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Apricum insights

Emerging renewable energy market series: Egypt

In the fast lane: Egypt moves to realize its outstanding wind and solar power resources

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Executive summary

Egypt is the second-largest economy in Africa and with approximately 90M inhabitants the most populous country in the Arab World. Its recent past was marked by societal and political turbulence and reordering, most notably during the Arab Spring. With social structures now returning to stability, the country's decision makers are focusing on finding answers to the economic challenges ahead. Securing an adequate power supply is a top priority as frequent blackouts impede industrial development and stir discontent. Solar and wind power are expected to play a key role in this process.

The recently announced ambitious and credible incentive structures and the exceptional availability of solar and wind resources have earned Egypt a spot on the global renewable power development hot list. With well-managed implementation, Egypt could evolve as one of the most progressive renewable energy markets in the MENA region within a short timeframe.

Apricum GmbH
Spittelmarkt 12
10117 Berlin
Germany

T. +49.30.308 776 2-0
F. +49.30.308 776 2-25
info@apricum-group.com

www.apricum-group.com

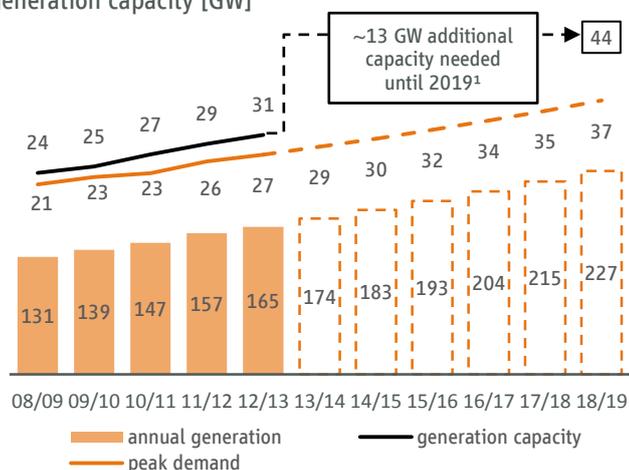
Domestic economic and energy-related challenges

Egypt's economy in general and the power sector in particular are facing major challenges that the recently-installed administration of Abdel Fattah el-Sisi needs to address.

Most prominently, Egypt suffers from a severe shortage of power supply. The installed generation capacity of 31 GW (2013) falls short of meeting peak demand especially during the summer months and has led to frequent blackouts and supply curtailments to industry.

Hence, investment in additional generation capacity is urgently needed. The problem is further intensified by rapid growth of domestic power demand, which is expected to climb at a rate of 5–6% p.a. over the next five years.

Annual power generation [TWh], peak demand [GW] and generation capacity [GW]



Sources: EEHC, Apricum research

Generous subsidies for power consumers play a crucial role in this context. Artificially low prices for fuel and electricity drive up domestic consumption. As 90% of Egypt's electricity mix is based on oil and gas-fired thermal plants, the resulting intensive domestic fuel consumption deprives the government of needed export revenues to enable public investment. In 2013, subsidy costs for the power sector totaled a massive 21% of the national budget.

The political and macroeconomic situation in Egypt's recent past has discouraged investment in exploration and commercialization of the country's remaining natural gas reserves. As a consequence of stagnating production and increased domestic consumption, less fossil fuel was available for export. As a result, the fuel trade balance shrunk from a USD 4.9B surplus (2006) to a USD 0.5B deficit (2013), which is one important reason

for the government's dire fiscal situation. Pressure on Egypt's politicians is high to resolve this dilemma of rising electricity consumption in a prevailing supply shortage and a budgetary deficit caused by declining fuel export revenues.

The role of renewable energy in Egypt

Renewable energy (RE), particularly solar and wind power, offers solutions to address the needs of the economic and power sectors in different ways:

- Exceptional availability of solar and wind resources allow for cost competitive power generation from RE power plants
- Increased share of renewables in power generation reduces domestic fossil fuel consumption and frees resources for export
- Typically high share of private sector participation in RE projects can minimize need for public investment and relieve the government's tight budget
- Fast deployment of wind and solar parks provides a direct answer to prevailing supply shortage, contrary to lengthy development of thermal plants
- Establishment of a renewable power sector will entail local value creation and generate employment, especially in the downstream sector

Renewable energy policy

The new Egyptian administration has initiated an ambitious program for the procurement of power from renewable sources. Its major element is a feed-in-tariff intending to procure 4.3 GW of wind and solar power in its initial phase. Under this feed-in tariff, producers of solar and wind power will receive fixed remuneration rates for 25 (solar) and 20 years (wind) and be guaranteed prioritized grid access. The government also provides land for FIT projects.

Tariffs are inflation-indexed and vary according to system size (solar) or full load hours of the project (wind). The state-owned power utility (EEHC) is the counterparty for the PPAs to be signed. Since the capacity for feed-in tariff projects is limited, it remains at the government's discretion to whom to award the licenses. A first-come, first-serve allocation has been announced; pre-conditions to be met are the registration of an SPV for the project and a down payment for required grid infrastructure.

Additional elements of renewable energy policy include e.g., a net-metering policy for small scale solar systems, public tenders for wind and solar power and a legislative

¹ Based on 5% consumption growth and 15% reserve capacity

framework for merchant generation and commercialization of renewable power.

Key market actors in Egypt's electricity sector

Four main players shape the electricity sector in Egypt:

1. Ministry of Electricity and Energy (MOEE) – Develops and implements the national energy strategy and governs and instructs EEHC, EgyptERA and NREA.
2. Egyptian Electricity Holding Company (EEHC) – EEHC is a state-owned vehicle that owns and operates almost the entire generation fleet as well as transmission and distribution networks via a number of subsidiaries; EEHC will be the main off-taker and PPA counterparty for wind and solar power under the FIT.
3. EgyptERA – The regulatory agency that awards licenses to private actors, monitors and sets electricity tariffs and is responsible for ensuring supply security. EgyptERA defined the requirements and procedures for the implementation of the FIT program.
4. New and Renewable Energy Authority (NREA) – A public body implementing national renewable energy policy through, e.g., tenders or own investments and also acts as a think tank providing industry data. NREA is closely interacting with EgyptERA in the implementation of the FIT and developing solar and wind projects under an EPC tender scheme.

Solar power in Egypt

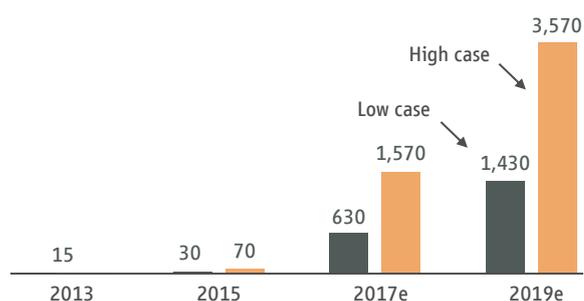
Egypt has remarkable climatic conditions for solar power. Global horizontal irradiation ranges between 2,000 and 2,400 kWh/m²*a, among the highest values found globally.

Despite this fact, current solar installations are limited to a number of off-grid and weak-grid PV installations and a combined CSP-thermal power plant with 20 MW of solar capacity. Public tenders for PV plants near the town of Kom Ombo have been initiated by the government but stalled recently due to political uncertainties.

Market outlook for solar power in Egypt

The strong emphasis that Egypt's government has put on the development of renewable power is underlined by its ambitious time frame for implementation. At the forefront of this initiative is the feed-in tariff program that seeks to contract 2.3 GW of solar power in its first phase by the end of 2017. It is split up into 2 GW of large-scale projects and 300 MW of small rooftop systems <500kW.

PV market forecast Egypt (cumulative installations) [MW]



Source: Apricum market model Q4/2015

The announcement of the FIT program details, including the generous remuneration rates for PV power in September 2014 spurred frenzied activity from local and international developers. Allocation of preliminary licenses and land parcels is expected in Q1/2015 by NREA to selected companies in a heavily oversubscribed qualification process. In the pre-qualification round seeking 2 GW of large-scale capacity, 178 project proposals totaling more than double the required capacity were registered; 69 projects achieved qualification. The key step towards realization of these projects will be for the government to provide a bankable framework to potential debt providers so that developers can reach financial close of their projects. The underlying PPA and associated securities are currently being drafted.

Remuneration rates for solar PV plants under the FIT

System size/segment	Tariff	Unit
Residential	84.8	EGP/kWh
Non-residential <200 kW	90.1	EGP/kWh
200 kW–500 kW	97.3	EGP/kWh
500 kW–20 MW	13.6	USDc/kWh
20 MW–50 MW	14.34	USDc/kWh

Source: EEHC, EgyptERA

Further demand for solar power may result from plans to hold tenders for EPC services (plants owned by NREA) and IPP projects (against PPA). However, despite the progressed stage of some projects, part or all of these could be postponed or included into the feed-in tariff program.

The net-metering scheme has been introduced to foster development of the rooftop PV sector. Yet, with subsidized power prices remaining artificially low, economic feasibility for such installations appears not to be achievable in the short term.

Apricum expects the Egyptian solar PV market to grow to a cumulative 2–3 GW by 2020, initially driven by the FIT

program and other utility-scale projects. CSP will likely play only a minor role in solar capacity expansion.

Solar industry in Egypt

The solar industry is at an early, yet highly dynamic stage in Egypt. Local and international players alike are rushing to get a foot in the door and profit from expected market growth.

In the downstream sector, a number of system integrators for PV systems already exist in Egypt, mainly targeting hotels and resorts in off-grid or weak-grid locations. For large-scale solar plants, the feed-in tariff program has stimulated local participation, mostly from contracting companies and investment funds like e.g., Orascom Construction, Taqa Arabia or Beltone Capital. Nonetheless, it is expected that global PV developers and EPCs will take a major share of the market initially, often in joint ventures with local partners.

Several Egyptian companies have announced intentions to enter PV module production; realization of these plans however remains uncertain. At this moment, components for solar systems are imported and subject to a 2% import tax levied by the government.

Wind power in Egypt

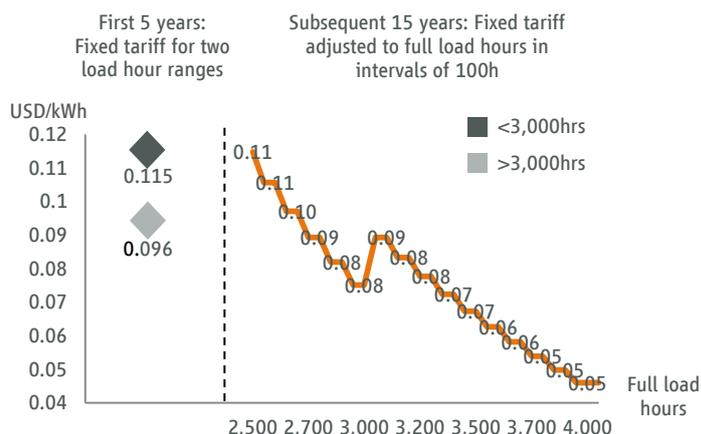
Like solar's excellent resources, wind speeds to drive turbines are high in Egypt, averaging ~6 m/s (at 50 m height) in the interior and reaching >10 m/s along the Gulf of Suez coastline. In 2006, Danish wind experts Risø deemed the area "probably the best wind farm site in the world".

Today, ~550 MW of wind capacity operate in Zafarana at the Suez Gulf coast, constituting the largest wind farm in Africa and the Arab region. Further similar installations have been announced but have not yet moved to construction phase.

Market outlook for wind power in Egypt

Response to the wind feed-in tariff was positive but did not completely fill the targeted 2.0 GW total capacity. A second procurement round is likely to be held in H1/2015 to contract the remaining capacity. The tariff scheme foresees remuneration rates based on the full load hours of the chosen site. Besides the feed-in tariff program, several wind power projects are being developed under two additional schemes: an EPC tender process promoted by NREA and two privately driven merchant IPP projects.

Remuneration rate for wind projects under the FIT



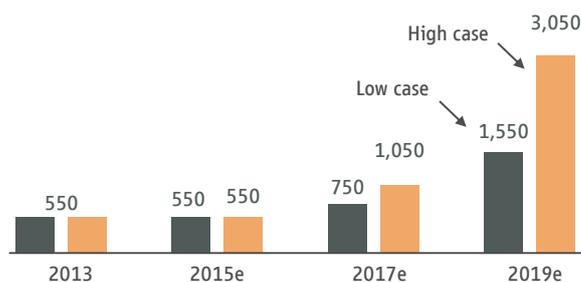
Source: EEHC, EgyptERA

Most of the public EPC tenders have land allocated and are backed by international development finance; nonetheless, none of them have proceeded to break ground.

At the same time, the private sector has taken the initiative; wind parks with a combined capacity of 720 MW are under development as a part of the newly introduced merchant IPP scheme. Italgem is developing a 120 MW wind plant in Gulf El Zayt that will provide power to nearby facilities of Suez Cement. Both companies are subsidiaries of global cement producer Italcementi. In July 2014, Egyptian company Elsewedy won a tender to develop 600 MW of wind capacity. The generated power can be used for self-consumption or sold to third parties.

Given its exceptional resource availability, an established track record in wind power and the existing project pipeline, Apricum expects the Egyptian wind power market to grow to a cumulative 2–3 GW by 2020. Installations along the Gulf of Suez will dominate; the Western Nile Delta offers further potential when the grid infrastructure along the Gulf reaches its capacity limits.

Wind power market forecast Egypt (cumulative installations) [MW]



Source: Apricum market model Q4/2014

Wind industry in Egypt

Besides its move into merchant wind activities, Egyptian cable and electronics company Elsewedy is the first and only local provider of wind power components. The company acquired a majority stake in Spanish MTorres' wind turbine business and established a joint venture with German SIAG for wind towers. Elsewedy for Wind Energy Generation (SWEG) offers complete solutions for wind power, including EPC and O&M services. The existing installations in Zafarana were predominantly sourced from global OEMs like Gamesa, Nordex or Vestas who are well-positioned to continue their involvement in the projects ahead.

Encouraged by the feed-in tariff, many downstream players of local and international profile have recently entered the stage. Next to well-known international heavyweights such as Acciona, EdF, Enel or GDF Suez, local players like Elsewedy, SIAC or Samcrete seek to take a share of this growing market.

RE business opportunities in Egypt

With a sizeable market for both solar and wind power in Egypt expected in the short term, the sector offers manifold business opportunities for both local and international companies.

Local players can act as independent project developers or contribute their local knowhow to international bidding consortia in the renewable feed-in tariff program. Civil works, construction and installation services are further opportunities, especially for local construction companies.

In the PV rooftop sector, system integration services and component wholesale of inverters, modules, mounting systems, etc. are suitable activities for local entrants. Production of PV mounting systems, e.g., with an experienced international partner, is an attractive manufacturing option for Egyptian steel and aluminum companies.

For the financial industry, large-scale renewable projects under the feed-in tariff and possibly the tender schemes will create a new asset class in Egypt. International and local financial investors can expand their portfolios to solar and wind power plants to profit from attractive returns and low technology risk.

Apricum in Egypt

Apricum has been active throughout the MENA region for several years advising international and local com-

panies on their development of activities in the wind and solar industries. With our unique and exclusive focus on renewable energy, we have contributed strategic thought-leadership and particular market and industry knowhow to the success of a broad range of clients.

Apricum's services for clients include:

- Feasibility studies for new business up to bankable business plans
- PMO and implementation support for renewable power projects
- Bid strategy and bid management support in tenders or other competitive procurement processes
- Financial engineering and preparation of bankable project documentation
- Partner identification and partner search for new business or specific projects
- Support in EPC selection and/or component procurement
- Independent advisory in partnership, consortia or other third party negotiations

If your company is considering participating in the Egyptian market for renewable energy, get in contact with our experts to find out how Apricum can support you in maximizing the success of your venture.

Your direct contacts



Martin Mitscher
Project Manager

mitscher@apricum-group.com
T. +49 30 30 877 62 17



Nikolai Dobrott
Managing Partner

dobrott@apricum-group.com
T. +49 30 30 877 6210