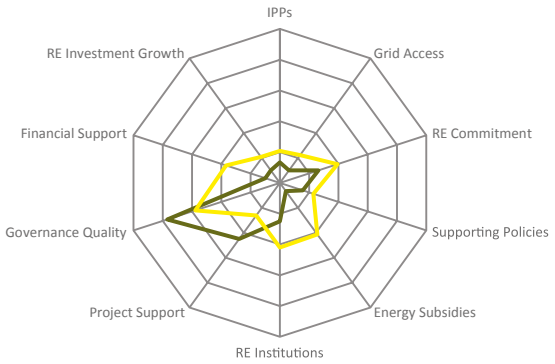
SCORE 20



Sudan is in a situation where the larger portion of its population has yet to gain access to electricity. As in Yemen, diesel is often used in rural and urban areas for electricity production and water pumping. Sudan has already initiated a rural PV electrification program, which aims to electrify 1.1 million homes with PV by 2031. This initiative is a step in the right direction. Sudan should continue to promote decentralized small-scale power generation, including small-scale PV, mini hydro and biomass. This includes eliminating barriers to deployment of renewable energy projects, such as high taxes and duties for PV systems, which are currently in place. Microgrids could enable power supply to remote areas at lower costs than required by traditional infrastructure, reaching large portions of the currently unserved population.

KUWAIT

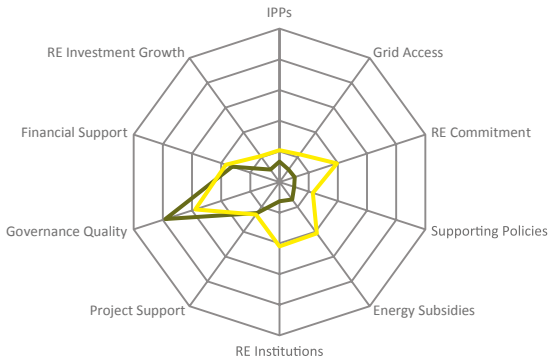
SCORE 20



Kuwait has shown commitment for renewable energy development by adopting targets and identifying a vast desert area for the development of large-scale renewable energy projects with a total capacity of more than 2000 MW, the Shagaya Renewable Energy Park. The first pilot phase of the Park, 70 MW of wind, PV and thermal storage, is already under construction. The second and third phases of the Park are planned to be developed through an IPP public competitive bidding process. Looking ahead, Kuwait should focus on successful implementation of its plan and ensure no delays in the tendering process.

BAHRAIN

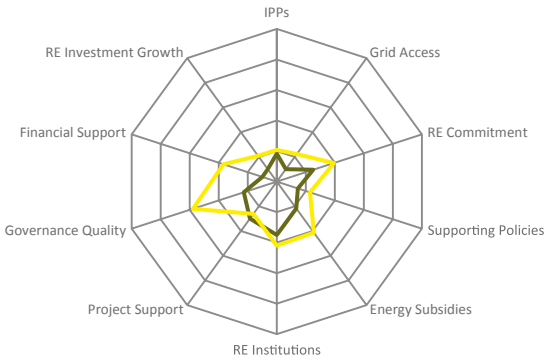
SCORE 19



Bahrain is one of the few countries in the region that has still not formulated clear targets. It also lacks a dedicated institution to lead the development of renewable energy projects. At the same time, Bahrain ranks high in ease of doing business and has favorable macro investment conditions. Bahrain has the potential to attract investments in renewables due to its compact size, available financial resources and relatively favorable business conditions. With the right focus on its long-term energy systems, Bahrain could show leadership in innovative applications of renewable energy. The most decisive elements will be motivation and commitment.

SYRIA

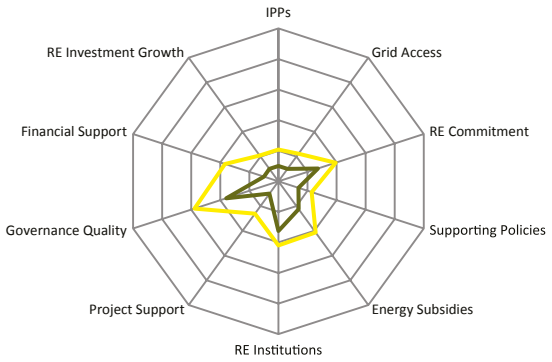
SCORE 19



Syria adopted progressive measures in 2011 to attract interest and activity in renewable energy. It has opened its market for private developers, adopted feed-in tariffs and a net metering policy, authorized private-to-private sale of renewable electricity, and announced tenders for public competitive bidding to develop the first large-scale wind projects. These are all positive foundational activities. However, due to the deteriorating political situation, all activities have been paused and the Syrian government has not had the chance to implement the newly introduced policies.

LIBYA

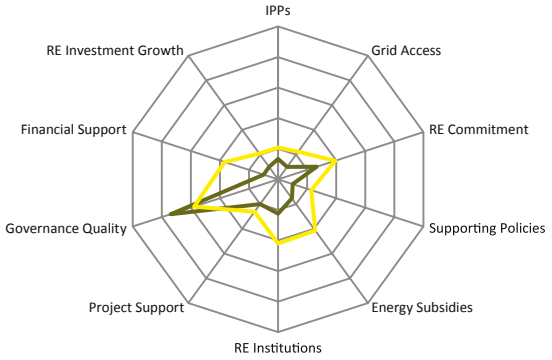
SCORE 16



In the past two years, Libya has shown a strong commitment to renewable energy. It has established a dedicated agency for renewable energy and adopted renewable energy targets. The construction of the first large-scale wind project was initiated in 2013 and wind turbines have already been brought to the country. However, due to the ongoing difficult political situation, all activities have been paused and Libya has not been able to make progress as expected. Institutional stability will be the first necessary step in supporting Libya's long-term renewable energy goals.

QATAR

SCORE 17



Currently Qatar has a very small share of renewable energy projects, and the private sector has no viable options to enter the power generation market. Qatar has a strong foundation, however, in its favorable business conditions. Among Arab countries, Qatar ranks highest in the Global Competitiveness Index and third in the Ease of Doing Business Index. Much like other GCC countries, Qatar has the potential to attract investments in renewable energy due to its relatively favorable business climate and availability of financial resources. The most decisive elements will be motivation and commitment.

Abu Darwish Mosque - Jordan
Provided by: Matthew Alison

Arab Future™ Energy Index

AFEX 2015

Renewable Energy

1 Introduction

1.1 About AFEX Renewable Energy

AFEX Renewable Energy is a policy assessment and benchmark tool that aims to provide a comprehensive assessment of the investment climate for renewable energy development, as well as its progress to date in the Arab region. The assessment is based on the compilation and analysis of detailed, country-specific data according to the set of pre-defined indicators listed in Table 1.

AFEX Renewable Energy 2015 aims to:

- Provide a comprehensive assessment of the current investment climate for RE development,
- Formulate targeted recommendations on improving regulatory and institutional frameworks for RE investment,
- Benchmark countries' performance in creating better conditions for RE investment,
- Highlight developments and progress made by each country toward RE since the first edition of AFEX in 2013,
- Effectively communicate RE success stories and highlight areas for improvement, and
- Identify areas for possible intervention at the regional level in order to maximize the effects of promoting RE.

1.2 Scope of Assessment

AFEX Renewable Energy is designed with consideration of the private investor's perspective, thus assessment areas focus on barriers and challenges that private investors face in deploying RE in Arab countries. The conceptual framework of AFEX Renewable Energy is presented in Table 1. It consists of four evaluation categories relating to the index's objectives and scope of assessment:

1. **Market Structure:** assesses the ease of accessing the power generation market for private investors, including grid access.
2. **Policy Framework:** assesses the level of political commitment for pursuit of RE, which includes setting RE targets with detailed action plans, formulating supporting policies to encourage investment in RE, and phasing out fossil fuel subsidies.
3. **Institutional Capacity:** measures institutional capacity of Arab states to design and formulate RE policies and, most importantly, provide institutional support for private developers in RE deployment.
4. **Finance and Investment:** assesses financial incentives available to private RE developers and measures private investment growth in RE.

The four evaluation categories are broken into ten factors, which are subsequently divided into sets of quantitative and qualitative indicators.

AFEX Renewable Energy measures the existence of policies, their implementation and, most importantly, their effectiveness. The focus of AFEX Renewable Energy is upon power generation from renewable sources, thus biofuels and the use of RE for cooling and heating purposes currently remain outside the scope of the assessment. AFEX Renewable Energy also does not assess countries' theoretical natural potential for power generation from renewable sources, although this factor is surely an important element for investors' decision making. Local current conditions of grid infrastructure have an impact on potential development of the RE market. However, these aspects remain outside the scope of the assessment until comprehensive data is available. AFEX Renewable Energy also does not assess the maturity of supply chain infrastructure.

AFEX Renewable Energy is constructed in accordance with the OECD methodology for constructing composite indicators (OECD, 2008). A detailed description of the methodology is presented in **Annex A**.

1.3 What is new in AFEX RE 2015?

Scope of assessment: The scope of AFEX Renewable Energy has been broadened to include assessment of grid codes for renewable energy power plant connection and synchronization with existing grids, which was previously missing due to lack of data. The scope of the Energy Subsidies factor has been broadened to include an assessment of electricity subsidies for commercial customers. Previously, only electricity prices for industrial and residential users were assessed.

Geographical scope: AFEX Renewable Energy 2013 provided an assessment of RE development in 13 Arab countries. The 2015 edition has expanded its geographical scope by adding four more countries to the assessment: Kuwait, Qatar, Saudi Arabia and UAE. The next edition of the AFEX will add three more Arab countries to the assessment: Djibouti, Mauritania, and Oman, bringing the whole assessment to 20 countries.

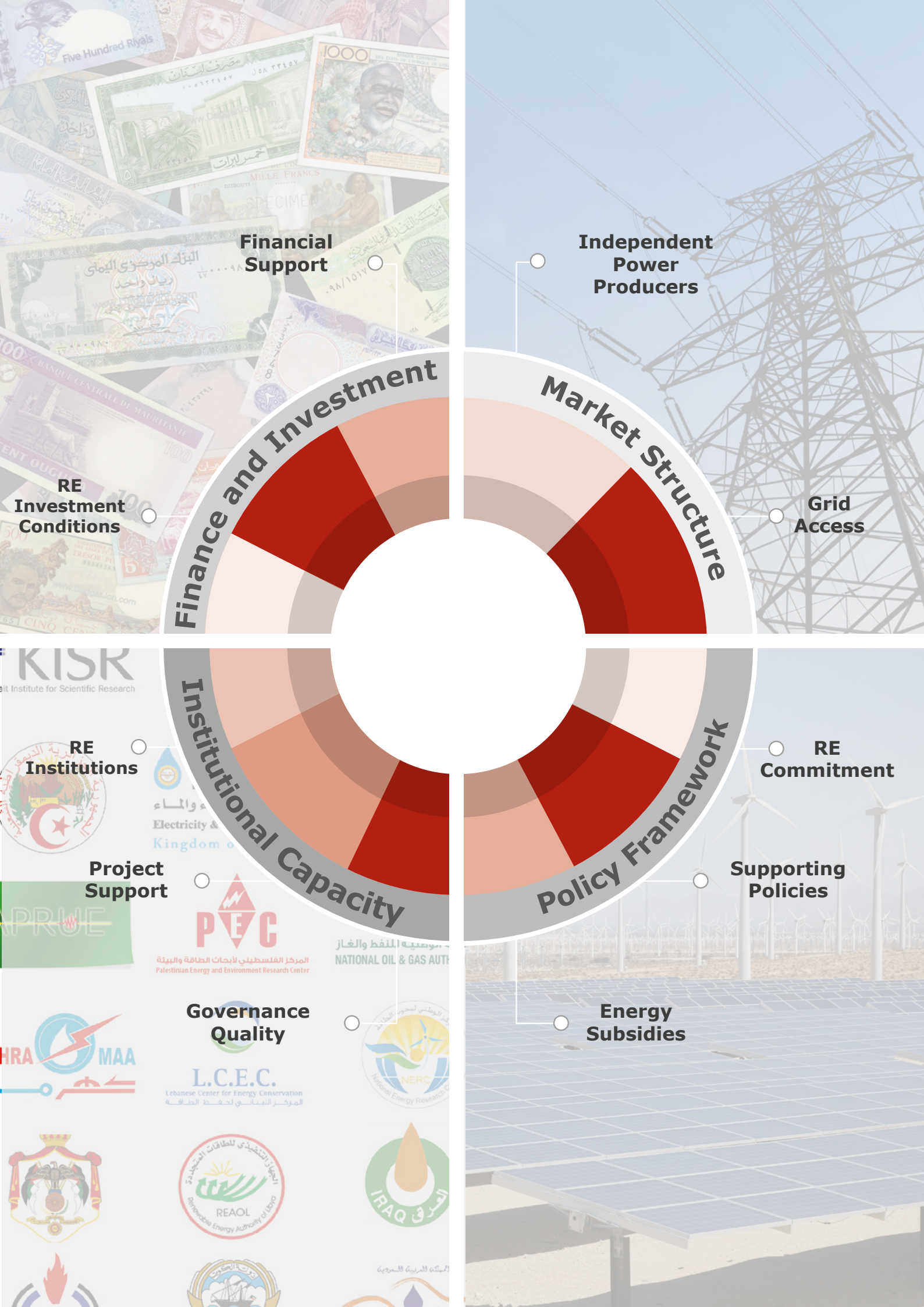
EXTENDED**SCOPE**

AFEX 2015 has expanded its geographical scope by adding four more countries to the assessment: Kuwait, Qatar, Saudi Arabia and UAE.

Photo left: Solar panels in Jordan. Provided by: Matthew Alison

Table 1: AFEX Renewable Energy Conceptual Framework

Category	Factors	Indicator	Score/Measuring Unit
Market Structure	Independent Power Producers	Utility Suppliers	Utility supply authorized by law. Utility suppliers exist in practice. Utility suppliers of RE exist in practice.
		Third-party Suppliers	RE third-party supply is authorized by law. RE third-party suppliers exist in practice.
		Direct Export	Direct export of RE authorized by law. Direct exporters of RE exist in practice.
	Grid Access	Guaranteed Access to Grid	Priority access guaranteed by law. Priority access guaranteed in practice. Priority dispatch guaranteed by law. Priority dispatch guaranteed in practice.
		Grid Code for RE	Technical guidelines to connect distributed smaler PV systems to low-voltage grid adopted. Technical guidelines to connect utility-scale PV systems to medium- and high-voltage grids adopted. Technical guidelines to connect wind parks to medium and high-voltage grids adopted.
Policy Framework	RE Commitment	RE Targets	RE targets are officially adopted as part of RE strategy or action plan by higher political authorities. RE targets are formulated, but not officially adopted yet by higher political authorities or scattered in various documents. No targets are adopted.
		RE Share Operational	Percentage of total installed capacity (MW).
		RE Projects under Construction	Percentage of total installed capacity (MW).
		RE Projects under Tendering	Percentage of total installed capacity (MW).
	Supporting Policies	IPP Public Competitive Bidding	Resources identified for private development. Tenders announced. PPA signed (MW).
		Direct Proposal Submission	Policy adopted by law. Proposals selected for private development. PPA signed (MW).
		Feed-in Tariffs	Officially adopted. RE projects implemented through feed-in tariffs (MW installed).
		Net Metering	Officially adopted. RE projects implemented through net metering scheme (MW).
	Energy Subsidies	Electricity Subsidies Residential	Percentage of Palestinian residential retail prices (benchmark).
		Electricity Subsidies Commercial	Percentage of Palestinian commercial retail prices (benchmark).
		Electricity Subsidies Industrial	Percentage of Palestinian industrial retail prices (benchmark).
Institutional Capacity	RE Institutions	Independent Regulator	Established by law or similar sovereign act. Under establishment. Not considered yet.
		RE Agency	Established by law. Under establishment. Non-existent.
		Capacity of RE institutions	Expert assessment from 1 to 10.
	Project Support	Resource Quality Assessment	Detailed wind atlas published and available to public. Detailed solar atlas published and available to public.
		Land Access	Land allocated for private development of large-scale wind projects. Land allocated for private development of large-scale solar projects.
		Project Lead Time	
	Governance Quality	World Bank Ease of Doing Business Index	Rank under World Bank Ease of Doing Business Index.
		Global Competitiveness Index	GCI scores.
		Bertelsmann Stiftung's BTI Status Index	BTI Status Index scores.
Finance and Investment	Financial Support	Fiscal Incentives	Number of fiscal incentives for RE projects.
		RE Fund	RE fund established by law; sources of financing are clearly defined; disbursement procedure is clearly defined; RE fund has collected and disbursed funds.
	RE Investment Growth	Share of Private Investment	Percentage of total installed capacity.
		Growth Rate of Private Investment	Percentage increase in installed capacity of RE.


Financial Support
RE Investment Conditions
Finance and Investment
Independent Power Producers
Grid Access
Market Structure
RE Institutions
Project Support
Governance Quality
Institutional Capacity
RE Commitment
Supporting Policies
Energy Subsidies
Policy Framework

1.4 Renewable Energy Drivers

Figure 1 illustrates the energy dependency ratio for each country of the region. It considers the total energy imports, exports, and consumption. Positive values indicate dependence and negative values indicate the ability to meet energy needs domestically. The trend for almost all Arab states is towards greater energy dependency. RE efforts can play an important role in achieving long-term stability in these countries.

Some of the major drivers motivating Arab states to pursue RE include:

Reducing dependency on energy imports: This is particularly important for energy-dependent countries such as Palestine, Jordan, Lebanon, Morocco, and Tunisia. These countries, on average, import more than 90% of their energy needs. This is also important for countries that are on the edge of becoming net importers such as Egypt, Syria, and Yemen.

Long term energy security: with the increased volatility of energy imports and prices, RE can bring long-term security of energy supply. Again, this is particularly important for the region, given the unstable political and security situation in many countries that often affects the energy imports.

Meeting growing energy demand: Arab countries face challenges in keeping up with the energy demand growth induced by economic development and population growth. Diversifying the energy mix with renewable sources can help countries ensure the continuity and stability of energy supply, and bring economic benefits in the long term.

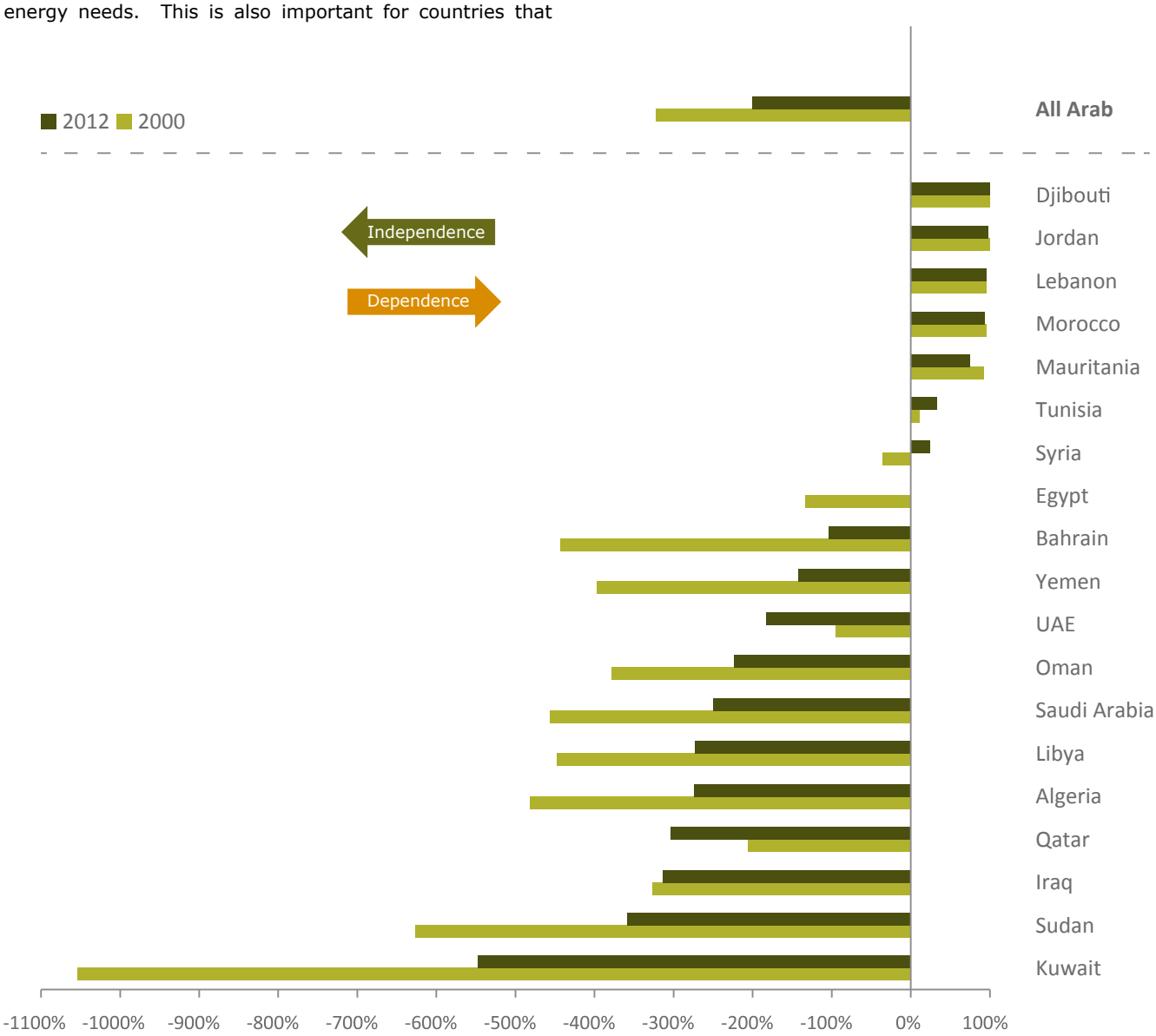


Figure 1: Energy Dependency Ratio

Market Structure

Independent Power Producers

Grid Access

2 Market Structure

The market structure category assesses the openness of electricity markets to private generation of RE. In most countries in the Arab region, power sectors are characterized by a high degree of vertical integration and state control. Thus, this category considers some key aspects that differentiate the individual markets and their level of openness. To better understand the possibility for private sector participation in renewable power generation, this year's AFEX report has been expanded to include the analysis of an emerging competitive power market through progress on unbundling of vertically integrated power utilities.

This category focuses on two factors: (1) independent power producers (IPPs); and (2) grid access. These factors are further measured by set of qualitative indicators as shown in Table 2.

Table 2: Power Market Structure Evaluation Factors and Indicators

Category	Factors	Indicator	Score/Measuring Unit
Market Structure	Independent Power Producers	Utility Suppliers	Utility supply authorized by law. Utility suppliers exist in practice. Utility suppliers of RE exist in practice.
		Third-party Suppliers	RE third-party supply is authorized by law. RE third-party suppliers exist in practice.
		Direct Export	Direct export of RE authorized by law. Direct exporters of RE exist in practice.
	Grid Access	Guaranteed Access to Grid	Priority access guaranteed by law. Priority access guaranteed in practice. Priority dispatch guaranteed by law. Priority dispatch guaranteed in practice.
		Grid Code for RE	Technical guidelines to connect distributed smaller PV systems to low-voltage grid adopted. Technical guidelines to connect utility-scale PV systems to medium- and high-voltage grids adopted. Technical guidelines to connect wind parks to medium and high-voltage grids adopted.

2.1 Power Sector Structure

In relation to RE deployment in the Arab region, there is a general concern regarding the extent to which the current power sector ownership arrangements can deliver transparent, non-discriminatory access to the electricity grids. In a highly integrated market, where the same actor handles both electricity generation and transmission, incentives might arise to exclude generating competitors by denying grid access (Manoussakis, 2009). Power sectors in the Arab region have traditionally seen a high degree of state ownership, monopoly, and vertical integration. High vertical integration refers to a situation in which all stages in the electricity value chain (generation, transmission, distribution, and retail) are owned and operated by the same actor. A separation of the different segments in the value chain is referred to as "unbundling" and is seen as one of the key pre-conditions to removing conflicts of interest between the operating actors and increasing overall competition in the power market.

Electricity sector unbundling can take different forms depending on the degree of vertical separation. It is possible to distinguish between ownership, legal, functional, and accounting separation. The highest degree of unbundling is ownership separation, which signifies a situation in which all network infrastructure (transmission and distribution) is fully separated from the generation stage. In the remaining forms of unbundling, all parts of the power sector will operate under the same ownership whilst being partly separated at lower levels.

2.1.1 Unbundling in the Arab Region

During the last decade, most countries in the Arab region have introduced power sector reforms in order to open up their electricity markets and facilitate private sector participation. As an important part of these reforms, six out of the 17 examined countries have already undertaken some first steps towards a formal unbundling of generation and transmission activities. All of these countries are still in the process of implementing transparent and functional organizations, and the coming decade should be seen as a transitional period. For the enforcement of the legal provisions, which are the basis for an open and unbundled market, independent regulators will play a crucial role.

Accordingly, all countries that have legally undertaken power sector unbundling have also established regulatory agencies. See Chapter 4 on institutional capacity for more information on the regulators.

Jordan is the only country in the region that has implemented a full ownership separation of the power sector. Since the adoption of the Jordanian General Electricity Law in 2003, the country has put into operation a fully unbundled power sector characterized by ownership separation of generation, transmission, and distribution. NEPCO, the National Power Electric Company, managed by the government and the electricity regulator, owns and operates transmission lines, while three private companies own and operate the distribution networks. Both private and public companies are active within the power generation segment, and privately owned companies produce about 75% of the electricity (NEPCO, 2014).

Most other countries with ambitions to unbundle and privatize have taken steps towards a legal or functional separation of their state-owned power sectors. The most common way to accomplish a legal separation has been to create a state-owned holding company with a number of subsidiaries that separately manage the different activities within the power sector value chain. This type of unbundling can be found in Algeria, Egypt, Abu Dhabi, and, to some extent, Saudi Arabia.

One last country worth mentioning in this context is Palestine. Given its particular situation, it has no high voltage transmission lines and only one conventional power plant. The power plant is not operating at the moment due to fuel shortage and its location in the war-affected Gaza. However, with prospects of a more extended electricity sector, the General Electricity Law adopted in 2009 includes the legal context for an unbundling of the power sector (IRENA, 2014).

Table 3: Status of Power Sector Unbundling, Incorporation and Privatization in the Arab countries

	Reference to the policy	Status of unbundling
Jordan	General Electricity Law nr. 64.	Ownership separation
Palestine*	General Electricity Law nr. 13.	Ownership separation
Egypt	Law 164.	Functional or legal separation
UAE (Abu Dhabi)	Law 2-98 from 2008	Functional or legal separation
Saudi Arabia	Electricity Law of 2005	Functional or legal separation
Algeria	Law 02-01 on Electricity and Gas Distribution	Functional or legal separation

* Palestine's current status of separation is naturally high since almost no generation or transmission takes place in the country. Distribution companies are private or owned by municipality.

2.2 Independent Power Producers

Private sector participation in RE power generation activities exists in various distinguishable forms depending on the party the electricity is sold to: utility supply, third-party sales, direct export, partial self-consumption and exclusive self-consumption. Excluding exclusive self-consumption, all other types of private power generation fall under the concept of Independent Power Producer (IPP) and will be analyzed below.

IPPs typically build, own, and operate power plants to sell electricity either to the utility or directly to a third-party by a PPA. While the first option is a common and sound means for private actors to operate, third-party sales offer additional incentives for investors (Dii, 2013). A third-party supply option can be particularly appealing for larger industrial and commercial actors that are unwilling to become electricity auto-producers despite their particular electricity needs.

Most Arab countries allow for some sort of private participation in power generation activities, and all but one of the investigated countries have adopted legislation authorizing IPPs. Libya is the only country with a fully closed electricity sector.

While many countries have IPPs producing conventional electricity, private participation in RE power generation remains limited. By the end of 2014, Morocco and UAE (Abu Dhabi) were the only countries in which private actors own and currently operate renewable energy power plants. In Morocco, the 300 MW Tarfaya wind farm has been in operation since 2014, and the 100-MW Shams-1 CSP plant in Abu Dhabi has been in operation since 2013. Nevertheless, a number of RE IPP projects are now in the pipelines in Egypt, Jordan, Abu-Dhabi, and Morocco.

IPPs

Most Arab countries allow for some sort of private participation in power generation activities, and all but one of the investigated countries have adopted legislation authorizing IPPs.

Table 4: Status of IPPs Producing RE in the Arab region (2014)

	RE Utility Supply		RE Third Party Supply		RE Direct Export	
	Legal basis to operate as IPP and sell power to utility	MW	Legal basis to operate as IPP and engage in third-party supply	MW	Legal basis to operate as IPP and engage in direct export	MW
Algeria	Law No 02-01 (2002) on Electricity and Distribution of Gas, Article 26; Decree No 13-218 (2013) on Feed-in tariffs for Renewable Energy.	0	Law No 02-01 (2002) on Electricity and Distribution of Gas.[1]		Law No 02-01 (2002) on Electricity and Distribution of Gas.[2]	0
Bahrain	Legislative Decree No. 1 of 1996 with respect to Electricity and Water.	0	No.	0	No.	0
Egypt	Law No 100 (1996); Law No 89 (1998) on Competitive Bidding; Renewable Energy Law No 203 (2014).	0	Decree No. 326 (1997) establishing "The Electric Utility and Consumer Protection Regulatory Agency."	0	No.	0
Iraq	Economic Affairs Commission Decree No S.L. 614, August (2008).	0	No.	0	No.	0
Jordan	Law No 13 (2012) on Renewable Energy and Energy Efficiency Law, Article 5 (competitive bidding), Article 6 (Direct Proposal Submission).	0	No.	0	General Electricity Law 64.[3]	0
Kuwait	IPP Law No 39-10 (2010).[4]	0	No.	0	No.	0
Lebanon	No complete policy.	0	No.	0	No.	0
Libya	No legal basis in place yet.	0	No.	0	No.	0
Morocco	Law No 13-09 (2009) on Renewable Energies.	300	Article 26 of the Law 13-09 (2009) on Renewable Energies.	200	Law 13-09 (2009) on Renewable Energies.	0
Palestine	General Electricity Law No 13 (2009).		No.	0	No.	0
Qatar	Law No 10 (2000) on the Establishment of KAHRAMAA.[5]	0	No.	0	No.	0
Saudi Arabia	Royal Order A/35 of H.M. King Abdullah bin Abdulaziz Al Saud on 17th April 2010 on establishment of KACARE.[6]	0	No.	0	No.	0
Sudan	Electricity Act (2001) Chapter II Article 3.2.	0	No.	0	No.	0
Syria	Law No 32 (2010), Article 30.	0	Article 30 of the Law 32 (2010).	0	No.	0
Tunisia	Law No 1996-27 (1996); Decree 1996-1125 (1996).	0	No.	0	Under preparation: overall exporting conditions specified in the new Renewalbe Energy Law.	0
UAE	Article (3) of the Decree No. (1) (1992), amended by Article (1) of Decree No. (9) (2011).[7]	100	No.	0	No.	0
Yemen	Electricity Law No 1 (2009).	0	No.	0	No	0

[1] The Law 02-01 (2002) does not differentiate between export of power produced from conventional sources and renewables
[2] The Law 02-01 (2002) does not differentiate between export of power produced from conventional sources and renewables
[3] The General Electricity Law No 64 regulates issues of export and import, but does not specify the situation for renewables
[4] The IPP Law No 39-10 (2010) does not specify situation for renewables
[5] The law authorizes KAHRAMAA to formulate and enter into power and water purchase agreements and provide necessary technical and corporate support for establishment of generation and desalination ventures.
[6] The Royal Order authorizes KACARE to develop, lead and implement clean energy projects in the kindgom.
[7] Authorizes Dubai Water and Electricity Authority to purchase electricity from any entity at the prices and under conditions it deems appropriate.

2.4.1 Utility Supply

A large majority of the Arab countries allow private power generation for utility supply, and many large-scale RE projects in the region have been made possible through competitive bidding processes and long-term PPAs with a single-buyer. While direct proposal submission for utility supply is only authorized in Jordan and Palestine, as many as 14 out of 17 countries allow for IPP public competitive bidding. In addition to that, Algeria, Egypt, Palestine, and Syria have introduced FIT schemes.

What characterizes the Arab region regarding the possibility for private actors to produce electricity for utility supply is a lack of clear signals from the governments. In most of the countries, private actors are fully dependent on government announcements of tenders, and as a general rule, competitive bidding processes are only planned for a few occasional projects. Egypt, Morocco, and Saudi Arabia are the only three countries that have set targets for the total installed capacity of RE to be developed through a competitive bidding approach. However, these targets have been realized to various degrees. More about the development in each country can be found in Chapter 4 under IPP public competitive bidding.

2.4.2 Third-party supply

In countries that allow third-party sales, new innovative business models have emerged to overcome some major barriers for both small- and large-scale RE deployment (Kollins, Speer, & Cory, 2010). Despite a more liberal approach towards private participation in general, third-party sales seems to be a sensitive political topic in many of the countries in the region.

Six countries authorize IPPs to produce electricity for third-party sales: Algeria, Egypt, Morocco, Saudi Arabia, Syria* and UAE. In Morocco, Law No. 13-09 allows RE IPPs to sell electricity directly to large consumers and bypass the single-buyer ONE. This option was applied in January 2013 when NAREVA Holding Company commissioned three

wind projects, with a total capacity of 200 MW, to supply power directly to large industrial customers (P. Rouaud, 2013). However, on a regular basis, the third-party supply option is to some extent being hindered by the fact that the medium voltage grid has not yet been fully opened for third-party access.

Egypt is close to applying the third-party option in practice. Egyptian law allows for third-party sales from IPPs and NREA has, in the first half of 2014, announced and awarded concessions for land in the Gulf of Suez dedicated to 600 MW of wind power. The contract was awarded to a private actor that intends to sell electricity to third parties. The third-party option in Egypt seems to have been developed as a parallel track to the competitive bidding plans that have been heavily delayed due to lack of sufficient sovereign guarantees.

In Algeria, despite Law No. 02-01 allowing third-party sales, RE projects under this option have not been developed. Third-party sales would theoretically be possible in Saudi Arabia, however this option is not part of the RE agency's (KACARE) plans, and developing projects outside of this plan is perceived to be difficult at the moment (Dii, 2014b).

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2.4.3 Direct export of RE

A hot topic of debate during the last five years has concerned the export of electricity in general and the export of RE electricity to Europe in particular. As of today, the possibility for private actors to produce RE for export to other countries is very limited, and all electricity-exporting activities that currently occur in the Arab region are performed by the national utilities (Dii, 2013). RE expansion in near and medium terms will mostly be for satisfying growing domestic needs.

As a general rule, the few countries that have included possibilities for export of RE-sourced electricity in their legislations have taken a rather restrictive approach, and have not implemented these legislations by sufficiently specifying details to make export possible in practice. Law No. 13-09 in Morocco allows for export of RE-produced electricity by using the national grid and interconnections. Any IPP that aims to export will be subject to a technical approval by the state-owned utility ONE. In Jordan, the General Electricity Law specifies that import and export will be handled on a case-by-case basis and that it depends on an authorization by the Council of Ministers. In Algeria, Law No. 02-01 allows for export, but the authorization procedure and other details are not fully developed. Tunisia has specified the conditions for exporting RE sourced electricity to a certain extent in its new electricity law, which is still waiting to be adopted. The remaining Arab countries do not seem to foresee private export of RE as a cost effective option for the seller in the near future.

2.5 Grid Access

2.5.1 Priority Access and Dispatch

Private participants in the RE power generation sector need to be provided with guaranteed access to the transmission grid under clear, transparent, and non-discriminatory conditions. Since wind and solar PV technologies are characterized by generation fluctuations, in combination with limited storage options, it is crucial for developers to know that their electricity can be fed into the grid at the time of generation.

In addition to guaranteed grid access, priority access and priority dispatch are important to increase the competitiveness of RE technologies. Priority access ensures that RE projects are granted priority if several actors are requesting access to the grid in a certain location. Since RE projects are more dependent on the geographical location than conventional generation, a priority access makes sure that constraints in relation to site selection can be minimized. Priority dispatch ensures that RE generators are allowed to send off and sell all their electricity in preference to conventional generators. The implication of a priority dispatch of RE is that conventional generators have to reduce their generation levels in cases of transmission congestion (ENPI, 2013).

To encourage investment in RE power generation activities, governments should establish clear and consistent conditions for grid access. An effective approach is to specify grid access details in national-level regulations and grid codes, and to avoid case-by-case negotiations. Moreover, it is important that all producers are treated in a non-discriminatory way. A guaranteed non-discriminatory access can be assured through regulated grid-transporting tariffs in combination with unbundling the power sector.

Only a few countries in the region have specified grid-access details in their regulations. Algeria and Jordan are the ones that currently include the most preferential grid-access conditions for RE projects.

GRID ACCESS

Only a few countries in the region have specified grid-access details in their regulations. Algeria and Jordan are the ones that currently include the most preferential grid-access conditions for RE projects.

Algeria guarantees access to the grid without any priority for RE projects. However, distribution companies operate as single-buyers on the market and once a RE project has been connected to the grid, priority dispatch is guaranteed (Décret exécutif no 06-429 du 2006). In Jordan, the General Electricity Law grants non-discriminatory access to the transmission lines, and the Renewable Energy Law from 2012 further obliges NEPCO, as the single-buyer on the market, to purchase all electricity produced, although without any priority dispatch for RE projects (Law 13 of 2012). Electricity regulators set the transmission tariffs and, in the case of Jordan, such tariffs have been specified and regulated.

Other countries in the region lack comprehensive national regulations that guarantee grid access for RE projects. In Morocco, Law No. 13-09 specifies the grid access conditions for the medium, high, and extra high voltage grids, which can be accessed within the limits of the technical capacity of the networks. The inaccessibility of the low voltage grid specifically prevents the development of distributed solar PV. Despite the lack of detailed grid access regulations, grid operators in both Egypt and Palestine are de facto committed to purchase all generated RE electricity. The Egyptian Electricity Transmission Company (EETC) has taken this further, and specifies priority dispatch for RE in its network access contracts with power producers. Tunisia is also in the process of adopting a new RE Law, and it remains to be seen whether this law will include priority access and dispatch for RE projects. Lastly, Saudi Arabia and Abu Dhabi have detailed grid codes but do not specify any special conditions for RE projects. Nevertheless, the regulatory agency in Abu Dhabi has recommended an amendment of the transmission code to give priority access to RE projects.

Table 5: RE Grid Access Conditions

	RE Guaranteed Access to the Grid	RE Priority Access	RE Priority Dispatch
Algeria	Executive decree No. 06-428 of 26 November 2006, executive decree No. 06-429 of 26 November 2006, and the order of 21/02/2008.	No priority access.	Priority dispatch once a RE system is connected.
Bahrain	No.	No.	No.
Egypt	Article 6, Renewable Energy Law No 203 (2014) "EETC and distribution companies are committed to connect RE to the grid."	No.	No.
Iraq	No.	No.	No.
Jordan	Non-discriminatory guaranteed access foreseen by the Law No 13 (2012) on Renewable Energy and Energy Efficiency, Article 8C.	No.	No.
Kuwait	No.	No.	No.
Lebanon	No.	No.	No.
Libya	No.	No.	No.
Morocco	No.	No.	No.
Oman	No.	No.	No.
Palestine	No, but Palestinian electricity distribution companies are committed to purchase all produced electricity.	No.	No.
Qatar	No.	No.	No.
Saudi Arabia	No.	No.	No.
Sudan	No.	No.	No.
Syria	No.	No.	No.
Tunisia	No.	No.	No.
UAE	No.	No.	No.
Yemen	No.	No.	No.

2.5.2 Grid Code

Grid codes, sometimes referred to as network codes, are technical specifications regulating the management and functioning of the electricity grid. In addition to technical specifications, the grid codes sometimes include cost sharing specifications and priority conditions as mentioned in the previous section. Since the technical capacity of the grid can be particularly problematic for RE developers, grid codes must clarify the technical rules on access to the grid for all types of RE projects.

In the Arab region, technology-specific RE grid codes have been developed in the few countries that have introduced regular support schemes, as opposed to ad-hoc projects, for RE. Jordan has come furthest in the establishment of grid codes, having technical specifications for RE producers of all sizes. Egypt is following this example and has now published two out of three grid codes mentioned below. Tunisia has, for several years, managed its successful support schemes for distributed solar PV with a "grid code light," specifying the overall technical conditions. Nevertheless, Tunisia is now in the process of preparing legally adopted grid codes for all sizes of RE projects.

GRID CODES

Jordan has come furthest in the establishment of grid codes, having technical specifications for RE producers of all sizes.

Table 6: RE Grid Codes

	Technical Guidelines Adopted to Connect		
	Small Scale PV Systems to Low Voltage Grid	Utility-Scale PV Systems to Medium and High Voltage Grid	Wind Parks to Medium and High Voltage Grid
Algeria	No.	Under preparation.	Under preparation.
Bahrain	No.	No.	No.
Egypt	Yes.	Under preparation.	Yes.
Iraq	No.	No.	No.
Jordan	Yes.	Yes.	Yes.
Kuwait	No.	No.	No.
Lebanon	No.	No.	No.
Libya	No.	No.	No.
Morocco	No.	No.	Under preparation.
Palestine	Yes.	n/a.	n/a.
Qatar	No.	No.	No.
Saudi Arabia	No.	No.	No.
Sudan	No.	No.	No.
Syria	No.	No.	No.
Tunisia	Under preparation.	Under preparation.	Under preparation.
UAE	No.	No.	No.
Yemen	No	No	No

2.6 Market Structure Final Scores and Ranking

The final scores and ranks of the Market Structure category are presented in Figure 3. The overall performance of the countries under this category is poor, but mostly due to grid-related issues. The leading country in this category is Jordan, followed by Morocco and Egypt. The Market Structure category assesses the openness of power generation markets to private sector participation, including grid access. The openness criterion is measured by looking at two aspects: the legal framework allowing IPPs to produce electricity from renewables, and the actual deployment of RE projects by IPPs. Jordan scored the highest in the category due to improvements in several areas. First, Jordan is the only country in the region that has developed and adopted grid codes for distributed and utility-scale PV systems and wind parks. Second, Jordan has moved forward with creating a pipeline of utility-scale RE projects to be developed by IPPs. Morocco ranks the second because it is one of the two countries in the region that has utility-scale RE projects in operation developed by IPPs. Also, it is the only country that has RE IPPs producing power under a third-party supply model. Libya remains the lagging country in this category because the Libyan electricity market until now remains closed for private power generation. Under the "Grid Access" factor, no country received the full scores since no country clearly stipulates priority access and priority dispatch conditions for renewables in legislation.

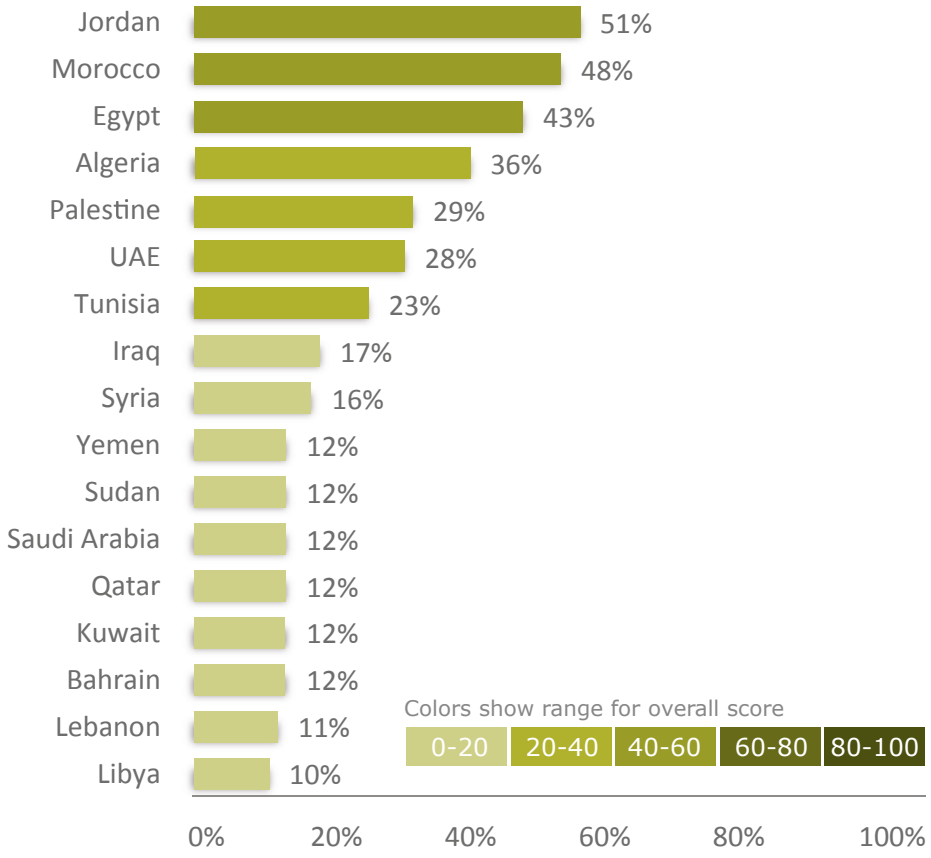


Figure 3: Market Structure Final Scores and Ranking

PROGRESS HIGHLIGHTS
MARKET STRUCTURE

Since the previous edition of the AFEX Renewable Energy in September 2013, the following countries have made progress under the Market Structure category:

Egypt

Egypt made progress under the "Grid Access" and "Independent Power Producers" factors by improving its regulatory framework:

In 2014, Egypt adopted a grid code for wind parks and small-scale PV projects. Grid code for medium and large-scale PV projects is currently under preparation. In December 2014, Egypt enacted the Renewable Energy Law, which allows the private-to-private sale of electricity produced from renewable sources.

Iraq

Iraq made improvements under the "Independent Power Producers" factor by announcing tenders for the country's first utility-scale RE projects to be developed by IPPs.

In 2014, Iraq announced tenders for the IPP development of the four RE projects: three PV projects with an approximate capacity of 5 MW each and one wind project with an approximate capacity of 5 MW as well.

Morocco

Morocco made major progress under the "Independent Power Producers" factor by commissioning large-scale RE projects developed by IPPs, and creating more pipelines of IPP-led RE projects through announcing and awarding major tenders.

In 2013, NAREVA Holding Company commissioned three wind projects (Haouma in the Tangier region, Akhfennir in the Tarfaya region, and Foum El Oued in Laayoune), with a total capacity of 203 MW, to supply power to six large industrial customers: Lafarge Maroc, Sonadid, OCP, Managem, Samir, and Air Liquide Maroc. The three wind farms have an energy output of 770 GWh per year. These three wind farms are Morocco's first RE projects realized under the third-party supply model overseen by the Law 13-09.

In 2014, the largest wind farm in the Arab region, the 300 MW Tarfaya project, entered into operation. Tarfaya is developed through public-private partnership between ONEE and NAREVA Holding Company, an energy subsidiary of the Moroccan National Investment Company (SNI). Tarfaya is the largest private utility supply RE project in the region.

In addition, Morocco currently has more than 1,000 MW of utility-scale RE projects under tendering for IPP development. In January 2015, Morocco awarded a PPA to the Riyadh-based ACWA Power for the development of two CSP plants, with a total capacity of 350 MW, as part of the Noor CSP complex in Ouarzazate in the south central part of the country.

Jordan

Jordan made improvements under both factors: "Independent Power Producers" and "Grid Access":

In 2014, Jordan finalized the first round of its direct proposal submission scheme, whereby it signed 13 power purchase agreements with different private consortia for the development of more than 200 MW of PV projects, and one agreement for the development of the country's largest wind project, the 117 MW wind farm in Tafila. Jordan also adopted a grid code for distributed and utility-scale PV systems and wind parks.

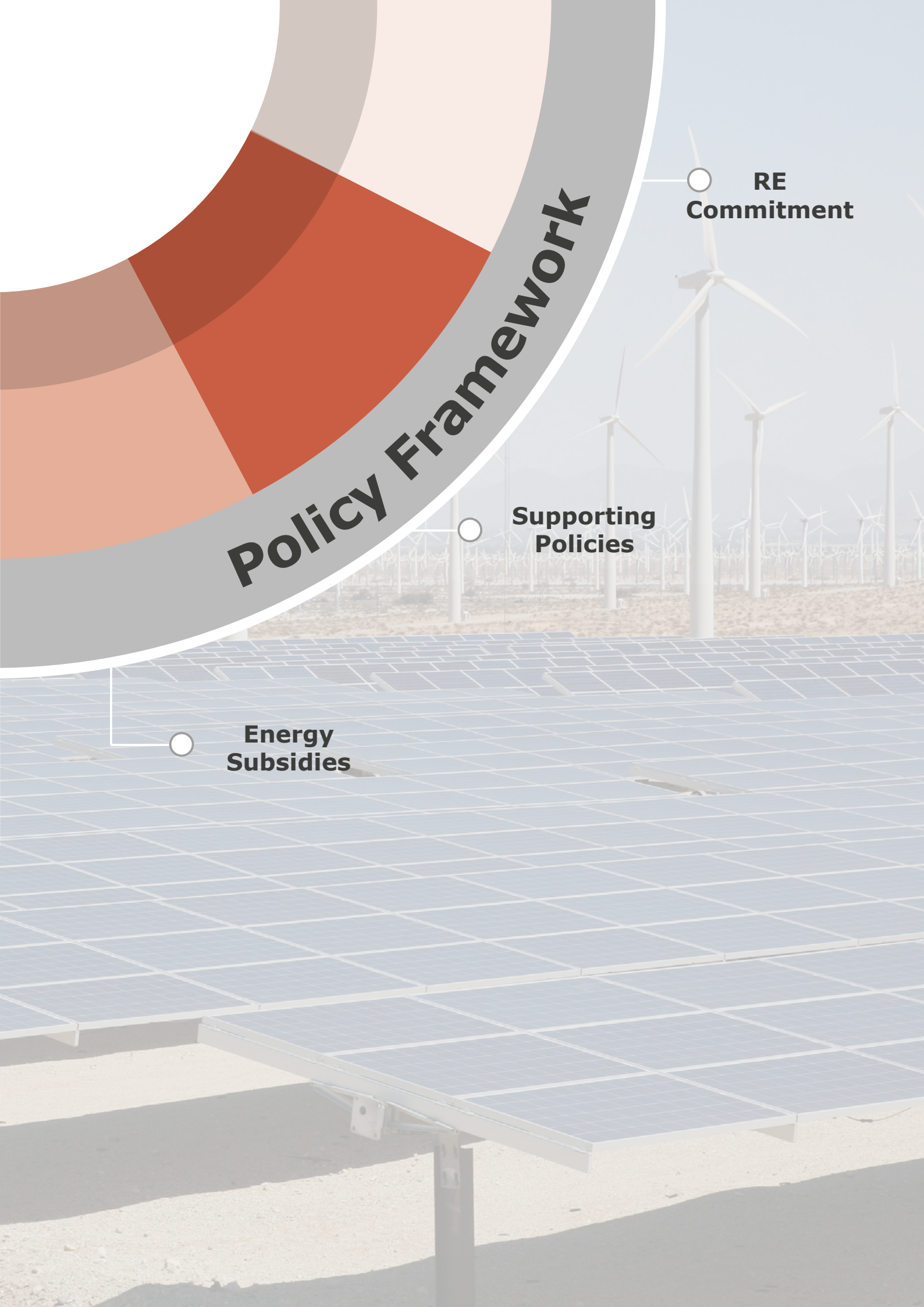
UAE

UAE improved its position under the "Independent Power Producers" factor by commissioning utility-scale RE CSP plants and creating more pipelines of IPP-led RE projects through announcing and awarding major tenders.

In 2013, the region's largest concentrated solar power (CSP) plant Shams1 entered into operation. Shams1 is a 100-MW CSP plant covering an area of 2.5 km^2 and generating power for 20,000 UAE homes. The project is a joint venture between the French Petroleum Company, Spanish company Abengoa Solar, and Masdar Institute. It is the largest private utility supply CSP project in the region.

In January 2015, UAE awarded a PPA to the consortium led by ACWA Power for the development of the second phase of the Mohammad Bin Rashid Al Maktoum Solar Park, a 200 MW PV project.

One month later, UAE announced tenders for the development of the 800-MW PV third phase of the Solar Park.


Policy Framework
RE Commitment
Supporting Policies
Energy Subsidies

3 Policy Framework

The policy framework category assesses the investment environment for RE by looking at the overall political commitment to enable RE development. Such commitment includes announcing ambitious and credible targets, establishing a predictable and transparent regulatory framework, streamlining administrative procedures, integrating fragmented RE strategies into an overall energy strategy, and mobilizing funds for deployment of demonstration projects. To attract both national and foreign RE investments, it is further crucial to establish RE policies in official and legally binding documents.

To better understand investment conditions in the region, the policy framework category focuses on three factors: (1) RE commitment; (2) supporting policies; and (3) energy subsidies. The factors are measured by a number of qualitative and quantitative indicators as shown in Table 7.

Table 7: Policy Framework Evaluation Factors and Indicators

Category	Factors	Indicator	Score/Measuring Unit
Policy Framework	RE Commitment	RE Targets	RE targets are officially adopted as part of RE strategy or action plan by higher political authorities. RE targets are formulated, but not officially adopted yet by higher political authorities or scattered in various documents. No targets are adopted.
		RE Share Operational	Percentage of total installed capacity (MW).
		RE Projects under Construction	Percentage of total installed capacity (MW).
		RE Projects under Tendering	Percentage of total installed capacity (MW).
	Supporting Policies	IPP Public Competitive Bidding	Resources identified for private development. Tenders announced. PPA signed (MW).
		Direct Proposal Submission	Policy adopted by law. Proposals selected for private development. PPA signed (MW).
		Feed-in Tariffs	Officially adopted. RE projects implemented through feed-in Tariffs (MW installed).
		Net Metering	Officially adopted. RE projects implemented through net metering scheme (MW).
	Energy Subsidies	Electricity Subsidies Residential	Percentage of Palestinian residential retail prices (benchmark).
		Electricity Subsidies Commercial	Percentage of Palestinian commercial retail prices (benchmark).
		Electricity Subsidies Industrial	Percentage of Palestinian industrial retail prices (benchmark).

3.1 RE Commitment

3.1.1 RE Targets

Demonstrating political will and commitment to pursuing RE is an important factor in creating favorable conditions for RE investments. Clearly formulated targets that are officially adopted represent an important first step in any ambitious plans to develop RE, and can provide a basis for generating investor trust and confidence.

Most Arab states have announced targets for RE deployment, but only a few have been officially adopted by a higher political authority. Among them is Morocco's clean power target of 6000 MW of installed capacity by 2020. This target represents 42% of total installed capacity, standing out as the most ambitious target in the region, even if the 2000 MW of already installed hydropower is removed. Other officially adopted targets can be found in Algeria, Egypt, Jordan, Palestine and Yemen. Table 8 lists RE targets in the region.

RE COMMITMENT

Most Arab states have announced targets for deployment of RE, but few have been officially adopted by a higher political authority.

Table 8: RE Targets (2014)

	RE Strategy/Action Plan/Program	RE Targets							Target Date
		Wind MW	PV MW	CSP MW	Biomass MW	Geo-thermal MW	Total		
							MW	%	
Algeria	National Program for Renewable Energy and Energy Efficiency 2030 adopted in 2011	50	280	325	0	0	660	6	2015
		270	800	1,500	0	0	2,570	15	2020
		2,000	2,800	7,200	0	0	12,000	40[1]	2030
Bahrain	None	-	-	-	-	-		5[2]	2030
Egypt	National RE Strategy 2020 adopted in 2008, updated in 2012; Feed-in Tariff Program; Master plan for RE 2025.	7,200	At least 2,300	0	0	0	9,500	20[3]	2020
Iraq	Renewable Energy Plan 2013-2017, adopted in 2012.	-	-	-	-	-	-	5	2030
Jordan	Master Strategy of Energy Sector in Jordan for the period (2007-2020) adopted in 2007.	1,200	500	100	50	0	1,850	10[4]	2020
Lebanon	Policy Paper for Electricity Sector (2010); NEEAP (2011-2015)	60-100	10	0	15-25	0	125-165[5]	12	2020
Libya	National Plan for developing RE in Libya (2013-2025).	260	124	0	0	0	384	3	2015
		600	344	125	0	0	1,069	7	2020
		1,000	844	375	0	0	2,219	10[6]	2025
Morocco	New National Energy Strategy Assessment Report, 2013.	2,000	2,000			6,000[7]	42[8]	2020	2020
Palestine	National Energy Strategy (2012-2020); Palestinian Solar Initiative.	44	45	20	21	0	130	10[9]	2020
Syria	The 11th Five-Year Plan for 2011-2015	1,000	2,000	1,300	250	0	4,550	30	2030
Sudan	RE master plan is under development	680	667	50	68	54	1,582[10]	11[11]	2031
Tunisia	The study for energy mix in 2030 is currently under development.	1,500	1,900	300	300	0	4,000	30[12]	2030
Yemen	National RE and EE Strategy adopted in 2009	400	8.25	100	6	160	674.25	15[13]	2025
UAE - Abu Dhabi		-	-	-	-	-	460	7	2020
UAE - Dubai	Dubai Integrated Energy Strategy 2030	-	-	-	-	-	3000	15	2030
Saudi Arabia	Saudi Arabia's Renewable Energy Strategy	9,000	16,000	25,000	3,000[21]	1,000	54,000	30	2032
Kuwait		10	10	50	0	0	70	15	2030
Qatar		-	-	-	-	-	1,800	20	2024

[1] Electricity generation
[2] Installed capacity
[3] Including current installed capacity of hydro
[4] Electricity generation
[5] Primary energy
[6] Including 40 MW hydro
[7] Electricity generation
[8] Including 2,000 MW hydro
[9] Installed capacity
[10] Electricity generation
[11] Including additional 63 MW hydro
[12] Installed capacity
[13] Installed capacity
[14] Installed capacity
[15] Waste to Energy

Sources: RCREEE Focal Points

Wind power station Kchabta-Metline - Bizerte in the North of Tunisia
Provided by: STEG

While Morocco's target stands out in terms of RE share of total installed capacity, Saudi Arabia is the country with the most ambitious target when it comes to total amount of planned capacity – 54,000 MW by 2032. Considering the already very high per capita electricity consumption and growing power demand in the country, this massive amount of installed RE is estimated to cover only 23-30% of total energy generation in 2032. Another interesting country is Algeria. In early 2015 Algeria announced that its RE target for 2030 would be revised from 12,000 MW to 25,000 MW.

It is, however, hard to compare targets since the format in which they have been expressed varies substantially. Some countries express targets as a share of generation mix, others as a share of total installed capacity, or even as a share of total primary energy consumption. At the same time, countries that express targets as a percentage of generation do not always provide details about the corresponding value in GWh. Despite these shortcomings, it is safe to say that most of the expressed targets are relatively ambitious, especially in relation to the continuing high regional domination of fossil fuels. The targets further reveal a regional preference and focus on solar rather than wind.

3.1.2 RE Share

The most common way to evaluate the overall effectiveness of a country's efforts to promote RE is by looking at the share of RE in the installed power capacity and corresponding electric output mix. The changing volume of installed capacity or generation, usually expressed as share of the total power mix, gives a simple indication of commitment to meet national RE targets. The changing volume of installed capacity or generation, usually expressed as share of the total power mix, gives a simple indication of commitment to meet national RE targets.

Table 9 provides an overview of each country's renewable mix (excluding hydro) in terms of installed capacity.

Table 9: RE Installed Capacities[1] (2014)

	Wind MW	PV MW	CSP MW	Other MW	Total RE in 2014		Total RE in 2012	
					MW	% of total installed capacity	MW	% of total installed capacity
Algeria	10	7.1	25	0	42.1	0.37	25	0.22
Bahrain	0.5	5	0	0	5.5	0.14	0.5	0.01
Egypt	610	15	20	0	645	2	585	1.88
Iraq	0	0	0	0	0	0	0	0
Jordan	1.45	13.6	0	3.5	18.55	0.59	6.55	0.1
Kuwait	0	1.8	0	0	1.8	0.01	1.8	0.01
Lebanon	0.5	1.6	0	0	2.1	0.09	1.1	0.05
Libya	0	5	0	0	5	0.05	5	0.06
Morocco	**750**	15	20	0	**785**	**10.9**	325	5.08
Palestine	0.7	4	0	0.2	4.9	3.38	1.52	1.06
Qatar	0	1.2	0	40	41.2	0.46	41.2	-
Saudi Arabia	0	19	0	0	19	0.03	7	-
Sudan	0	0	0	0	0	0	0	0
Syria	0.15	2	0	0	2.15	0.02	2.15	0.02
Tunisia	245	20	0	0	265	**6.63**	158	3.91
UAE	0	**33**	**100**	1	134	0.49	22.5	-
Yemen	0	3	0	0	3	0.20	1.5	0.1
Arab Region	1618	146	165	44	1974	1	1184	

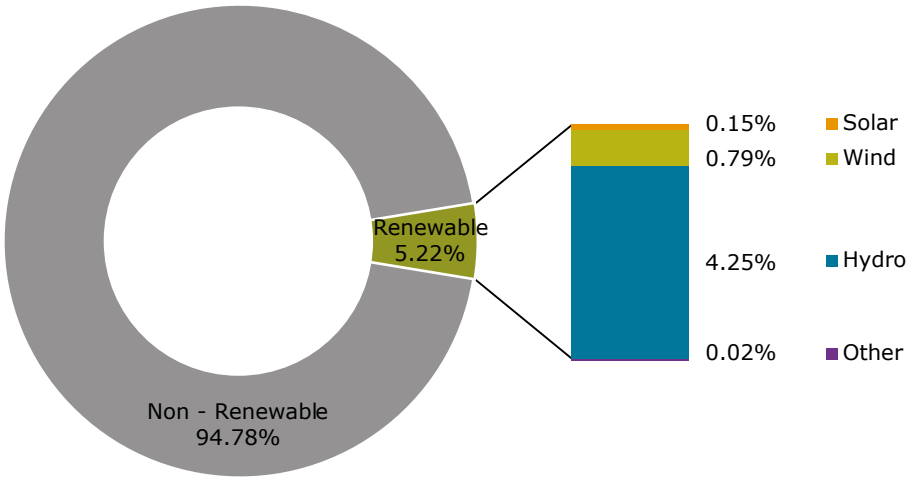
Although hydro is considered a renewable source of energy, it is excluded from further evaluation in AFEX due to the maturity of the industry and its limited potential for further development.

Observing the data by country, the dominant generation position has been taken over by Morocco when it comes to wind power and UAE when it comes both solar PV and CSP. In terms of overall share of installed RE, the leader continues to be Morocco, which is the country that has seen the largest development since AFEX 2013. Morocco has increased its share of solar from 19.5 MW in 2012 to 35 MW in 2014, and wind from 290 MW in 2012 to 750 MW in 2014. This can be explained by the country's long-term efforts and the implementation of various support polices, especially to deploy wind projects.

[1] Exluding hydro

The overall energy generation mix of Arab states has increased marginally since the 2013 edition of AFEX, and the share of RE remains relatively low despite abundant RE sources in the region. The aggregate share of installed RE in 2014 consists of hydro (4.25%), followed by wind (0.79%), solar (0.15%), and others (0.02%).

Figure 4: Regional Share of Installed Capacity of Renewable Energy (2014)



Source: AUE (2014), RCREEE focal points

3.1.3 RE Projects under Construction

RE projects under construction is an important complement to the previous indicator, which only took into account completed projects. In early RE markets, projects under construction give a first indication of successful implementation of RE strategy, and allow for assessment of the likelihood of achieving the stated targets. A continued evaluation of the actual outcome of RE efforts is also important in order to offer governments an opportunity to adjust RE strategies along the way. Table 10 provides an overview of the RE projects under construction in 2014. The table provides information on both public and privately-developed projects.


Tafila wind farm under construction- Jordan

Table 10: RE Projects under Construction, 2014 (Only Projects above 1 MW are Reported)

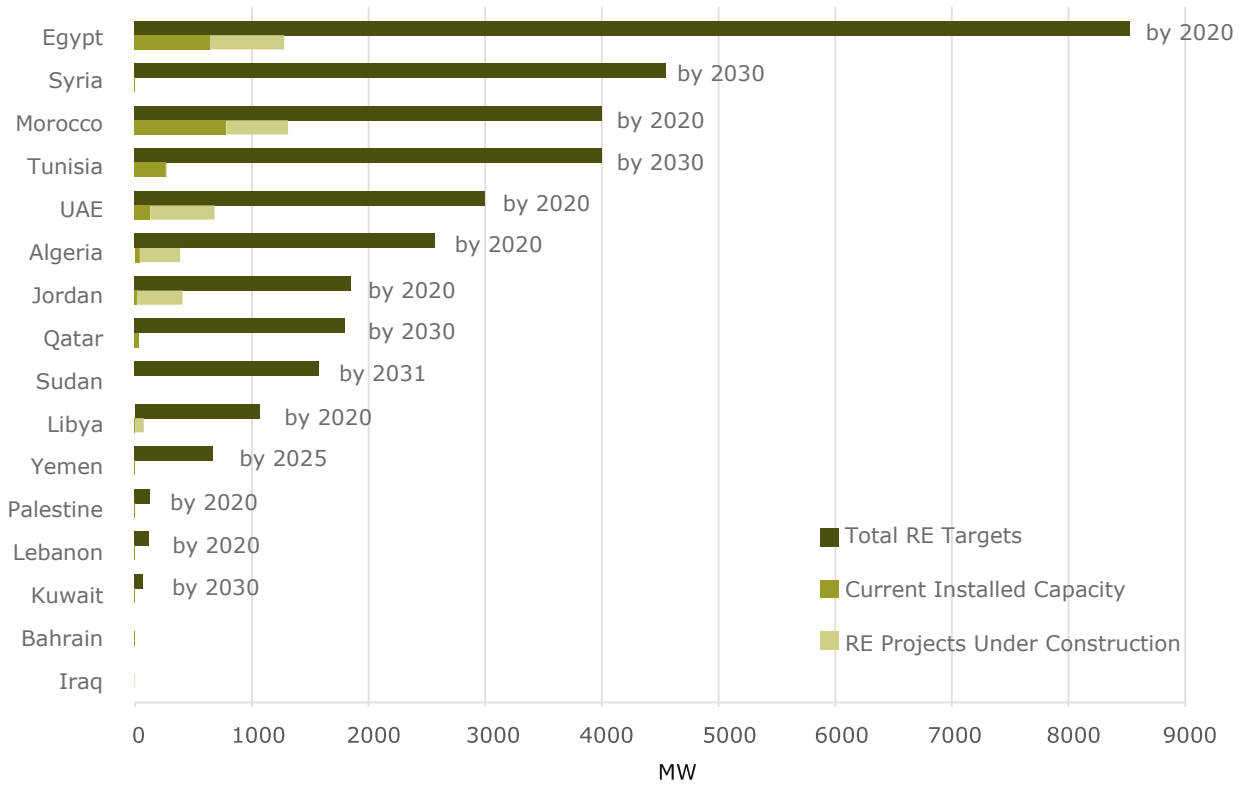
	RE Technology	MW	Project	Total
Algeria	PV	53	Sud Ouest du Pays	348
	PV	90	Hauts Plateaux	
	PV	90	Hauts Plateaux Centre	
	PV	85	Hauts Plateaux Ouest	
	PV	3	Djanet	
	PV	9	Tindouf	
	PV	13	Tamanrasset	
	Geothermal	5	Geothermal	
Bahrain	-	0	-	0
Egypt	Wind	140	Gulf of Al-Zayt	637
	Wind	120	Gulf of Suez (Italgen Co)	
	Wind	220	Gabal Al-Zayt	
	Wind	120	Gulf of Suez (NREA)	
	PV	10	Siwa	
	PV	27	Distributed PV in 13 locations	
Iraq	PV	1	Ministry of Electricity	4
	Distributed hybrid (PV with Diesel)	3	Off-grid rural electrification of 1,000 families	
Jordan	Wind	117	Tafila	432.17
	Wind	66	Maan	
	PV	10	Maan	
	PV	10	Shamsuna (South Aqaba)	
	PV	20	North Hassan Industrial	
	PV	164	Maan Development Area	
	PV	5.17	Azraq (EPC)	
	PV	20	Hosha/ Mafraq	
	PV	10	Mafraq	
	PV	10	Aqaba	
Kuwait	PV	10	Umm Gudair	80
	PV	10	Shagaya RE Complex I	
	CSP	50	Shagaya RE Complex I	
	Wind	10	Shagaya RE Complex I	
Libya	Wind	60	Darnah	74
	PV	14	Al-Jofra	
Morocco	Wind	150	Taza	530
	Wind	100	Koudia Al Baida Repowering	
	Wind	120	Jbel Sendouq-Khalladi ("Khalladi")	
	CSP	160	Noor 1	
Palestine	PV	470 kW	Tubas	1.17
	PV	700 kW	Jericho	
Qatar	PV desalination	10	Duhail	10
Saudi Arabia	PV desalination	15	Khafji	65
	Integrated Solar Combined Cycle	50	Green Duba ISCC	
Sudan	-	0	-	0
Syria	-	0	-	0
Tunisia	PV	10	Tozeur	10
UAE	PV	200	Dubai MBR Solar Park Phase 2	550
Yemen	-	0	-	0

Source: RCREEE focal points

As demonstrated in Table 10, there are five countries, Algeria, Egypt, Jordan, Morocco, and UAE that emerge as the leaders when it comes to RE projects under construction. All five belong to the group of Arab countries with ambitious and officially adopted RE targets. The countries that have no or very little RE projects under construction are Bahrain, Kuwait, Lebanon, Qatar, Sudan, Syria, and Yemen.

In Libya, the construction of both projects stopped due to the deteriorating political situation in the country. In total, there are more than 2,500 MW of RE projects under construction, which is surely a positive development. This will more than double the total RE installed capacity in the region, which currently amounts to 1,974 MW.

Figure 5: Arab States Distance to Targets (2014)



3.2 Supporting Policies

Even though cost effectiveness and competitive advantages of RE systems improved and look better than ever before, many of these technologies remain in an early stage of commercialization in the region and lack mainstreaming strategies. For this reason, announced RE targets need to be combined with appropriate supporting policies that specifically target mitigation of commercial risks of investors and lenders associated with financing and deploying of RE projects.

3.2.1 IPP Public Competitive Bidding

IPP Public competitive bidding refers to the process where a government identifies and reserves a site aimed for private development. The developer is chosen through a tendering process and a PPA is signed with the successful bidder at the bidding price.

IPP public competitive bidding used to be the most preferred policy option to enable private development of large-scale RE projects in the region. However, with the adoption of feed-in tariffs schemes and direct proposal submission, only few countries pursue this model for development of large-scale RE projects. In Jordan, for example, the 90-MW wind project which was previously planned and already tendered for private development through public competitive bidding process has been changed to a direct proposal submission scheme.

While a large majority of the countries in the region enable IPP public competitive bidding processes in their legislations, only a handful of countries have launched official tenders for some sort of RE project. Among these, Morocco has proved to be effective in carrying out IPP public competitive bidding processes for RE projects and in realizing its announced plans. In other countries, where tenders have been announced for private development of RE projects through public competitive bidding schemes, the tendering processes have often been delayed or interrupted for various reasons.

RE COMMITMENT

In total there are more than 2,500 MW of RE projects under construction, which is surely a positive development.

What characterizes the Arab region in regards to IPP public competitive bidding processes in general is a lack of clear signals from the governments in terms of future announcements of projects under this process. Morocco, Egypt and Saudi Arabia are the only countries with clearly announced targets and plans for IPP public competitive bidding of RE projects. Morocco is well on track towards meeting its targets of developing 1,000 MW of solar and 1,200 MW of wind power through competitive bidding. In addition to around 500 MW of RE projects that have been awarded PPAs, another 850 MW of wind power and 300 MW of CSP are now in the tendering process.

Table 11: IPP Public Competitive Bidding – Status of Projects (2014)

	PPA Bidding/Public Competitive Bidding					
	Identified RE Sites for Private Development (MW)		Announced Tenders (MW)		PPA Signed (MW)	
	Wind	Solar	Wind	Solar	Wind	Solar
Algeria	0	0	0	0	0	0
Bahrain	0	0	0	0	0	0
Egypt	2,500	0	250	0	0	0
Iraq	5	15	5	15	0	0
Jordan	0	0	0	0	0	0
Kuwait	0	60	0	60	0	0
Lebanon	60	10	60	-	0	0
Libya	120	50	0	0	0	0
Morocco	1,200[1]	1,000	1,200	510	150	510
Palestine	0	0	0	0	0	0
Qatar	0	0	0	0	0	0
Saudi Arabia	500-800		0	0	0	0
Sudan	0	0	0	0	0	0
Syria	50	0	50	0	0	0
Tunisia	0	0	0	0	0	0
UAE	0	**1,000**	**0**	300	0	100
Yemen	0	0	0	0	0	0

Compared to Morocco, Egypt has seen large delays in its plans to develop 2,500 MW of wind power through competitive bidding. Ten bidders pre-qualified for the first project of 250 MW issued in 2009, but the project was interrupted because of sovereign guarantee issues. For two years now, the New and Renewable Energy Authority, NREA, has talked about a re-launch of the 250-MW project. Tender documents were sent to developers in 2014 and proposals are expected to be submitted in the spring of 2015. Instead, Egypt has launched an auction for the concession of land designated for private wind power projects. However, the auction differs from the previous projects in the way that it does not allow the selling of electricity to the transmission company EETC.

Similar to the Egyptian case, the announcements of planned tenders have also been delayed in Saudi Arabia. The country launched very ambitious RE targets in 2012, and its planned tendering rounds would together allow for the development of between 500-800 MW of RE projects for utility supply. The first introductory round was supposed to be launched in late 2013, but no official announcements have yet been made.

In the UAE, Abu Dhabi was the first Emirate to announce and award a PPA tender for a RE power plant. This 100-MW CSP plant has been in operation since 2013. In early 2015, UAE and the Dubai Electricity and Water Authority (DEWA) awarded a PPA for another large-scale 200-MW PV power plant, the second phase of the Mohammad Bin Rashid Al Maktoum Solar Park.

Promising steps towards possibilities for IPPs to produce electricity for the grid have also been taken in Tunisia during the last year. The new regulatory framework under preparation will open up competitive biddings for private RE projects larger than 10 MW.

In 2014, Iraq announced tenders for the private development of RE projects through IPPs for the first time. Four projects are currently identified as pilot projects for private development through IPP public competitive bidding schemes: three PV projects with an approximate capacity of 5 MW each and one wind project with an approximate capacity of 5 MW as well. Interested investors are invited to submit a letter of interest to the National Investment Commission by 14 May 2015.

[1] 1000 MW through Integrated Wind Programme and 200 MW extension of existing wind project (Koudia Al Baida)

Kuwait is another country that announced a tender for the private development of a large-scale RE project for the first time. In May 2014, Kuwait's Partnerships Technical Bureau invited companies to submit expressions of interest to develop the Al-Abdaliyah integrated solar combined-cycle (ISCC) project. ISCC is planned to run on a combination of solar power and gas, with a total installed capacity of 280 MW, and with a 60 MW solar component. The selected qualified bidder will sign a 25-year-long PPA with the Ministry of Water and Electricity (Anonymous, 2014). In this context, it is noted that Egypt and Morocco have given up their ambitions to further develop the ISCC technology for CSP applications, and opt only for stand alone CSP.

3.2.2 Direct Proposal Submission

Direct proposals allow developers to submit unsolicited applications to the government. Unlike IPP public competitive bidding, such a process allows for a PPA to be signed on the initiative of the developer. Naturally, this process requires less preparatory work from government, thus the process is usually faster and more direct.

Jordan and Palestine are the only countries that allow direct proposal submission. While Jordan provides some guidance when it comes to identifying appropriate land sites, direct proposals usually put greater responsibility upon the developer to find a suitable site for deployment. This is particularly difficult in Palestine where most rural land suitable for larger scale ground-mounted RE systems remains under Israeli control.

In Jordan, two rounds of direct proposals have been launched with a third round put on hold due to grid capacity issues and a rejected transmission grid improvement grant. The first round was initiated in 2011 and involves 12 projects with a total capacity of 200 MW. Round two has not yet been completed. The Ministry of Energy and Mineral Resources received 34 proposals with 50 MW each (1700 MW in total). However, only four or five proposals will be chosen in the beginning of 2015 with a total capacity of 200-250 MW.

The Jordanian direct proposals have seen a major shift from the first round to the second round. The first round involved a standard flat rate feed-in tariff, which is the common direct proposal model in many countries. The second round saw a shift to a tender scheme under which the project that is technically viable and offers the lowest feed-in rate will be chosen, in other words more similar to a traditional competitive bidding process. This shift has been a smart move from the government. By offering a very attractive rate in the first round of projects, the country was able to grab the attention of many of the world's premium solar PV developers as well as local developers relatively new to the market. Through a 'learning by doing' approach, Jordan has been able to improve the capacity of its governmental organizations, as well as local developers, to enable the industry to thrive over the coming years, with a second round currently being evaluated and a third round to be undertaken as soon as the capacity of the grid has been increased to accommodate more projects. Each round has a nominated priority area that the Ministry of Energy and Mineral Resources (MEMR) has identified and would like to develop. Developers with deployment plans in these areas will be prioritized (RCREEE, 2014).

In Palestine, authorities received one offer for the development of a large-scale wind project with a capacity of 100 MW, and four offers for the development of large-scale solar projects: one for constructing five solar stations (28 MW), the second to build a 20-MW PV plant in Hebron, and the last two offers for the development of two projects with 10 MW and 5 MW capacities. By now, the authorities have only granted permit for development of a 3-MW PV project.

RE TARGETS

Morocco is well on track towards meeting its targets of developing 1,000 MW of solar and 1,200 MW of wind power through competitive bidding.

Table 12: Direct Proposal Submission – Status of Projects

	Direct Proposal Submission					
	Tender Announced for Direct Proposal Submission (MW)		Proposals Qualified for Private Development (MW)		PPA Signed (MW)	
	Wind	Solar	Wind	Solar	Wind	Solar
Jordan Round I	230 + 90[1]	200	230+90	210	0	210
Jordan Round II	0	1,700	0	0	0	0
Palestine Round I	100	63	0	3	0	3

[1] A 90-MW wind project was previous planned to be developed through public competitive bidding. In 2014, the Ministry of Energy and Mineral Resources requalifed this project to be developed through direct proposal submission process.

3.2.3 Feed-in Tariffs

Feed-in tariffs, or FITs, are a type of market-based instrument aimed to increase investment security for RE technologies where the supply price has not yet reached grid parity and the incremental costs must be covered either by treasury, a foreign grant/loan or distributed among consumers. Worldwide, FITs are commonly used and many studies argue that this policy option is the most effective to stimulate the deployment of grid-connected RE technologies (Michell et al., 2011; del Río, 2012; Couture & Gagnon, 2010).

Several countries in the region have some sort of experience with FITs and others are now considering introducing this policy option. Since the first edition of the AFEX report, Algeria and Egypt have moved forward and issued FITs, while Palestine has taken a step back and cancelled its FIT scheme for solar PV deployment. Syria is still suffering from the ongoing armed conflict and all activities related to its FIT scheme and other RE development are stalled.

Other countries looking into the possibility of introducing FITs are Tunisia and Saudi-Arabia. Tunisia is in the process of adopting its new RE electricity law, which will open up FITs for projects up to 10 MW connected to the medium voltage grid (ANME, June 2014).

The major similarity between the FITs introduced in Algeria, Egypt, and Palestine concerns the choice of applying a fixed tariff rate. Depending on scheme and technology, some of these fixed rates are revised during the duration of the programs, but always according to pre-defined price levels and not according to market fluctuations, except FOREX rate fluctuations. This factor creates certainty for investors who know from the beginning how much support they can expect. There are many differences between the schemes in the region such as the duration, scope, tariff structure, as well as tariff levels and how these levels have been determined.

The Egyptian FIT scheme was introduced in October 2014 and applies to both solar PV and wind projects. Tariff rates per kWh are technology-specific, and have further been classified according to the amount of installed capacity (when it comes to solar PV) and full operating hours determined by site (when it comes to wind). For solar PV, the FIT will be granted according to a fixed rate for 25 years. For wind projects, FIT will be fixed and granted for 20 years – the first 5 years according to a flat rate and the following 15 years according to a site-specific fixed rate (EgyptERA, 2014a).

The tariff level for wind is moderate with a flat tariff of EGP 0.684 – EGP 0.828 (USD 0.09-0.11) per kWh during the first five years and then EGP 0.329 – EGP 0.8208 (USD 0.04-0.11) per kWh during the remaining 15 years. All FIT projects in Egypt are subject to guaranteed access and priority dispatch to the grid. If the latter is not possible, the transmission company EETC is obliged to compensate the RE generator for any losses. Land access will be provided on the basis of a usufruct, implying that the investor pays a land fee of 2% of the project income (EgyptERA, 2014a). Over 100 projects have been prequalified for the first round of the FiT in Egypt.

In April 2014, Algeria made a second attempt to introduce a FIT scheme since its first attempt in 2004. The new Algerian FIT scheme, eligible for both solar PV and wind energy projects, applies fixed tariff rates. This is the main difference from the old scheme that used premium price tariffs. The design of the scheme is similar, yet slightly more complicated than the Egyptian FITs. Tariff rates per kWh are technology-specific and have interestingly been classified according to the quality of wind or solar resources. For both solar PV and wind energy, PPAs are granted for 20 years, with a revision of initial tariff rates after the first five years (Arrêté du 2 Rabie Ethani 1435, 2014). During the first five years, the FIT is based on a flat uniform rate, which is later revised for each project according to the effective operating hours during the initial five-year phase. The FIT rate will be increased up to 15% for the projects with low energy yield and reduced up to 15% for projects with a high energy yield. The initial tariff level for systems of a size between 1-5 MW is set to be DZD 15.94 (USD 0.17) per kWh for solar PV and DZD 13.10 (USD 0.14) per kWh for wind. For systems larger than 5 MW, the initial tariff is set to be DZD 12.75 (USD 0.14) per kWh for solar PV and DZD 10.48 (USD 0.11) per kWh for wind (Arrêté du 2 Rabie Ethani 1435, 2014). The tariff revision after 5 years can change the tariffs by approximately +/- 30%.

The Algerian general investment framework is rather restrictive. To qualify for Algerian FIT, 51% of local ownership is required and financing must be structured through local banks. In addition, foreign investment projects must be submitted to the National Investment Council (CNI) for its approval (DII, 2014). Such demanding requirements have hindered so far the entrance of foreign investors into the market and benefiting from FIT.

Palestine has adopted FITs for several different RE technologies. However, the only established program that has made use of these FITs is the Palestinian Solar Initiative, introduced in 2013. This program offered small-scale (<5kW) solar PV installers a fixed feed-in tariff, annually decreasing by 7% under a 20-year power purchase agreement. The program was planned to be launched in three steps, but was interrupted halfway through the second step because of the high associated costs (PERC, June 2014).

FIT levels should be determined as close as possible to the actual generating cost of each technology. While missing country-specific LCOE calculations, it is clear that introduced tariff levels vary a lot between the countries. Algeria offers a higher initial support to RE systems; however this FIT will be revised after the first five years of operation in accordance with the specified schedule of adjustments, and depending on the actual energy yield for solar projects and full load hours for wind projects. Palestine, on the other hand, started with tariff levels that overcompensated the investors. This, in combination with an undefined plan for financing, led to the termination of the program.

FEED-IN **TARIFFS**

Several countries in the region have experience with FITs and others are now considering introducing this policy option. Since last year's AFEX report, Algeria and Egypt have moved forward and issued FITs.

3.2.4 Net Metering

Net metering has become a widespread billing mechanism to support deployment of distributed RE installations all over the world (Michell et al., 2011). It is essentially used to encourage residential or small-scale businesses to install RE and particularly solar PV, primarily for self-consumption.

The net metering mechanism can be seen as more flexible and easier to administer alternative to feed-in tariffs. Net metering usually places the economic burden on the utility and is of little or no cost to the state. It allows for prosumers[1] to feed their excess RE generated electricity into the grid and use it to offset electricity consumption from the utility. This provides the prosumer with a long-term guarantee of low electricity bills, something that can be particularly attractive in countries with high electricity tariffs. The bill-saving value is highest if the electricity tariff structure is divided in tariff-brackets and prosumers are able to cut their top consumption and avoid the most expensive brackets (Darghouth, Barbose, & Wiser, 2011).

The design details of the net metering mechanism is of crucial importance for the attractiveness of the scheme and particularly when it comes to how the potential net excess generation is handled in the end of a settlement period. Some systems allow for customers to credit the excess kWh to the next billing period; others have been regulated so that any excess kWh in the end of the period is granted to the utility, or alternatively that any surplus has to be purchased by the utility. Another design detail that varies between different net metering schemes is the eligible installed capacity. The best result of a net metering scheme can be obtained if the mechanism does not limit system size or capacity and allows for excess generation to be credited to the next settlement period (Michell et al., 2011).

In the region six countries, Egypt, Jordan, Lebanon, Tunisia, UAE and to some extent Morocco have adopted net metering policies. However, only a few of them have implemented this policy in practice. Since the Palestinian FIT scheme was cancelled, an implementation of the net metering policy is considered instead, but has not yet been launched.

The implemented schemes are all very different and are targeting different categories of prosumers. While Jordan and Tunisia have relatively simple schemes that have

[1] "Prosumer" is used to indicate actors with the double role of producer and consumer, e.g., an actor that installs an RE system for self-consumption (Schleicher-Tappeser, 2012, p. 69).

attracted smaller system investors, Egypt has designed a complicated scheme more suitable for the electricity consumers in the highest tariff slot under the low-voltage grid. Common for all schemes is that they limit the allowed capacity, either clearly stating it in the policy (in the case of Jordan and Tunisia) or through the design of the billing mechanism, which does not make it profitable to install a system that covers more than part of your own consumption (in the case of Egypt).

Jordan

Jordan's net metering scheme applies to all RE systems up to 5 MW. The size of the systems making use of the scheme cannot exceed the consumer's average monthly consumption. In case of any excess electricity at the end of the month, this surplus is transferred to the next month. In the end of the year, potential surplus can either be sold at a price of JOD 0.12 (USD 0.15) per kWh or be transferred to the next year. Even though the scheme can be used by relatively large systems, the policy does not provide enough details on how it will take into account the day/night/peak capacity tariff structure that applies for most commercial and industrial consumers (RCREEE, 2014).

Tunisia

Tunisia offers different net metering conditions depending on which grid level the prosumer is connected to. For actors connected to the low-voltage grid, the policy has been designed so that no monetary transfer is ever involved. Any net excess electricity at the end of the billing period is rolled over to the next period and in order to prevent the level of excess electricity from becoming too high, the policy specifies that prosumers are not allowed to install a higher capacity of solar PV than previous years capacity subscription (Decree n 2009-2773). For the actors connected to the medium or high-voltage grid, prosumers are allowed to produce and sell an amount of surplus electricity that must remain within the limits of 30% of what is being produced annually. Since the retail tariff for electricity within this sector is time-based, the net metering scheme employs a time of use design. While the scheme targeting large-scale prosumers has been used to a very limited extent, the scheme targeting small-scale actors has been popular (STEG, June 2014). This scheme has been successfully combined with a grant and a bank loan allowing net metering subscribers to pay off their loan directly via the electricity bill.

The main impediment to a wider use of the net metering scheme by medium or high-voltage customers is the current regulatory framework of Tunisia. The current regulatory framework of Tunisia still does not allow for private to private sale of electricity. Many industries are reluctant to install RE power projects as it is not their 'core business.' So the investment risks are perceived too high, and the scheme is not sufficiently attractive.

Egypt

Egypt adopted a net metering policy in the beginning of 2013 and is now in the process of implementing it. Although the policy de facto stopped operating due to introduction of FIT program, by law it is still operational and is still open for applications. The policy applies for solar PV projects connected to the low voltage grid. The scheme has a very complicated design where the prosumers can only offset electricity consumed in the highest tariff bracket for each month. No installation limit has been specified, meaning that customers can connect a system that produces more electricity than they consume (EgyptERA, 2013). This is, however, unlikely because of a number of reasons. Most importantly, the fact that surplus electricity can only be credited in the highest tariff bracket, which encourages customers to install PV systems that only meet a small portion of their overall need. This behavior is reinforced through the policy design, which cancels potential excess electricity in the end of the year.

Morocco

Morocco does not provide any support for self-generators at the moment. It is worth mentioning that it is the only country with any large-scale grid-connected RE auto-producer in practice. These auto-producers were established as a result of a specific investment program, guaranteeing the purchase of excess electricity at a preferential price, launched by the utility operator ONE in 2006. This specific program ended in 2012 and auto-producers are no longer eligible to benefit from these incentives.

It is important to note that net metering is more effective as an incentive mechanism for RE in markets with unsubsidized electricity prices. In countries with low electricity prices, net metering has a small effect due to the wide gap between investment cost of an RE system and the potential for electricity savings. Among the countries with implemented schemes, Egypt and Lebanon have the lowest electricity tariffs. Looking at potential electricity bill savings, it is unlikely that the scheme in its current design will be attractive.

UAE, Dubai

On December 15, 2014 the UAE's Executive Council passed a motion that allows for rooftop PV systems to operate under a net metering system. The net metering scheme was officially launched by Dubai Electricity and Water Authority (DEWA) on 15 March, 2015 and is expected to encourage commercial and residential building owners to fit solar PV panels through the Shams Dubai framework, enabling them to submit planning applications to DEWA directly through a free online portal. The PV generation capacity is limited to the equivalent of a prosumer's total load, which is approved by DEWA. Despite the limitation on capacity, there is no limit to the amount of generated energy. This means that prosumers can generate more electricity than they consume and the surplus energy will be carried forward as credit to the following bill, with no time or quantity restrictions. Procurement and installation has to be conducted according to DEWA's standards and approved list of equipment, consultants, and contractors.

Table 13: Net Metering Policy

	Net Metering Policy	Projects Implemented through Net Metering Scheme, 2014 (MW)
Algeria	No net metering policy.	-
Bahrain	No net metering policy.	-
Egypt	Decision of Egyptian Electric Utility and Consumer Protection Agency on regulating rules to encourage the exchange and usage of electrical power produced from solar energy adopted during its fourth session for 2012/2013 financial year on 29/01/2013.	0
Iraq	No net metering policy in place yet, but Ministry of Electricity is considering revising electricity tariffs and introducing a net metering scheme to support the development of distributed renewable energy systems.	-
Jordan	Law No 13 (2012) on Renewable Energy and Energy Efficiency Directive governing the sale of electrical energy generated from RE systems issues by the Council of Commissioners of Electricity Regulatory Commission pursuant to Article 10 (b) of the Renewable Energy and Energy Efficiency Law No 13 (2012).	13.6
Kuwait	No net metering policy.	
Lebanon	Decision of Board of Directors of Electricité du Liban (EDL).	1
Libya	No net metering policy.	-
Morocco	No net metering policy.	-
Palestine	Decree approved by the cabinet in March 2012 decision No 13/127/16 on the use of Renewable Energy.	4
Qatar	No net metering policy.	-
Saudi Arabia	No net metering policy.	-
Syria	Electricity Law No 32 (2010).	0
Sudan	No net metering policy.	-
Tunisia	Decree of the Ministry of Industry, Energy and Small and Medium-Sized Enterprises No 2009-2773 dated 28 September 2009, fixing the transport conditions of electricity produced from renewable energies and sale of its surpluses to the Tunisian company of electricity and Gas. Decision of Minister dated 1 June 2010.	20
UAE	"Shams Dubai" net metering scheme.	0
Yemen	No net metering policy.	-

3.3 Energy Subsidies

Energy subsidies worldwide continue to influence overall RE progress. While the global spending on RE subsidies, i.e incremental cost cover, reaches around USD 101 billion per year, it is estimated that five times that amount is granted to fossil fuel subsidies(IEA, 2013). This subsidy difference is even larger in the Arab region, in which almost 50% of global fossil fuel subsidies are spent, while the RE industry receives very little support from governments (IMF, 2014).

A transition to sustainable energy development must happen with the 'system approach' in mind, where actions should be taken at all levels (Liebreich M., 2013). Keeping current fossil fuel subsidies in place will keep fossil-dependent energy systems embedded longer, causing tremendous damage to the environment and society as a whole (Ochs and Makhijani, 2012). Regulatory policy changes, as mentioned earlier in this chapter, are not enough to speed up the deployment of RE technologies. Any country with serious ambitions to increase the share of RE technology must, in parallel, take the necessary steps to reform, phase out, or reduce fossil fuel subsidies. Such efforts include estimating the amount of subsidies, assessing social and economic impact of a subsidy phase out, designing a strategy that minimizes the negative effects during the phase out, and last but not least, make sure to create public acceptance for undertaking these necessary measures (IRENA, 2014b). This section starts by providing a general idea of the magnitude of subsidies in the electricity sector in each country and proceeds with an overview of recently implemented subsidy reforms.

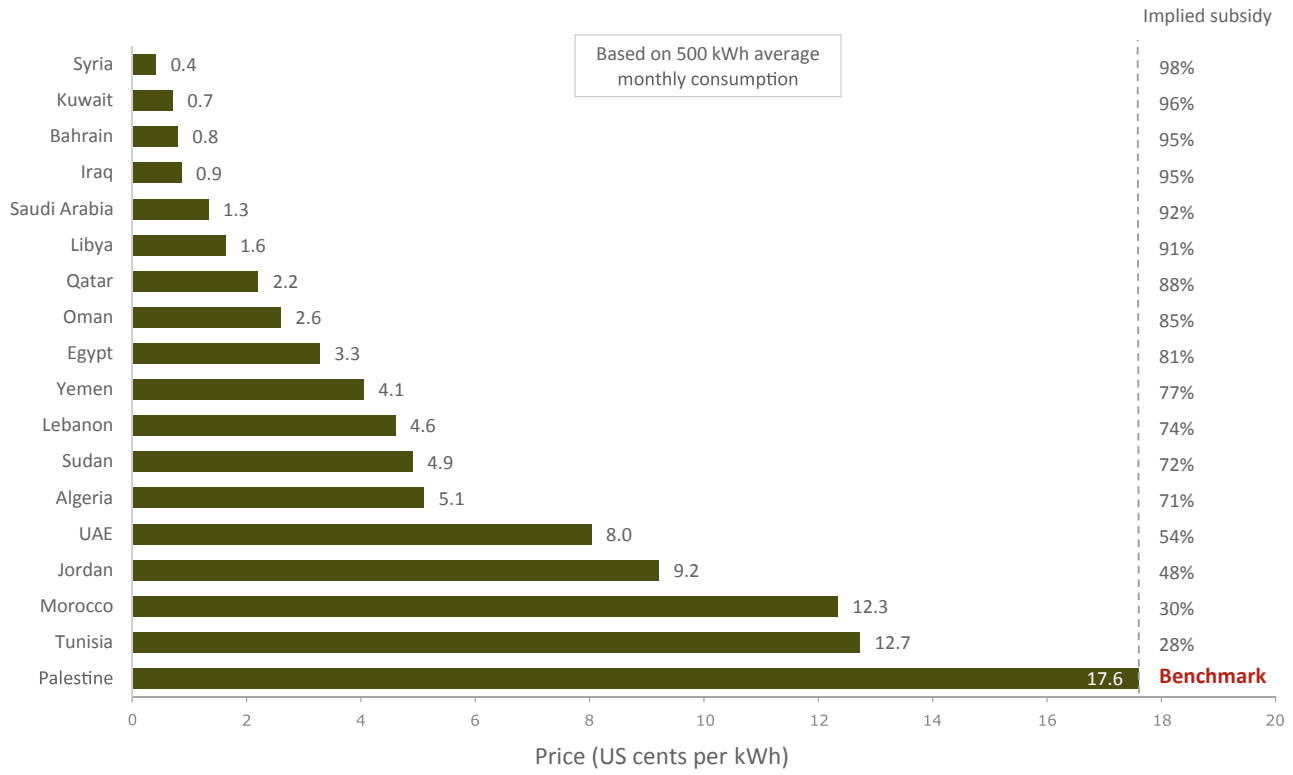
Estimating the exact amount of subsidies in each Arab country is a challenging task due to the different forms they may take, modes of implementation, poor data quality and availability, secrecy of information, and lack of transparency (RCREEE, 2013a).

Based on the price-gap approach, the first edition of AFEX Renewable Energy introduced a method to provide an estimate of implied subsidies. As a reference price, Palestine's retail electricity tariffs were selected. They are almost unsubsidized and, therefore, represent the approximate true retail cost for a specific energy mix used for power generation. In all other Arab countries, prices are currently set by the national governments. It should be noted that the goal of this method is not to calculate the exact amount of subsidies, but rather provide a general idea of the magnitude of subsidies in the electricity sector.

Figures 6, 7 and 8 illustrate an implied subsidy in the residential, commercial, and industrial sectors. These figures are based on an estimation of the average monthly electricity consumption by different segments of consumers in 17 Arab countries. For residential customers, the average consumption is taken at 500 kWh per month, for commercial customers 1,500 kWh per month, and for industrial customers 30,000 kWh per month.

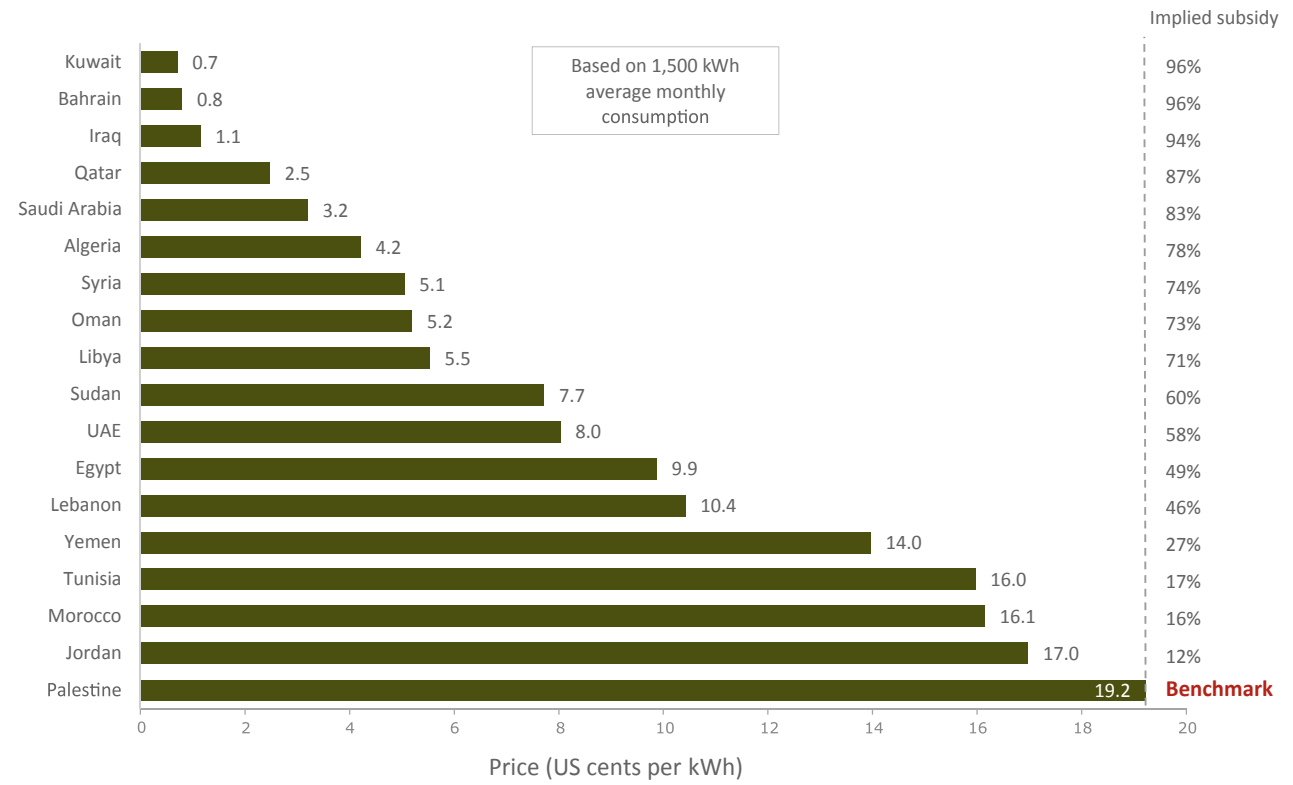
All of the countries represented in this report subsidize electricity tariffs, while most subsidize fossil fuels. Several countries recognize the problems associated with fossil fuel subsidies and have adopted subsidy reform programs and implemented energy price adjustments. Despite these efforts, the overall subsidy rate remains high for both oil exporting and oil importing nations in the region.

PV - Palestine
By Emma Åberg



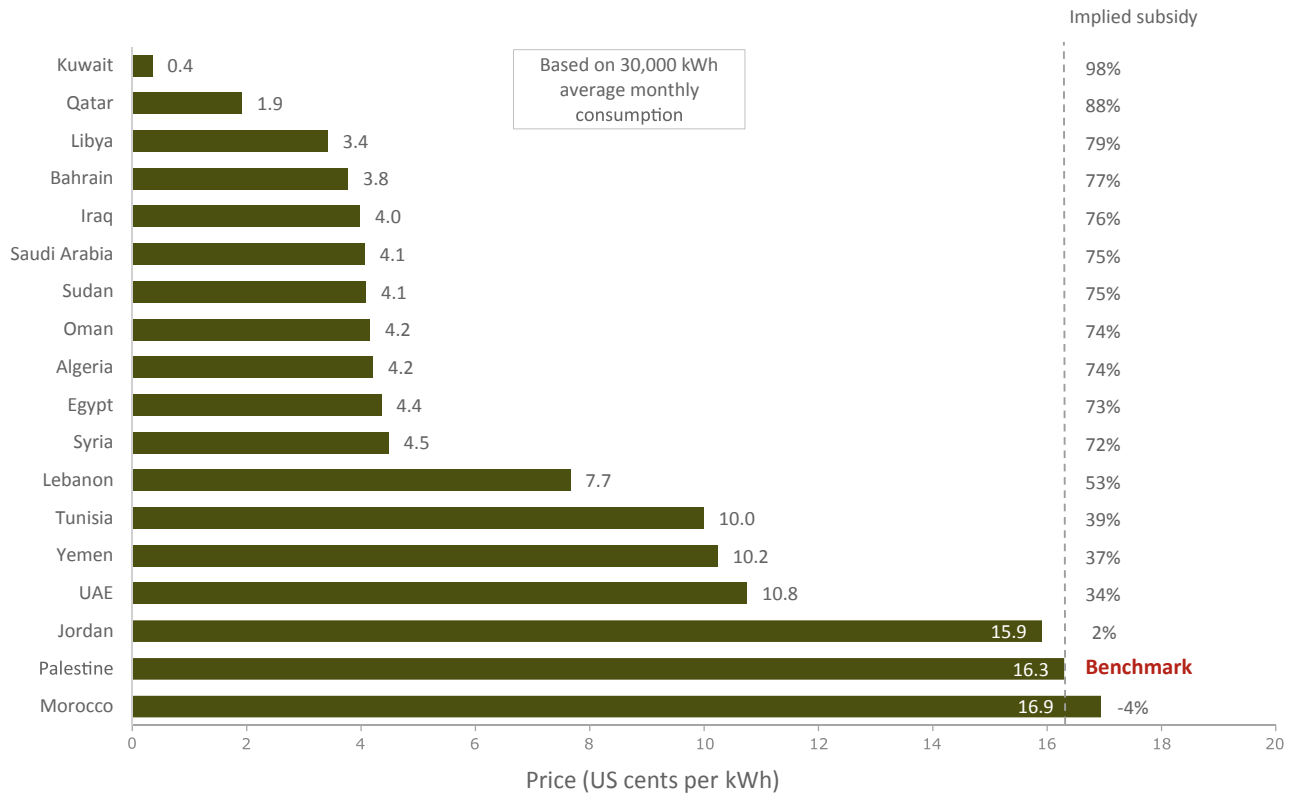
Source: RCREEE based on data from national energy utilities

Figure 6: Residential Electricity Prices and Subsidies Benchmarked to Palestine (2014)



Sources: RCREEE based on data from national energy utilities

Figure 7: Commercial Electricity Prices and Subsidies Benchmarked to Palestine (2014)



Sources: RCREEE based on data from national energy utilities

Figure 8: Industrial Electricity Prices and Subsidies Benchmarked to Palestine (2014)

As can be observed from Figures 6, 7 and 8, the residential sector remains the most subsidized or cross subsidized sector. In almost all countries, electricity tariffs for industrial and commercial customers are higher than for residential customers. The difference in electricity tariffs between the countries is quite substantial, where residential customers in Bahrain and Kuwait pay only 5 percent of the residential tariffs in Palestine and about 7.5 percent of the residential tariffs in Tunisia and Morocco. Compared to AFEX 2013, the order of the countries has not changed considerably. However, one remarkable change can be observed in Jordan, where electricity prices for the industrial and commercial sector have increased substantially. This can be explained by the subsidy reform, which is discussed below.

It is important to note, though, that these figures only show differences in prices between countries at a certain level of consumption. They do not represent the actual price paid by different consumers, as the electricity tariff rates often range depending on the voltage and level of consumption. Furthermore the different fossil fuel energy mixes used for power generation and fuel supply costs for power plants has not been figured into.

Looking at the economic consequences of the subsidy situation, it is not surprising that it is among the net-importing countries that the most ambitious subsidy reform programs have been undertaken. During 2013 and 2014, Egypt, Jordan, and Tunisia implemented subsidy reform efforts in the electricity sector.

Tunisia aims to phase out subsidies in all sectors within seven years, starting from 2014. The strategy is a stepwise increase of electricity tariff and gas prices, which already allowed for savings of 0.7% of GDP in 2014. While the residential and industrial sectors have seen an electricity tariff increase twice by 10% each time during 2014, cement companies have seen tariffs increase by 70% in 2014, which means that the subsidies have been completely eliminated to this sector.

Jordan plans to substantially decrease the total amount of electricity subsidies by 2017. The country started increasing electricity tariffs in the beginning of 2014, and has announced the level of stepwise increases for the coming years. While a large majority of households will not be directly affected by the coming increases, the industrial and commercial sector will have to prepare for considerably higher electricity tariffs. The highest electricity tariffs in the whole region will soon be paid by Jordanian banks and hotels, which will see an annual increase of 15%. By 2017, banks will pay 322 Fils (USD 0.45) per kWh and hotels will pay 255 Fils per kWh (USD 0.36). As a result of this dramatic tariff increase, a large number of RE projects and net metering can be expected in these two sectors within the near future.

In Egypt, the government introduced a five-year subsidy phase-out plan in July 2014. This plan implies annual electricity tariff hikes for most consumer segments until 2018. The highest tariff increases will be experienced by some of the extra-high voltage industrial users – more than 20% annually. Moreover, residential customers will see an annual increase of 10-20%, and commercial customers will see an annual increase of around 7%.

Off-grid Prospects for Renewable Energy

Although the Arab region as a whole is known to be energy-rich, millions of households and economic actors suffer from low access to reliable energy services. Access to electricity is particularly challenging due to the weakness and unreliability of the national power networks in many countries, including Djibouti, Egypt, Iraq, Lebanon, Sudan, Syria, and Yemen. Consequently, decentralized diesel-based technologies are often used to meet the energy needs of residential and productive sectors, such as agriculture, tourism, and industry. Diesel technologies are used for lighting, irrigation and pumping, heating and cooling, agro-processing, as well as powering domestic and industrial electrical appliances. This energy insecurity constitutes one of the main obstacles to achieving equitable, sustainable, and long-lasting development in these countries.

A study was conducted by RCREEE in 2015 to understand diesel consumption for electricity generation and water pumping in four Arab countries: Djibouti, Egypt, Sudan and Yemen. Annual diesel consumption in these sectors was estimated at six million tons, or approximately 45 million barrels of oil equivalent. The majority of this diesel (approximately 90%) is consumed by the agricultural sectors in Egypt and Yemen, where diesel-powered pumps are used to draw groundwater for irrigation. This reliance on diesel has exposed farmers and agribusinesses to shortages of energy supply and price fluctuations, leading to decreased productivity and lower profit margins.

Experience has shown that solar PV technologies can be used cost-effectively to reduce diesel consumption in these sectors. Yet, businesses in the region have been hesitant to make this transition. The main barriers to the market uptake of decentralized PV applications in these countries are: (1) low awareness among energy users; (2) difficulty with access to finance form banks; and (3) lack of demonstration projects to show the potential of this technology. In addition there are only few government support programs to promote the replacement of diesel with decentralized PV technologies. However, these programs remain scattered and underfunded, which limits their impact on market transformation.

RCREEE is launching a regional initiative in cooperation with UNDP to promote diesel to solar retrofits through the introduction of scalable, sustainable business models suitable for the region. RCREEE and UNDP will bring the private and public sectors together to overcome barriers to rapid deployment of solar technologies and to reduce diesel consumption in the Arab region.

3.4 Policy Framework Final Scores and Ranking

The final scores and ranks for the Policy Framework category are presented in Figure 9. The Policy Framework category measures three major aspects: commitment of government authorities to pursing RE, supporting policies in place, and phase-out of fossil fuel subsidies. Jordan again emerges as the leader in this category due to improvements in several areas. Jordan has shown great commitment for RE by focusing on successful implementation of its supporting policies: the direct proposal submission scheme for the development of utility-scale RE projects and the net metering scheme for the development of distributed RE projects.

With a very small difference, Morocco comes second in the rank. By the end of 2014, Morocco has more than doubled its share of non-hydro RE installed capacity, reaching almost 800 MW in total. This is by far the highest installed capacity in the region. Morocco also showed great advancement in its public competitive bidding scheme by tendering more than 1,000 MW of utility-scale RE projects, and awarding a USD 2 billion contract to the Riadh-based ACWA Power for the development of 350 MW of CSP plants.

The leaders in the Policy Framework category are countries that not only have supporting policies in place, but also relatively high electricity tariffs. It is not surprising to observe that it is the countries with the high electricity tariffs that have better progress in the implementation of net metering schemes. The lagging countries in this category still need to improve their efforts in deploying RE projects, whether private or public, enact supporting policies to attract private investments in RE, and introduce gradual reform of fossil-fuel subsidies.

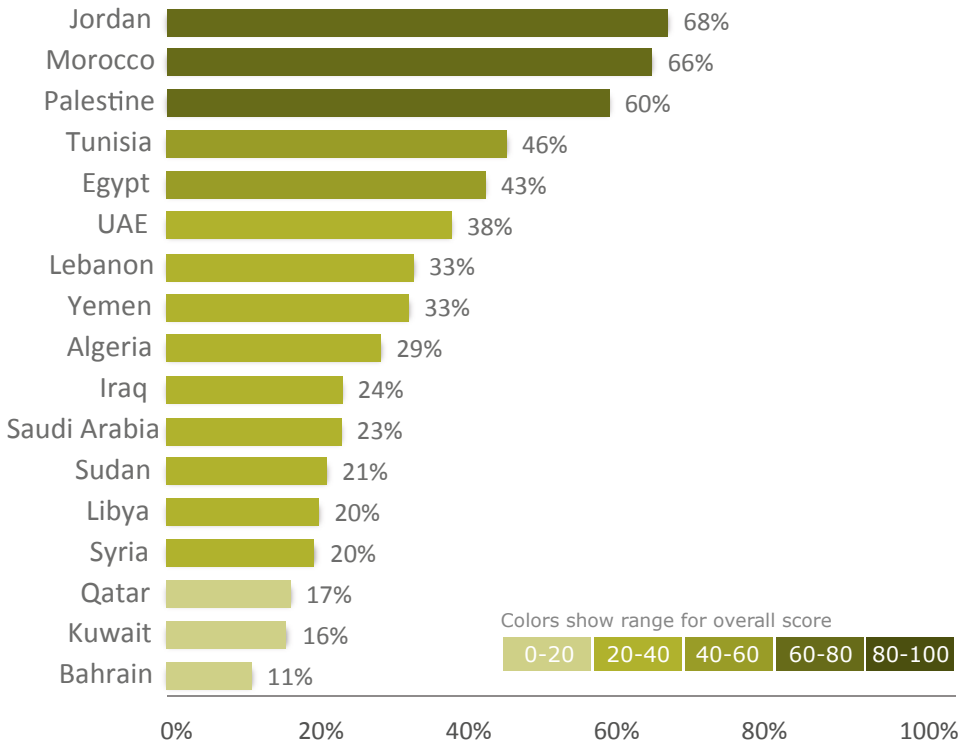


Figure 9: Policy Framework Final Scores and Ranking

PROGRESS HIGHLIGHTS
POLICY FRAMEWORK

Since the previous edition of the AFEX, major developments took place in the Policy Framework category, and almost all countries in the region have shown progress in RE deployment.

Algeria

Algeria made progress in the "RE Commitment" and "Supporting Policies" factors by installing additional capacity of RE projects and creating a pipeline of RE projects:

The total RE installed capacity increased from 25 MW in 2012 to 42 MW in 2014. Algeria currently has over 300 MW of RE projects under construction, a considerable increase compared to 16 MW in 2012. In April 2014, Algeria adopted a new feed-in tariff scheme to promote solar and wind projects.

Bahrain

Bahrain made improvements in the "RE Commitment" factor by increasing its RE installed capacity, which increased from 0.5 MW in 2012 to 5.5 MW in 2014.

Egypt

Egypt made improvements across all three factors of the Policy Framework category: "RE Commitment," "Supporting Policies," and "Energy Subsidies."

RE installed capacity increased from 585 MW in 2012 to 645 MW in 2014, most of which is wind projects. Currently, there are more than 600 MW of RE projects under construction, almost double the amount of RE projects under construction in 2012 (320 MW). Most importantly, in October 2014, Egypt adopted a feed-in tariff scheme to promote the development of RE projects. Also, in July 2014, Egypt introduced a five-year subsidy phase-out plan for the electricity sector. This plan implies annual electricity tariff hikes for most consumer segments until 2018.

Iraq

Iraq made improvements under the "RE Commitment" and "Supporting Policy" factors by initiating the construction of the first pilot RE projects, and the process of the country's first IPP public development scheme for the development of utility-scale RE projects.

In 2014, Iraq announced tenders for private development of RE projects for the first time. Four projects are currently identified as pilot projects for private development through a public competitive bidding scheme: three PV projects with an approximate capacity of 5 MW each and one wind project with an approximate capacity of 5 MW as well. In addition, there are about 4 MW of small-scale PV projects under construction.

Jordan

Jordan made improvements across all three factors of the Policy Framework category.

RE installed capacity increased from 6.5 MW in 2012 to 18.5 MW in 2014. Currently, there are more than 390 MW of RE projects under construction, a considerable increase compared to zero in 2012. In just one year, Jordan's net metering scheme has successfully led to the implementation of more than 13 MW of distributed RE projects, mostly in the commercial and public sectors. Jordan completed the first round of its direct proposal submission scheme, whereby it signed PPAs with 13 private consortia for the development of more than 200 MW of utility-scale PV projects, and one PPA for the development of the country's largest wind farm, the 117 MW farm in Tafila.

In June 2013, Jordan's Cabinet approved a plan to increase electricity tariffs for most segments until 2017. While a large majority of households will not be directly affected by the coming increases, the industrial and commercial sectors will have to prepare for considerably higher electricity tariffs.

Kuwait

Kuwait showed progress in the "RE Commitment" factor by creating a pipeline of RE projects.

In 2014, Kuwait initiated the execution of the first phase of the Shagaya RE Complex, and there are currently 80 MW of large-scale RE projects under construction. In addition, Kuwait has announced a tender for the country's first private utility-scale RE project, the Al-Abdaliyah integrated solar combined-cycle (ISCC) project. ISCC is planned to run on a combination of solar power and gas, with a total installed capacity of 280 MW, of which 60 MW is a solar component.

Morocco

Morocco made improvements in the two factors of the Policy Framework category, "RE Commitment" and "Supporting Policies," by substantially increasing its RE installed capacity and advancing in its IPP public competitive bidding schemes.

RE installed capacity increased from 325 MW in 2012 to 785 MW in 2014. Currently, there are more than 530 MW of RE projects under construction. In 2014, Morocco announced tenders for the private development of 850 MW of wind projects through its Integrated Wind Programme. It has also announced tenders for the extension of an existing wind project, the 200-MW Koudia Al Baida.

In January 2015, Morocco awarded a PPA to the Riyadh-based ACWA Power for the development of two CSP plants, with a total capacity of 350 MW, as part of the Noor CSP complex in Ouarzazate in the south central part of the country.

Palestine

Palestine showed advancement in the "RE Commitment" and "Supporting Policies," factors and holds the first rank under the "Energy Subsidies" factor.

RE installed capacity increased from 1.5 MW in 2012 to 4.9 MW in 2014. Currently, there are around 2 MW of RE projects under construction. Palestine's net metering scheme led to the implementation of around 4 MW of small-scale PV systems.

Saudi Arabia

Saudi Arabia made progress in the "RE Commitment" factor by increasing its current installed capacity.

RE installed capacity increased from 7 MW in 2012 to 19 MW in 2014. Currently, there are at least 65 MW of RE projects under construction.

Tunisia

Tunisia made progress across all three factors of the Policy Framework category:

RE installed capacity increased from 158 MW in 2012 to 265 MW in 2014. Currently, there is a 10 MW PV power plant under construction. The Tunisian net metering scheme has successfully led to the implementation of 15 MW of small-scale rooftop PV systems.

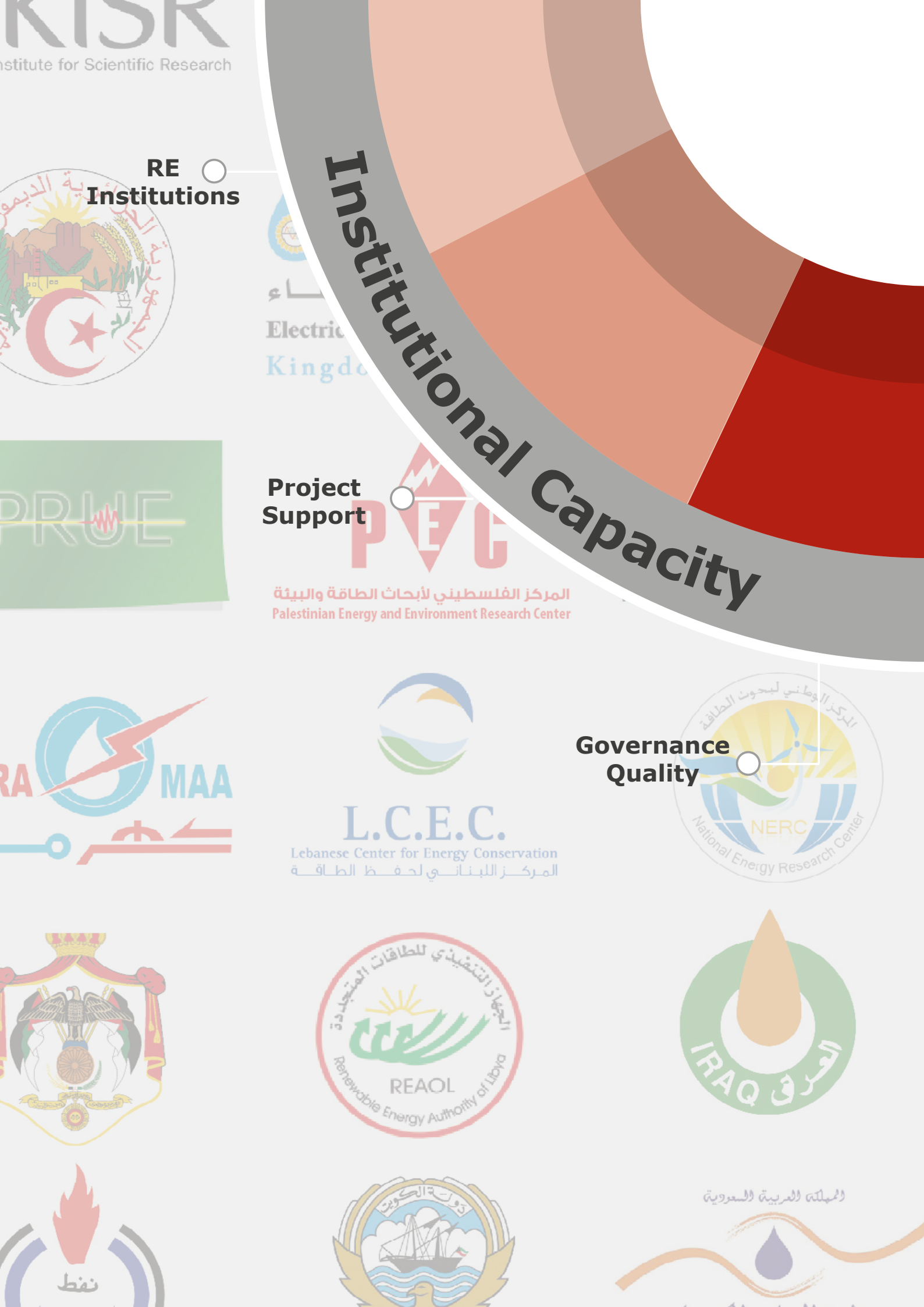
In 2014, Tunisia adopted a stepwise strategy to phase out subsidies for electricity. While the residential and industrial sectors have seen electricity tariffs increase twice, by 10% each, during 2014, cement companies have seen tariffs increase by 70% in 2014, which means that the subsidies have been completely eliminated to this sector.

UAE

UAE made advancements in the "RE Commitment" and "Supporting Policies" factors by increasing its RE installed capacity, and creating pipeline of utility-scale RE projects:

RE installed capacity increased from 22.5 MW in 2012 to 134 MW in 2014. Currently, there are at least 500 MW of RE projects under construction. In early 2015, the Dubai Electricity and Water Authority (DEWA) awarded a PPA for the development of the second phase of the Mohammad Bin Rashid Al Maktoum Solar Park, a 200-MW PV project. One month later, UAE announced tenders for the development of the 800 MW PV third phase of the Solar Park.

Additionally, in 2014, Dubai adopted a net metering scheme to promote the development of distributed RE projects.


Institutional Capacity
RE Institutions
Project Support
Governance Quality
Palestinian Energy and Environment Research Center
L.C.E.C.
Lebanese Center for Energy Conservation
REAOL
Renewable Energy Authority of Libya
IRAQ

4 Institutional Capacity

The Institutional Capacity category assesses the capacity of states to design RE policies and provide institutional support to the deployment of RE projects. Strong institutional capacity is critical to ensure meeting RE targets. The Institutional Capacity category consists of three factors: (1) RE Institutions; (2) Project Support; and (3) Governance Quality. These factors, and associated eight indicators, are explained in Table 14. An indicator for project lead time is not assessed this year due to lack of data, but will be included in the assessment for the next edition of AFEX Renewable Energy.

Table 14: Institutional Capacity Evaluation Factors and Indicators

Category	Factors	Indicator	Score/Measuring Unit
Institutional Capacity	RE Institutions	Independent Regulator	Established by law. Under establishment. Non-existent.
		RE Agency	Established by law. Under establishment. Non-existent.
		Capacity of RE institutions	Expert assessment from 1 to 10.
	Project Support	Resource Quality Assessment	Detailed wind atlas published and available to public. Detailed solar atlas published and available to public.
		Land Access	Land allocated for private development of large-scale wind projects. Land allocated for private development of large-scale solar projects.
		Project Lead Time	
	Governance Quality	World Bank Ease of Doing Business Index	Rank under World Bank Ease of Doing Business Index.
		Global Competitiveness Index	GCI scores
		Bertelsmann Stiftung's BTI Status Index	BTI Status Index scores.

4.1 RE Institutions

4.1.1 Independent Regulator

It is widely recognized that independent and transparent regulation of the power sector is the basis for an open and functional power market in which investors' trust is high (Cambini & Franzi, 2013). An independent regulator should ensure fair competition between stakeholders on the market and ensure as well consumer protection. Its main tasks include tariff-setting, license issuance, power sector performance monitoring concerning efficiency and effectiveness, and enforcement of legal provisions that are the basis for an open market (Bjork et al, 2011; Dii, 2013).

The 3rd EU Energy Market Directive offers guidelines on best practices for well-functioning independent regulators. These guidelines specify that electricity regulators must be legally distinct and functionally independent from any private or public entity. This includes the legal power to fix and approve price tariffs and other binding regulations without interference of the government. Moreover, all regulatory activities should generally follow a common, clear, and transparent methodology (Dii, 2013). The mentioned provisions require a high level of in-house expertise as well as sufficient funds to hire consultants.

In the region, countries that are committed to unbundling the power market established regulatory agencies, see Table 15. However, common for these regulators is the lack of resources and political interference by respective governments overruling regulatory decisions. Among the regulatory agencies established in the Arab region, the Jordanian Electricity Regulatory Commission (ERC), which recently changed its name to Energy and Minerals Regulatory Commission (EMRC), is the only one that can be considered somewhat independent, at least when it comes to its decision making processes (Cambini & Franzi, 2013). This means that EMRC can undertake any decision, on for example tariff levels and licensing, without receiving approval or informing the government or parliament of its work. In contrast, the level of political independence of the regulatory bodies in Algeria, Egypt, Palestine, Sudan, and Saudi Arabia was shown to be low, and the agencies mainly operate as advisory bodies to the governments that take the final decisions (Åberg, 2014; Dyllick-Brenzinger & Finger, 2013).

The regulatory body in Abu Dhabi has government representatives on its board and can, for this reason, not be seen as administratively independent. However, it is said to have far-reaching regulatory powers in licensing and monitoring activities. A common characteristic for many countries is that transferring of responsibility from government-controlled bodies to independent regulators has been challenging. The current state must be seen as a transitional period, and reaching a stage of fully independent regulators will take time. In countries where an independent regulatory body does not exist at all, national utility operators or transmission systems operators usually perform associated functions.

Table 15: Electricity Regulatory Agencies

	Electricity Regulatory Agency	Power Off-taker for Large-scale RE Projects
Algeria	Commission de Régulation de l'Electricité et du Gaz (CREG)	Société Algérienne de Gestion du Réseau de Transport de l'Electricité (GRTE)
Bahrain	Non existent	Electricity and Water Authority (EWA)
Egypt	Egyptian Electric Utility and Consumer Protection Regulatory Agency (EgyptERA)	Egyptian Electricity Transmission Company (EETC)
Iraq	Non existent	Directorate of Transmission Directorate of Transmission Project
Jordan	Energy and Minerals Regulatory Commission (EMRC)	National Electric Power Company (NEPCO)
Kuwait	Non existent	Ministry of Electricity and Water
Lebanon	Non existent	Electricité du Liban (EDL)
Libya	Non existent	General Electricity Company of Libya (GECOL)
Morocco	Non existent	Office National d'Electricité (ONE)
Palestine	Palestinian Electricity Regulatory Council (PERC)	Palestinian Electricity Transmission Company Ltd. (PETL)
Qatar	Non existent	Qatar General Water and Electricity Corporation "KAHRAMAA"
Saudi Arabia	The Electricity and Co-Generation Regulatory Authority (ECRA)	Saudi Electricity Company (SEC)
Sudan	Electricity Regulatory Authority (ERA)	Sudan Electric Transmission Company (SETCO)
Syria	Non existent	Public Establishment for Electricity Generation and Transmission (PEEGT)
Tunisia	Non existent	Société Tunisienne d'Electricité et du Gaz (STEG)
UAE	Abu Dhabi Regulation and Supervision Bureau (RSB)	Dubai Electricity and Water Authority (DEWA); Abu Dhabi Water and Electricity Authority (ADWEA)
Yemen	Non existent	Public Electricity Corporation (PEC)

4.1.2 RE Agency

Institutional and administrative barriers are major obstacles to RE development. This includes complicated, lengthy, and non-transparent permitting procedures, involvement of too many public authorities, and lack of clarity of institutional framework. Many countries around the world have established dedicated RE agencies with the purpose of overcoming some of these barriers and accelerating the development of RE.

An RE agency should be a dedicated body with an ability to design RE policies, streamline administrative procedures, assist in the deployment of private RE projects, and lead the deployment of demonstration and other public RE projects. An essential function of RE agencies is effective coordination among various stakeholders, including private developers and state institutions, to ensure more efficient use of existing human, capital, and technical resources in achieving RE targets. In countries where governments receive donor support for RE development, RE agencies can act as counterparts in negotiating and coordinating donor agreements. Dedicated RE agencies can also play an important role in raising awareness, conducting resource quality assessments, conducting feasibility studies, and promoting research and development. This requires sufficient resources, competent and specialized staff, and committed leadership.

Construction of the Tafila wind farm - Jordan

Table 16: RE Institutional Stakeholders

	RE Policy Maker (Dedicated RE Department or Dedicated Agency)	Other Key RE Institutional Stakeholders
Algeria	Renewable Energy and Energy Conservation Directorate at the Ministry of Energy and Mines	Sharikat Kahraba Takate Moutajadida «SKTM», filiale du Groupe Sonelgaz Center for development of RE (CDER) Silicon Technology Development Unit (UDTS) Unit Development of Solar Equipment (UDES) Center for Research and Development of the Electricity and Gas (CREDEG)
Bahrain	No dedicated RE department or agency in place yet	Electricity and Water Authority (EWA)
Egypt	New and Renewable Energy Authority (NREA)	Egyptian Electricity Transmission Company (EETC)
Iraq	Green Tourism Unit within the Ministry of Tourism	Research Center for Energy and Environment under Ministry of Science and Technology Research Center under Ministry of Higher Education and Scientific Research (universities and institutes) Energy and Environment Research Center under Ministry of Industry
Jordan	Renewable Energy Department at the Ministry of Energy and Mineral Resources	National Energy Research Center (NERC)
Kuwait	No dedicated RE department or agency in place yet	Kuwait Institute for Scientific Research (KISR)
Lebanon	Lebanese Center for Energy Conservation (LCEC)	CEDRO; The Lebanese Solar Energy Society (LSES) Industrial Research Institute (IRI) National Council for Scientific Research (CNRS)
Libya	Renewable Energy Authority of Libya (REAoL)	Center for Solar Energy Research and Studies (CSERS)
Morocco	Direction of Electricity and Renewable Energies at the Ministry of Energy, Mines, Water and Environment; Agency for the Development of Renewable Energy and Energy Efficiency (ADEREE)	Moroccan Agency for Solar Energy (MASEN) Société d'Investissements Energetiques (SIE) Institut de Recherche en Energie Solaire et Energies Nouvelles (IRESEN) Centre National pour la Recherche Scientifique et Technique (CNRST)
Palestine	Palestinian Energy Authority (PEA) Palestinian Energy and Environment Research Centre (PEC)	Energy Research Centre (ERC) at An-Najah National University
Qatar	Qatar General Water and Electricity Corporation "KAHRAMAA"	Qatar Science and Technology Park (QSTP) Energy and Environment Research Institute (QEERI) Qatar Solar Technologies (QST)
Saudi Arabia	King Abdallah City for Atomic and Renewable Energy (KACARE)	Saudi Aramco
Sudan	Directorate for Renewable and Alternative Energy within Ministry of Water and Electricity	National Center for Energy Research (NCR)
Syria	National Energy Research Center (NERC)	Scientific Studies and Research Center Higher Institute for Applied Sciences and Technology Research Centers in universities; mainly Damascus University Industrial Research and Testing Center
Tunisia	Agence Nationale pour la Maîtrise de l'Energie (ANME)	Centre de Recherche et des Technologies de l'Energie (CRTEN)
UAE	Clean Energy and Climate Change Department at the Ministry of Energy	MASDAR
Yemen	Renewable Energy Department within the Ministry of Electricity and Energy	Renewable Energy and electronic design Centre, University of Science and Technology Technical Centre for Training and registration – Dhahban, Public Electricity Corporation (PEC)

4.2 Project Support

4.2.1 Detailed Resource Mapping

Identifying and assessing the technically feasible, commercialized and already economically competitive power generation potential of natural resources is essential for establishing a business case. Detailed data on wind speed and solar irradiation can reduce risk for developers, and potentially allow for lower costs during development (Dii, 2013). The accuracy of the data is important since the quality of renewable resources differs depending on the location, time, season and climatic zone. Hence, public domain availability of a reliable, transparent, detailed, and accurate mapping of resource intensity and quality is the first guidance for site qualification, technology selection, and optimum design of RE power plants.

Although the use of satellite and meteorological data can provide important information, satellite data on its own is not sufficient, as it can result in over-estimation of energy yield due to exclusion of the effects of near-ground haze. Hence, local data based on site measurements are important to generate more accurate data (IFC, 2012).

Table 17 indicates the status of various national detailed resource mapping initiatives. It shows that several countries in the region have issued detailed solar and wind atlases. However, the data are often not easily accessible to project developers. Often, results are neither available in electronic format nor in hard copy. In many cases, the data are outdated or lack the necessary quality and level of detail to allow for reliable energy yield prediction (Dii, 2013). Jordan is one of the few countries in the region that provides details of wind and solar irradiation measurements on the website of the Ministry of Energy and Mineral Resources. Lebanon's national wind atlas is also widely available in the electronic format on the websites of the UNDP CEDRO Project.

Table 17: Detailed Resource Mapping

	Wind Atlas Published	Solar Atlas Published
Algeria	No	Yes
Bahrain	Assessment of wind resources were completed in 2012	Assessment of solar resources were completed in 2012
Egypt	Yes	No
Iraq	Ministry of Science and Technology installed 9 towers to measure the wind potential	No
Jordan	Yes	Yes
Kuwait	Yes	Yes
Lebanon	Yes	No
Libya	No	No
Morocco	Yes	Yes
Palestine	Yes	Yes
Qatar	Mapping of resources is ongoing	Mapping of resources is ongoing
Saudi Arabia	Mapping of resources is ongoing	Mapping of resources is ongoing
Sudan	Wind measurements were completed in 2011, but detailed wind atlas is not published	No
Syria	Yes	Yes
Tunisia	Yes	No
UAE	Mapping of resources is ongoing	Mapping of resources is ongoing
Yemen	Yes	No

Solar panel, Jordan.
Provided by: Matthew Alison

4.2.2 Land Access

Access to land is one of the central elements in unlocking investments in RE, and should be facilitated without entailing excessive administrative burdens for developers. When allocating land for RE development, it is crucial to consider others value than the natural solar or wind conditions. Any type of spatial planning must take into account and evaluate social, economic, mining rights, military importance and environmental consequences of land use changes (Moomaw et al., 2011). Land access policies need to evaluate socio-cultural impacts, water availability, food security, trade concerns, existing infrastructure, local content, and employment possibilities as well as other sector-specific issues.

Currently, the regime for land ownership in the region is complex, particularly in the regions where tribal communities have their livelihoods. Even in cases when several socio-economic impact studies have been undertaken and vast desert land seems uninhabited, the land has shown to be of great cultural and economic importance to local tribes and pastoralists (German Development Institute (DIE), 2013).

An additional challenge involves identifying the current owner of property when considering an allocation of land for RE deployment. Although most countries in the region have a registry for titles of legal ownership, participation is not strictly mandatory and registration tends to be limited. This lack of adherence is typically most common in the non-urban areas that are most attractive for RE projects (Dii, 2013). Complex land access conditions cannot be discussed without mentioning the challenging situation in Palestine. What highly affects the deployment of large-scale RE in this region is the fact that Israeli Authority controls 62% of the Palestinian territory in the West Bank (OCHA, 2014).

Often, when land owners are identified, negotiations can take significant amounts of time, especially considering the large areas needed for RE project development and the multiple owners of land that will be required to be consulted. Developers in Jordan specifically encountered this problem during the development of PV projects under the first round of direct proposal scheme. Often, developers had to deal with multiple landowners due to the size of the projects and different land plots that were needed. Organizing meetings with all landowners at the same time was found to be difficult. Reaching final agreement and signing a land lease contract between multiple (sometimes up to six) landowners delayed the process extensively, and meant extensions were required on final project submissions. The process of land acquisition from either private or state-owned entities should start very early and should be facilitated by a central office in the future.

The large majority of Arab states must increase their efforts in identifying appropriate land for further RE deployment. In addition, all countries have to pass clear regulations that facilitate access to public and private land while taking into account the consequences of land use change. In the region, only a few countries have undertaken initiatives to facilitate land access for private developers.

Morocco:

In Morocco, the government has identified a number of priority development zones for RE projects. Any project larger than 2 MW must be located in one of certain development zones. MASEN is the agency responsible for the allocation of land for solar projects. This agency has been given far-reaching authority, including the authority to expropriate private land for the purpose of developing solar projects (Dii, 2013). There are no restrictions for foreign investors except for the use of agricultural land, which is only possible to lease for 99 years. Despite several impact studies, the land allocation process in Ouarzazate, where the country's first CSP plant is currently under construction, has been criticized for not consulting nor informing local groups (German Development Institute (DIE), 2013).

Egypt:

In Egypt, the National Renewable Energy Agency (NREA) has a program for allocation of land for wind projects. In the first half of 2014, NREA announced and awarded concessions for land in the Gulf of Suez dedicated to 600 MW of wind power. Up until today, a total of more than 7,600 km^2 of desert land has been allocated for the deployment of public and private wind farms. The land will be leased to investors against 2% of the annual electricity generated or 2% of the value of the output of the project.

Jordan:

In Jordan, the government has identified a special zone to spur industrial development and innovation called the Ma'an Development Area. Within this zone, Jordan has dedicated areas for development of solar projects. In addition, project developers can freely select sites for projects under the direct proposal scheme; this, however, places a lot of responsibility on the investor to identify an appropriate site. Land access for foreign investors is subject to priority authorization (Dii, 2013).

UAE:

In Dubai, the authorities have identified a vast area of 48 km^2 for the private development of large-scale solar projects, the Sheikh Mohammed bin Rashid Al Maktoum Solar Park.

Kuwait:

In Kuwait, authorities have also identified a vast desert area of 100 km^2 for the development of large-scale RE projects, the Shagaya Renewable Energy Park. According to the proposed master plan by KISR, the Park is planned to be developed in three phases. While the first phase is developed by the government, the second and third phases of the Renewable Energy Park are planned to be developed by private investors on a Build-Operate-Transfer (BOT) basis for 25 years.

In the second phase, the authorities plan to expand the capacity of the Renewable Energy Park to 1000 MW, and in the third phase to 2000 MW. KISR plans to facilitate the large part of the process of developing the Shagaya Renewable Energy Park by providing ready sites for the selected developers, as well as information on solar and wind resources, soil investigation, and topographic survey data (Hashem, 2013).

LAND **ACCESS**

Often, when land owners are identified, negotiations can take significant amounts of time, especially considering the large areas needed for RE project development and the multiple owners of land that will be required to be consulted.

4.3 Governance Quality

Aside from natural resource quality or any 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 include the overall political stability, security of investment and risk of expropriation, regulatory environment, competitive landscape, currency rate fluctuations, war, and civil disturbance.

Three recognized initiatives designed to assess these factors are: the World Bank's Ease of Doing Business Index, the Bertelsmann Stiftung's Transformation Index (BTI), and Global Competitiveness Index.

Table 18: Countries Performance under International Indices

World Bank Ease of Doing Business		BTI Status scores		Global Competitiveness Index	
UAE	22	**Qatar**	6.16	**UAE**	12
Saudi Arabia	49	**Lebanon**	6.00	**Qatar**	16
Qatar	50	**Kuwait**	5.96	**Saudi Arabia**	24
Bahrain	53	**UAE**	5.96	**Kuwait**	40
Tunisia	60	**Tunisia**	**5.74**	**Bahrain**	44
Oman	66	**Bahrain**	5.34	**Oman**	46
Morocco	71	**Algeria**	5.11	**Jordan**	64
Kuwait	86	**Jordan**	5.09	**Morocco**	72
Lebanon	104	**Egypt**	5.08	**Algeria**	79
Egypt	112	**Oman**	4.91	**Tunisia**	87
Jordan	**117**	**Libya**	4.62	**Lebanon**	113
Yemen	137	**Morocco**	4.52	**Egypt**	119
Palestine	143	**Saudi Arabia**	4.31	**Libya**	126
Algeria	154	**Iraq**	4.07	**Yemen**	142
Iraq	156	**Yemen**	3.08	**Iraq**	-
Sudan	**160**	**Sudan**	2.58	**Palestine**	-
Syria	**175**	**Syria**	**2.18**	**Sudan**	-
Libya	188	**Palestine**	-	**Syria**	-

4.3.1 Ease of Doing Business

The World Bank Ease of Doing Business Index reports on basic issues relating to starting and operating a commercial enterprise. While this index is not tailored regionally, and does not relate to RE directly, it provides feedback on the general conditions existing in countries relative to one another. The Ease of Doing Business Index ranks economies from 1 to 185, according to whether the regulatory environment is conducive to business operation. What is particularly remarkable for the Arab region is the huge range between the countries; while one country reaches a top ranking, others can be found at the very bottom of the list.

Among Arab countries, the highest rankings under the ease of doing business can be observed among the Gulf countries. The UAE has the highest ranking, at 22 out of 189 economies, and is also among the 10 top improvers in this year's report (The World Bank, 2015). Since AFEX 2013, Morocco has seen the largest improvement in ranking, from 94 to 71, thanks to its efforts to decrease the complexity of starting a company, transferring property, paying taxes electronically, and trading across borders (The World Bank, 2014). Syria and Sudan saw the most negative development in terms of ranking. From a ranking of 134 to 175 for Syria and 135 to 160 for Sudan, placing them, together with Libya, among the lowest ranked countries in the region.

4.3.2 Bertelsmann Stiftung Transformation

The Bertelsmann Stiftung Transformation Index (BTI) measures countries' state of democracy and market economy in an international comparison. Focusing on what they term the developing and transition countries, Bertelsmann's biennial indices measure the state of 128 countries' progress and setbacks "on the path toward a democracy based on the rule of law and a market economy flanked by socio-political safeguards" (Bertelsmann Stiftung, 2014).[2]

The BTI scores show that the political and economic situation is precarious in many countries in the region. The overall regional average with respect to political transformation shows no notable improvement since AFEX 2013 and the last BTI Status Index. Adding economic transformation trends gives an even more sobering result since the average score here declined by 0.40 points. Among Arab countries, the highest BTI Status Index score has been given to Qatar, which is described by Bertelsmann Stiftung as the only developed market economy in the region. Highest overall improvements can be observed in Tunisia and is explained by a large improvement in relation to the country's political dimension. Hardly surprising, given the ongoing violent conflict, Syria sees the largest drop in its overall scoring (Bertelsmann Stiftung, 2014).

4.3.3 Global Competitiveness Index

The Global Competitiveness Index, developed by World Economic Forum, assesses the competitiveness landscape of 144 countries. Competitiveness is, in this case, defined as the set of institutions, policies and factors that determine the productivity of a country. The assessment builds on a weighted average of a large number of different components measuring different aspects of competitiveness. These are grouped into 12 pillars including, among others: institutions, infrastructure, macroeconomic environment, labor market efficiency etc. While countries are given a score (from 1-7), they are also ranked in relation to each other (World economic forum, 2014).

In the GCI, the highest rankings in the region can be observed in Gulf countries among which the United Arab Emirates scores highest, at place 12 out of 144 economies. The high ranking of UAE relates, among other things, to its well-developed infrastructure, strong macroeconomic environment and high government efficiency. Improvement potential for UAE has been identified to be R&D and business innovation. Algeria is the country that has seen the largest improvements from last year's index, moving up from place 100 to 79. This improvement is driven mainly by sound macroeconomic conditions, but also by a general development of institutions and physical security. Due to political conflicts and unrest, both Libya and Lebanon have lost several places in the ranking and can now be found among the lowest ranked countries together with Yemen (World economic forum, 2014).

[2] The BTI Status Index is formed by calculating the average of the total scores (from 1 to 10) given for the dimensions of political (democracy status) and economic (market economy status) transformation.

4.4 Institutional Capacity Final Scores and Ranking

The final scores and ranks for the Institutional Capacity are presented in Figure 10. Three major aspects were measured under this category: RE institutions, project support, and general investment climate conditions in the country. Morocco leads this category followed by UAE and Jordan. Morocco scored the highest in the RE institutions factor, particularly under the "RE Agency" indicator. UAE performs well under the factor assessing the general business conditions. It scored the highest under the "Ease of Doing Business" indicator and under the "Global Competitiveness Index." The top-ranking countries under this category are also countries that have made some efforts in improving the land access situation for the deployment of utility-scale RE projects. Overall, all countries need to improve their efforts in providing better institutional support for the deployment of private RE projects. This includes streamlining administrative procedures, improving the coordination amongst various stakeholders, and establishing institutions or entities to facilitate land access and permitting processes.

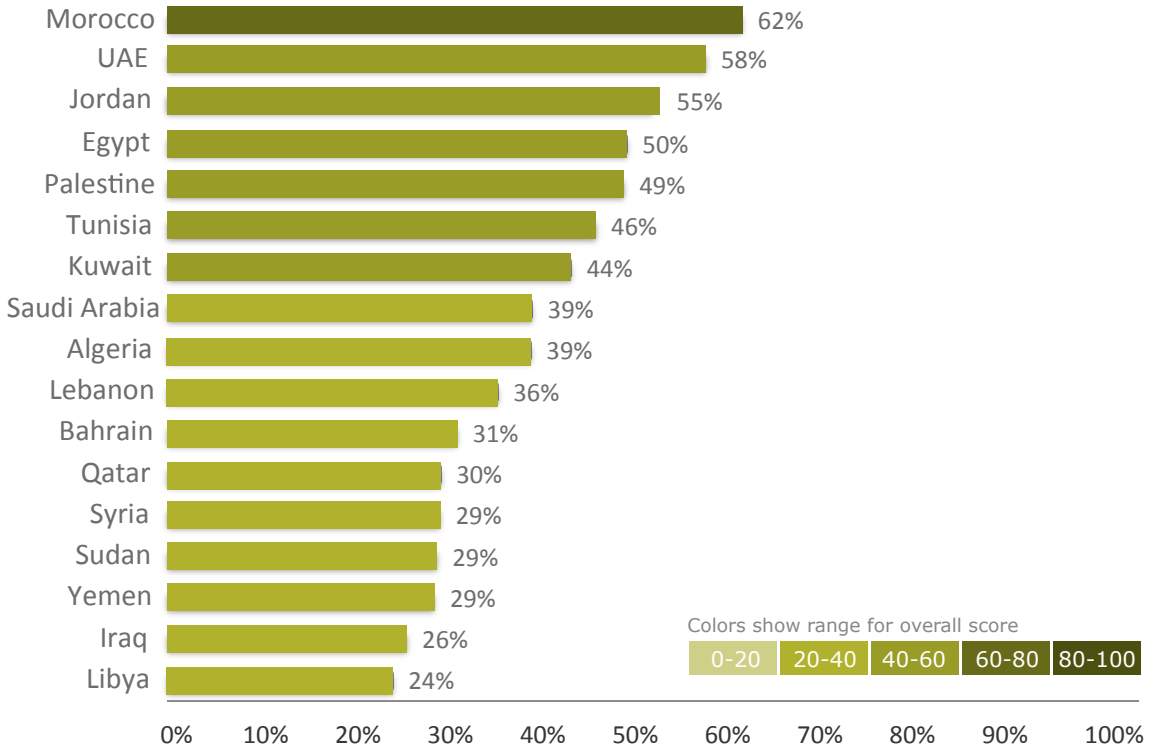


Figure 10: Institutional Capacity Final Scores

PROGRESS HIGHLIGHTS
INSTITUTIONAL CAPACITY

Unlike the progress in other categories, only a few countries made progress under the Institutional Capacity category since the first edition of the AFEX Renewable Energy in September 2013:

Iraq

Iraq made progress under the "RE Institutions" factor by establishing a dedicated department for renewable energy and energy efficiency within the Ministry of Electricity.

Morocco

Morocco showed improvements underthe "Governance Quality" factor by improving its performance in the Ease of Doing Business Index:

Since AFEX 2013, Morocco has seen the largest improvement in ranking, from 94 to 71, thanks to its efforts in decreasing the complexity of starting a company, transferring property, paying taxes electronically, and trading across borders (The World Bank, 2014).

Palestine

Palestine made improvements under the "Project Support" factor by issuing national wind and solar atlases.

Tunisia

Tunisia showed improvements under the "Governance Quality" factor by improving its performance under the BTI Index, which mainly measures countries' state of democracy, political stability, and market economy in an international comparison.

Tunisia's score under BTI improved from 5.0 in 2012 to 5.74 in 2014. This improvement is explained by a large development in relation to the country's political dimension.

Finance and Investment

Financial Support

RE Investment Conditions

5 Finance and Investment

RE projects require intensive upfront capital investments, which is one of the biggest challenges to developers, especially in developing countries. In addition to high costs associated with debt and equity, RE projects tend to be smaller in scale than conventional energy plants and, therefore, face relatively higher upfront transaction costs (UNEP, 2012). With the higher political, regulatory, and macroeconomic risks that characterize RE investments, investors also require higher returns on their investments. Under these circumstances, it is essential that governments mitigate investment risks for RE projects by supporting better access to fair financing and by creating a secure investment environment.

The Finance and Investment category assesses two major factors: (1) the level of financial support provided by the state to RE projects; and (2) RE investment growth. Factors and indicators are summarized in Table 19.

Table 19: Finance and Investment Evaluation Factors and Indicators

Category	Factors	Indicator	Score/Measuring Unit
Finance and Investment	Financial Support	Fiscal Incentives	Number of fiscal incentives for RE projects
		Mechanism to Cover Incremental Costs of RE	Mechanism established by law Sources of financing are clear Disbursement procedure is clear Mechanism is operational
	RE Investment Growth	Share of Private Investment	Percentage of total installed capacity
		Growth Rate of Private Investment	Percentage increase in installed capacity of RE

5.1 Financial Support

5.1.1 Fiscal Incentives

Fiscal incentives, in the form of tax-related measures, include, among others: tax reduction or exemptions, tax credits, tax holidays, accelerated depreciation, and import duty exemptions. These incentives are best used as complementary means to support a larger RE policy and financing portfolio. While tax reductions, exemptions, and accelerated depreciation act directly on the total payable tax amount, tax credits can be used to offset income tax payments by the end of the year. The effectiveness, in terms of allowed saving, depends on the applicable tax rate - the higher the tax rate, the higher the potential savings from a tax incentive (Michell et al., 2011). To give an idea about the potential effectiveness of tax incentives, Table 20 provides an overview of various tax rates throughout the region. Various taxes affect RE projects in different stages of the investment. While customs duties and sales tax have the largest impact in the initial investment and construction stage, the withholding tax is applied once sponsors or lenders receive dividends or interest from their investment. Reaching the commercial operation stage, the profit of the RE investment is mainly subject to corporate tax (Dii, 2013). The latter varies substantially between countries in the region - from 0% in UAE to 30% in Morocco and Tunisia ("Tax Guides and Country Highlights | Deloitte

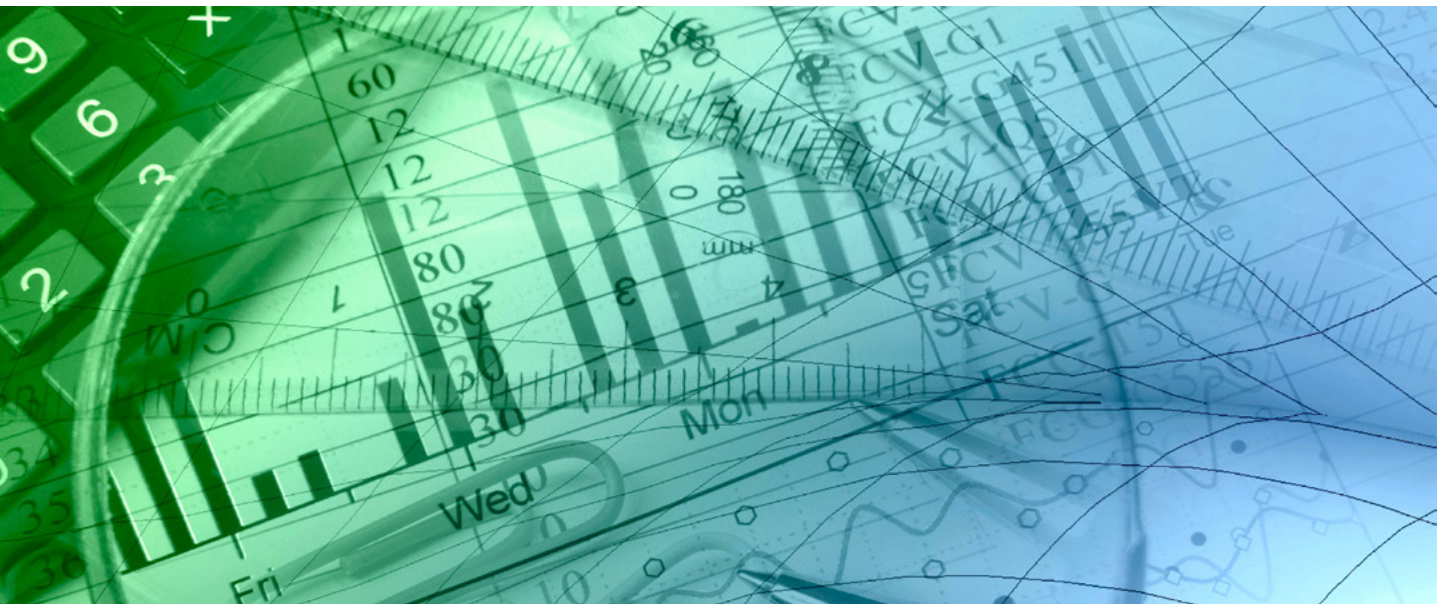


Table 20: Tax Rates in the Arab Region

	Corporate Tax Rate (%)	Withholding Tax on Interest (%)	Withholding Tax on Dividends (%)
Algeria	23	10	15
Bahrain	No corporate tax for most companies in Bahrain	0	0
Egypt	25	20	0
Iraq	15	0-15	0
Jordan	20	5	0
Kuwait	15	0	0-15
Lebanon	15	5-10	10
Libya	20	5	0
Morocco	30	10	15
Palestine	15-20	0	10
Qatar	10	7	0
Saudi Arabia	20	5	5
Sudan*	10-20	-	-
Syria	10-28	7.5	0
Tunisia	30	20	0
UAE	0	0	0
Yemen	20	10	10

[1] Special tax rules for hydrocarbon sector
[2] 46% for oil companies
[3] 40-55% oil and gas companies
[4] 35% for hydrocarbon sector*
[5] 24% for electricity generation
[6] 10 from financing of micro projects by credit institutions
[7] 35% oil and gas operations
[8] 50% hydrocarbon
[9] 50-55% oil and gas companies, 20% foreign banks
[10] Varies greatly between sectors

Sources: "Tax Guides and Country Highlights | Deloitte International Tax Source," n.d.

International Tax Source," n.d.).

Among Arab countries, a handful has introduced fiscal incentives targeting RE projects. The most common tax-related initiative in the region is exemptions from customs duty, and can be found in Egypt, Jordan, Libya, Morocco, Palestine, Sudan and Tunisia. A common feature is that procedures to qualify for an exemption are complicated. Investors in Egypt, for example, have to acquire a certificate from NREA verifying that imported equipment is to be used for RE projects. In Palestine, investors need prior authorization from the Israeli authorities, something that has shown to be complicated to obtain. Tunisia has restricted its duty exemption initiative in order to protect local manufacturers, and the country only allows duty exemptions for RE components that do not have locally manufactured substitutes (Dii, 2013).

In addition to the countries offering duty exemptions, Jordan, Palestine, Tunisia, and Morocco are also offering several other tax exemptions. Jordan has established clear rules specifying that all RE and EE systems qualify for full exemption from sales tax. In Morocco, large-scale investment projects over MAD 200 million can, in addition to duty exemptions, qualify for a value-added tax exemption on all imported equipment, materials, and tools. Standard related tax rates in these two countries imply that substantial savings can be made if projects qualify for these exemptions.

While none of the countries in the region have introduced tax credits or exemptions on withholding, Sudan is the only country stipulating that all strategic projects, including electricity generation, are subject to an exemption from the corporate profit tax for a period of ten years. As opposed to Sudan, Jordan, with a standard corporate tax rate of 20%, applies a higher tax rate for electricity generation. It is, however, unclear if RE projects are also subject to this tax rate. Moreover, it should be noted that all oil- and gas-producing countries, except Sudan, apply a higher corporate tax regime for the hydrocarbon sector. The corporate tax rate for the oil and gas sector varies from 35% in Qatar and Iraq to 55% in UAE.

Among the countries offering fiscal incentives, very few have clear regulations and guidelines determining how these incentives can be obtained. All countries need to facilitate the use of these tax measures and further guarantee their existence throughout a fixed period of time.

5.1.2 RE Funds

In order to finance incentives initiated or supported by the government, many countries are establishing RE funds. A fund can be helpful in mobilizing financing from various sources, and facilitating the establishment and implementation of the various financing mechanisms such as soft loans, subsidies, grants, equity investments, and others.

Nine out of 17 countries have formally established, or are discussing the possibilities of establishing, RE funds. One of the most successful RE funds can be found in Tunisia, and has recently changed name from the National Fund for Energy Management (FNME) to the Fund for Energy Transition (FTE). This indicates a focus not only on energy efficiency measures, but also on RE measures. The fund has been particularly successful in easing the access to commercial financing for small private investors.

PROSOL financing mechanism, Tunisia

During the last nine years, Tunisia has introduced three similar financing mechanisms; PROSOL Residential (SWH), PROSOL Teritiary (SWH) and PROSOL Elec (Residential Solar PV). Below is a description of PROSOL Elec with a target of installing 8000 distributed solar PV systems (12 MW) by 2016:

PROSOL Elec consists of a capital subsidy combined with a concessional loan reducing the upfront cost of a residential Solar PV system to almost nothing. The subsidy is provided through the national RE fund, and covers around 30% of the upfront cost with a cap of EUR 6500 (TND 15000). The loan, which finances the remaining cost, is available through Commercial Attijari Bank, and is eligible to finance the first two kW of the system - repayment period is 7 years with an interest rate around 6.5%.

The success of PROSOL Elec is closely related to its design details, in which loan repayments are handled via the national utility STEG and the electricity bill savings made possible through the country's net metering scheme. This design detail provides enough guarantee to enable commercial lending for households that otherwise would fail to meet collateral requirements.

In addition to independent RE funds, several state-owned energy companies have created special RE investment units. Examples of such units can be found in Algeria, Kuwait, Morocco, Qatar, Saudi Arabia, Syria, and Tunisia. While many net energy-importing countries have energy companies struggling with financial deficits, the energy-exporting countries have greater opportunities to invest their profits in RE technology. For example, Qatar General Electricity and Water Corporation announced, in 2013, a USD 125 billion investment program for alternative and renewable energy (REN21, 2013).

Table 21: Public RE Funds

Algeria	RE Fund	National Fund for Renewable Energy and Cogeneration (FNER) established by executive decree No. 11-423 in December 2011
	Sources of financing	1% of oil royalties Other sources and donations
	Disbursement procedure	Financing newly introduced feed-in tariffs scheme
Bahrain	RE Fund	Not in place yet
Egypt	RE Fund	Renewable Energy Fund established by Cabinet in 2012
	Sources of financing	Not identified yet
	Disbursement procedure	Not identified yet
Iraq	RE Fund	Not in place yet
Jordan	RE Fund	Jordanian Renewable Energy and Energy Efficiency Fund (JREEEF)
	Sources of financing	Annual budget allocations Foreign donations
	Disbursement procedure	Not identified yet
Kuwait	RE Fund	Not in place yet
Lebanon	RE Fund	National Energy Efficiency and Renewable Energy Action (NEEREA) established by Central Bank of Lebanon in 2010
	Sources of financing	EUR 12 million from EU grant for RE projects Central Bank of Lebanon (low interest soft loans)
	Disbursement procedure	Low interest loans for RE and EE projects for a period of 14 years with grace period of 4 years and 10 years for repayment
Libya	RE Fund	Not in place yet
Morocco	RE Fund 1	Energy Development Fund (EDF) with a total capital of USD 1 billion
	Sources of financing	USD 200 million from Hassan II fund USD 300 million from UAE USD 500 million from Saudi Arabia
	Disbursement procedure	
	RE Fund 2	Renewable energy fund (FER) established by SEI
	Sources of financing	SIE forecasts to avail a contribution of 2 Billion Dirhams in equity
	Disbursement procedure	Equity investments in new and established companies focusing on wind projects
Palestine	RE Fund	Not in place yet
Qatar		
Saudi Arabia	RE Fund	Under consideration
Sudan*	RE Fund	Not in place yet
Syria	RE Fund	Not in place yet
Tunisia	RE Fund	National Fund for Energy Management (FNME) established by Law 2005-82 (2005) and Law 2005- 106 (2005)
	Sources of financing	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 Approximately EUR 17.5 million per year is contributed to the fund as a result of these revenue streams
	Disbursement procedure	-
UAE	RE Fund 1	Masdar Clean Tech Fund is a privately structured, government-backed entity that channel government funds and venture capital into RE projects worldwide and within the country USD 250 million venture capital vehicle
	RE Fund 2	Abu Dhabi Fund for Development also sets aside USD 350 million in soft loans for RE projects in developing countries
Yemen	RE Fund	Under consideration

5.1.3 Other Financial Support

In Jordan, there are two initiatives providing capital subsidies. Jordan Chamber of Industry Factories Support Program offers a non-refundable capital subsidy for small industrial enterprises to install either solar PV or solar water heaters. The objective is to install small projects in order to familiarize industry with the technology. The subsidy covers up to 35% of product costs, if foreign, and up to 50% if the product is Jordanian. The Higher Council for Science and Technology Industrial Research and Development Fund (IRDF) provides industrial organizations with grants of up to EUR 32,792 for implementing a solar PV project in partnership with an academic institution. Out of the two initiatives, the Jordan Chamber of Industry Factories Support Program has been the most successful one in attracting beneficiaries (Alison, 2014).

Jordan, Morocco, and UAE are examples of the Arab countries that have established entities that offer equity products to new and established companies focusing on RE projects. Societe D'Invetissements Énergétiques, (SIE), in Morocco, is a government-funded organization that takes ownership stakes directly in RE project companies. Because SIE is well trusted by banks and other financing institutions, it lowers the risk profile of the projects company and enables beneficiaries to attain lower cost debt (Alison, 2014). Up until today, SIE's equity function has been used to a limited extent. However, a recently established renewable energy fund (FER), dedicated to wind energy projects, is expected to increase SIE's equity investments during the coming year. In Jordan, JEDCO Governorates Development Fund supports startup companies by allowing up to 80% of equity in their RE projects. Since JEDCO only requires 10% return on any profits, this significantly reduces the cost of equity. The Jordanian fund has not been heavily used. However, with the increasing electricity prices, JEDCO expects a higher demand for RE systems and their offered services (Alison, 2014).

In UAE, Masdar Capital provides private equity transactions to promising and pioneering companies in clean tech and renewable energy. The main difference from the equity investment entities established in Jordan and Morocco is that Masdar has a global coverage, and is focusing on company investments predominantly in Europe and North America.

5.2 RE Investment Growth

5.2.1 Share of RE Private Investment

The share of private investment in RE indicates not only the effectiveness of support mechanisms, but also the general investment climate in the country. A larger share of private investment indicates a higher level of investor confidence in the legal system, institutions, supporting mechanisms and ultimately the profitability of RE projects.

In the Arab region, it is government agencies and publicly owned or controlled electricity generation companies that have taken the lead in RE investment or RE output procurement, often with the support of development banks. Since the first edition of AFEX in 2013, the situation with regards to private investments has improved, but overall still remains poor.

In 2014, the countries that made advancements in attracting private investment for large-scale RE projects are Morocco, Jordan and UAE. Jordan and Tunisia made advancement in creating better investment conditions for small-scale RE projects. The following tables provide details of large-scale private RE projects in the region that have been awarded power purchase agreements.

Table 22: Status of Large-scale Private RE Projects, Jordan (2014)

	Technology	Project	Capacity (MW)	Status	Lead Developer	Approximate Total Investment Costs
Jordan	PV	Ma'an Development Area	52.5	PPA signed, under financial closure	Kawar Investment Company	USD 165 million
	PV		20.5	PPA signed, under financial closure	SunEdison Italia Construction	USD 56 million
	PV		10	PPA signed, under financial closure	Ennera Energy and Mobility	USD 25 million
	PV		10	PPA signed, under financial closure	Martifier Solar Investment	USD 25 million
	PV		10	PPA signed, under financial closure	Bright Group Investments	USD 31 million
	PV		10	PPA signed, under financial closure	Clean Energy Concepts (CEC)	USD 24 million
	PV		21	PPA signed, under financial closure	Catalyst Private Equity	USD 45 million
	PV		20	PPA signed, under financial closure	European Jordanian Renewable Energy (EJRE)	USD 47 million
	PV		10	PPA signed, under financial closure	Greenland Alternative Energy	USD 27 million
	PV	Hosha/ Mafraq	20	PPA signed, under financial closure	Evolution Solar Inc.	USD 73.5 million
	PV	Mafraq	10	PPA signed, under construction	Philadelphia Solar	USD 23 million
	PV	Aqaba	10	PPA signed, under construction	Shamsuna Power Company	USD 20 million
	PV	Shamsuna (South Aqaba)	10	PPA signed, under construction	Trina Solar	USD 20 million
	PV	Maan	10	PPA signed, under financial closure	Scatec Solar	USD 28 million
	Wind	Tafila	117	PPA signed, under construction	Jordan Wind Project Company (JWPC), an investment by InfraMed, Masdar and EP Global Energy Ltd.	USD 292 million
TOTAL			**341**			**USD 902.5 million**

Jordan is one of the few countries in the region that saw large increase of private investments in RE, both of large-scale projects and small-scale as a result of its policy framework. By the end of 2014, Jordan had 400 MW of private RE projects under construction and around 15 MW of distributed small-scale projects installed through net metering scheme. The total investment cost of the large-scale projects is estimated at USD 902.5 million. The pool of investors is quite diversified. It includes both local and foreign investors. On average the size PV projects is rather medium, mostly under 50 MW and large portion of these projects is concentrated in the southern part of the country in Ma'an Development Area. In the second round of direct proposal submission process the preference will be given to RE projects in the northern and eastern parts of the country.

Table 23: Status of Large-scale Private RE Projects, Morocco (2014)

	Technology	Project	Capacity (MW)	Status	Developer	Approximate Total Investment Costs
Morocco	Wind	Tétouan (Lafarge Cement Plant)	32	In operation since 2006, 2011	Lafarge SA	USD 50 million
	Wind	Ciments du Maroc	5	In operation since 2000	Ciments du Maroc	USD 10 million
	Wind	Tarfaya	300	In operation since 2014	NAREVA Holding and ONEE	USD 610 million
	Wind	Akhfenir	100	In operation since 2014	NAREVA Holding	USD 415 million
	Wind	Haouma in the Tangier region	50	In operation since 2014	NAREVA Holding	
	Wind	Foum El Oued in Laayoune	50	In operation since 2014	NAREVA Holding	
	CSP	Noor-1	160	PPA signed, under construction	ACWA Power	USD 1 billion
	CSP	Noor-2	200	PPA awarded	ACWA Power	USD 2 billion
	CSP	Noor-3	150	PPA awarded	ACWA Power	
TOTAL			**1047**			**USD 4.085 billion**

Morocco made advancements in attracting private investment in RE projects mostly due to its IPP public competitive process. By the end of 2014, the total pool of private RE projects amounted to 1047 MW, of which around 540 MW were wind projects in operation and another 510 MW of CSP projects that have been awarded PPAs. Unlike Jordan's investors' market, Morocco's pool of developers is dominated by few big players. Most wind projects so far have been developed by NAREVA Holding Company, an energy subsidiary of the Moroccan National Investment Company. All CSP projects have been awarded to a consortium lead by ACWA Power. It is important to note that MASEN has 25% stake in all CSP projects. The total investment cost of the large-scale projects is estimated at USD 4.085 billion.

Table 24: Status of Large-scale Private RE Projects, UAE (2014)

	Technology	Project	Capacity (MW)	Status	Developer	Approximate Total Investment Costs
Morocco	CSP	Shams-1	100	In operation since 2013	Masdar, Total and Abengoa	USD 600 million
	PV	Mohammad Bin Rashid Al Maktoum Solar Park Phase 2	200	PPA signed	ACWA Power	USD 250 million
TOTAL			**300**			**USD 850 million**

Similar to Morocco, UAE attracted private investments mostly in large-scale RE projects through IPP public competitive scheme. UAE's total pool of private RE projects is 300 MW, of which 100 MW of CSP is already in operation and 200 MW of PV have been awarded a PPA. The total investment cost of the large-scale projects is estimated at USD 850 million. The 200 MW project made major headline news as the winning consortium led by ACWA Power offered the lowest ever price for the development of PV project of USD cents 5.84 per KWh.

5.2.2 Increase of RE Private Investment

Since the previous edition of the AFEX report Arab countries made considerable progress in attracting private investment in RE projects. In 2013, only Morocco had private RE projects in operation, while by the end of 2014 this number increased to four countries, Jordan, Morocco, UAE and Tunisia. In Morocco the share of private investment in RE in 2014 increased by 13.2% from 1.3% in 2013. UAE saw increase of share of private investment by 1.1%. In Jordan share of private investment increased by 12.9% and in Tunisia by 0.4%. The increases in share of private investment include large-scale RE projects that have been awarded PPAs and for small-scale projects that have been installed through net metering schemes (Tunisia, Jordan and Palestine). Although there is no formal process for private RE projects in Lebanon, there are de facto small scale RE projects in Lebanon operating under net metering scheme.

Table 25: RE Private Investment Increase (2014)

	Total in 2013 (% of installed capacity)	Total in 2014 (% of total installed capacity)	Investment Increase
Algeria	0.0%	0.0%	0.0%
Bahrain	0.0%	0.0%	0.0%
Egypt	0.0%	0.0%	0.0%
Iraq	0.0%	0.0%	0.0%
Jordan	0.0%	12.9%	12.9%
Kuwait	0.0%	0.0%	0.0%
Lebanon	0.0%	0.0%	0.0%
Libya	0.0%	0.0%	0.0%
Morocco	1.3%	14.5%	13.2%
Palestine	0.0%	0.0%	0.0%
Qatar	0.0%	0.0%	0.0%
Saudi Arabia	0.0%	0.0%	0.0%
Sudan	0.0%	0.0%	0.0%
Syria	0.0%	0.0%	0.0%
Tunisia	0.0%	0.4%	0.4%
UAE	0.0%	1.1%	1.1%
Yemen	0.0%	0.0%	0.0%

5.3 Finance and Investment Final Scores and Ranking

The final scores and ranks for the Finance and Investment category are presented in Figure 11. This category measures the level of financial support provided to RE projects, including support through fiscal policies and RE investment growth. Although several countries made improvements in this category, the overall performance of the region still remains poor. Only a few countries were able to attract investments in RE projects. The leading country in this category is Morocco, followed by Jordan and UAE. These are the only countries that were able to attract private investments in utility-scale RE projects. While Morocco and Jordan perform better in the Increase in RE Private Investment indicator, UAE performs better in fiscal policies. Tunisia also performs well in this category by offering clearly stipulated financial incentives for the development of rooftop PV projects.

Although Arab countries can pursue success in achieving their RE goals and targets through publicly-driven programs, the financial resources and technical capabilities of private investors can accelerate their progress. The aspects highlighted by this category deserve careful consideration by policy makers when developing RE strategies in the future.

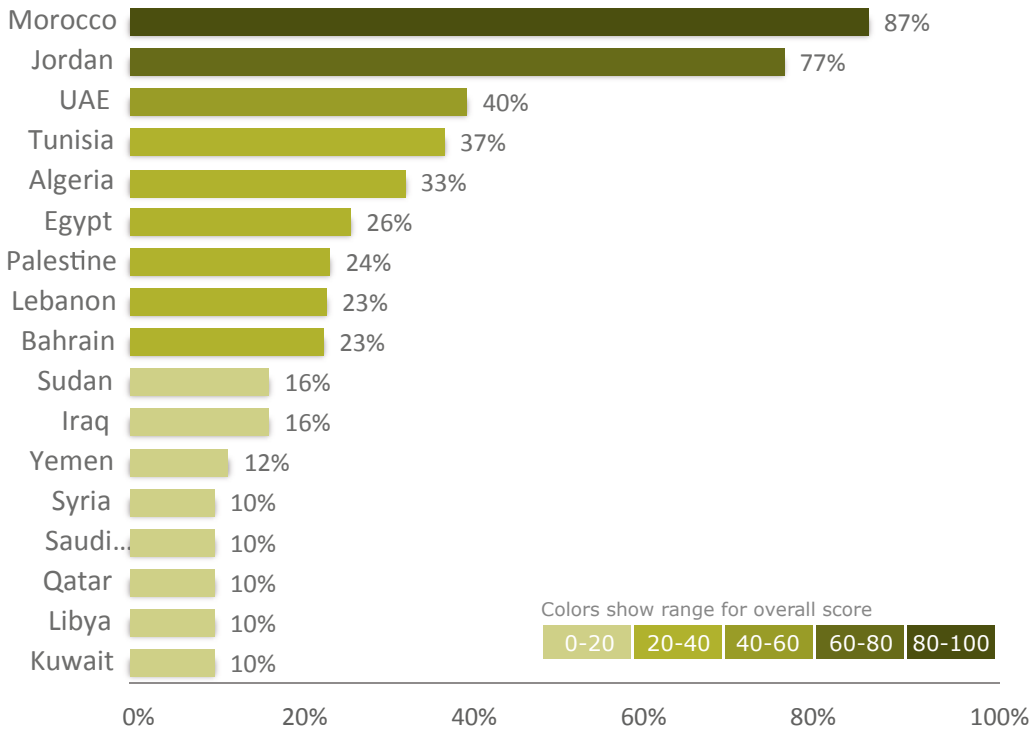


Figure 11: Finance and Investment Final Scores and Ranking

PROGRESS HIGHLIGHTS
FINANCE AND INVESTMENT

Since the previous edition of the AFEX in September 2013, only a few countries showed improvements under the Finance and Investment category.

Jordan

Jordan made improvements under the "RE Investment Growth" factor by attracting private investment in distributed RE projects under the net metering scheme, and creating a pipeline of private RE projects through its direct proposal submission scheme. In 2014, the share of RE private projects that have been already awarded PPAs increased by 12.9% compared to zero in 2012, which is a considerable success.

Morocco

Morocco also made improvements under the "RE Investment Growth" factor by attracting private investment in utility-scale RE projects. In 2014, the share of RE private projects increased by 13.2% from 2012, mostly due to commissioning large-scale wind parks and awarding PPAs for the development of two CSP plants, with a total capacity of 350 MW, as part of the Noor CSP complex in Ouarzazate in the south central part of the country.

UAE

UAE also showed progress under the "RE Investment Growth" factor by attracting private investment in utility-scale solar projects. In 2014, the share of RE private projects increased by 1.1% from 2012, mostly due to commissioning the 100 MW CSP plant in Abu-Dhabi and awarding a contract to the 200 MW PV project.

Tunisia

Tunisia improved its performance under the "RE Investment Growth" factor by increasing the share of private investment in distributed roof-top PV systems through its net metering scheme, which was combined with smartly-designed financial support.

Palestine:

Similar to Tunisia, Palestine made improvements under the "RE Investment Growth" factor by increasing the share of private investment in small-scale distributed PV systems, mostly through its feed-in tariff scheme.

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ADEREE	Agency for the Development of Renewable Energy and Energy Efficiency
AUE	Arab Union of Electricity
BOT	build-operate-transfer
BTI	Bertelsmann Transformation Index
CDER	Algerian Center for Development of Renewable Energy
CNI	National Investment Council
CSP	concentrated solar power
DEWA	Dubai Electricity and Water Authority
DLR	German Aerospace Center
DNI	direct normal irradiation
EDL	Electricité du Liban
EETC	Egyptian Electricity Transmission Company
EgyptERA	Egyptian Electric Utility and Consumer Protection Agency
EMRC	Energy and Minerals Regulatory Commission
EPC	engineering, procurement and construction
ESMAP	Energy Sector Management Assistance Program
EU	European Union
EUR	Eurozone Euro
EWA	Electricity and Water Authority
FDI	foreign direct investment
FIT	feed-in tariff
GCI	Global Competitiveness Index
GDP	Gross Domestic Product
GECOL	General Electricity Company of Libya
GHI	global horizontal irradiation
GRTE	Société Algérienne de Gestion du Réseau de Transport de l'Electricité
GW	gigawatt
GWh	gigawatt hour
IEA	International Energy Agency
IFC	International Finance Corporation
ILS	Israeli New Shekel
IMF	International Monetary Fund
IPP	independent power producer
IRENA	International Renewable Energy Agency
ISCC	integrated solar combined cycle
KISR	Kuwait Institute for Scientific Research
Km	kilometer
kW	kilowatt
kWh	kilowatt hour
kWp	kilowatt peak
LCEC	Lebanese Center for Energy Conservation
m	meter
MAD	Moroccan Dirham
MASEN	Moroccan Agency for Solar Energy
MEMR	Ministry of Energy and Mineral Resources
MW	megawatt
MWh	megawatt hour
NEPCO	National Power Electric Company
NERC	National Energy Research Center
NREA	New and Renewable Energy Authority
NEEREA	National Energy Efficiency and Renewable Energy Action
OECD	Organization for Economic Co-operation and Development
ONE	Office National d'Electricité
PEC	Public Electricity Cooperation
PEEGT	Public Establishment for Electricity Generation and Transmission
PETL	Palestinian Electricity Transmission Company Ltd
PPA	power purchase agreement
PV	photovoltaic
PWMSP	Paving the Way for the Mediterranean Solar Plan
RCREEE	Regional Center for Renewable Energy and Energy Efficiency
RE	renewable energy
SEC	Saudi Electricity Company
SETCO	Sudan Electric Transmission Company
SIE	Société d'Investissements Energetiques
SNI	Moroccan National Investment Company
STEG	Société Tunisienne d'Electricité et du Gaz
SWH	solar water heater
TND	Tunisian Dinar
UNCTAD	United Nations Conference on Trade and Development
UNEP	United Nations Environmental Program
USD	United States Dollar
WB	World Bank

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Annex A. Methodology

The structure of AFEX Renewable Energy is based on three main components to derive a final index score. It consists of 28 quantitative and qualitative indicators, which combine to provide higher-level results for 10 factors. The factors are aggregated to the highest level, supplying results for 4 categories. When the results of all categories for all countries are combined, the final index result is achieved.

AFEX Renewable Energy uses the OECD methodology for constructing composite indicators (OECD, 2008). The technical parts of the index construction are performed with guidance from the Joint Research Center's 10th JRC Annual Seminar on Composite Indicators.*

Data are organized in accordance with the established conceptual framework. Each indicator is assigned a desired direction depending on its nature and value, where '1' indicates a higher score is better and '-1' indicates a lower score is better. The indicators are assigned weights depending on their importance in relation to each other under the same category. The weights are then re-scaled to unity sum. Once data are organized, necessary statistical descriptors such as missing values, minimum, maximum, mean, standard deviation, skewness and kurtosis are calculated for each indicator.

In order to negotiate the direction and to be able to aggregate the data to develop index scoring, the 'min-max method' is used for indicator normalization. The directions and weights of the individual indicators are taken into account during this normalization. The following formula is used for normalization:

$$\text{new value} = \frac{(\text{old value} - \text{min})}{(\text{max} - \text{min})*\text{direction}} + 0.5*(1 - \text{direction})$$

where:

new value is the indicator's resultant value after normalization;

old value is the indicator's value supplied by measurement, statistical data, survey or other collection technique;

min is the minimum value observed in the 17-country group for the indicator;

max is the maximum value observed in the 17-country group for the indicator;

direction is the value of either 1 or -1 that indicates the direction of scoring for the indicator.

The normalized values for each indicator are combined to provide scores for each factor, and factors are combined to score each category. Results for the four categories are combined to develop final index scores and ranks based on the min-max method.

Ranks for individual indicators are also calculated, but not displayed in the report. Ranks have proven to be useful while interpreting the results and to argue why one country has performed better than another within a category. When the raw data are normalized using ranks, the directions of the indicators are also taken into account.

The arithmetic mean, applying variable weight to each normalized indicator value, is used to develop the rank and the performance of each country for the given set of indicators. Weights are assigned to each indicator, summing to unity for each category. The assignment is based on the relative impact each indicator is perceived to have upon the category being measured, and is based on the experience of RCREEE's regional experts.

* The guide is available at **http://ipsc.jrc.ec.europa.eu/index.php?id=65**

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أرض الجولف، مدينة نصر، القاهرة، مصر
الهاتف: ٢٤١٥ ٤٧٥٥ ٢ ٠٢+
الفاكس: ٢٤١٥ ٤٦٦١ ٢ ٠٢+

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