



## Egypt's power sector: on the right track?

With demand outstripping capacity additions, Egypt's government urgently needs to bring new power projects on line to fill the gap. But there are serious financing challenges. In order to overcome them, the government has been pursuing an aggressive reform agenda aimed at restructuring the power sector and removing subsidies. The government's objective is to attract Independent Power Producers (IPPs) to revive the industry. The failure to do so will mean that power outages will persist.

Egypt's electricity consumption has been rising at an annual rate of 5.6% in the past ten years. Driving this growth is a rising population, improving income levels, industrialisation, but also subsidised electricity prices. Egypt's estimated capacity of 34GW is not sufficient to meet this rising demand, and power outages are frequent – especially in summer months – when people can experience blackouts more than three times a day. The country has ambitious plans to invest and increase its capacity in the medium term. Our estimates suggest that Egypt will need to invest \$28bn in power generation and a further \$15bn in transmission and distribution (T&D). This would increase capacity in MENA's most populous country by approximately 20GW to reach 54GW in 2020.

To address the acute power shortage, the country has ambitious plans to diversify its power generation mix – currently dominated by gas-fired power plants – by introducing nuclear and coal plants. Renewable energy will also be at the forefront of Cairo's efforts, with 4.3GW of wind and solar targeted by 2020. However, an ailing economy, and significant political uncertainty will make investors wary. Financing challenges remain the government's biggest obstacle, with a weakening currency and tightening financing terms from international banks. It is therefore imperative that the government pushes ahead with the market and price reforms that it has announced. The country has relied on the state utility - the Egyptian Electricity Holding Company (EEHC) - to increase capacity, with the private sector responsible for only 10% of generating assets. This has to change, and moving forward, IPPs will be key to the future of Egypt's power sector.

### Ambitious plans

In 2015, Egypt announced plans to invest \$43bn in the power sector over the medium term. The country suffers from a shortage of gas, typically prioritised for power generation. But the discovery of the giant Al-Zohr field, coupled with BP's West Nile Delta upstream developments and several LNG import contracts should improve gas supply. Meanwhile, Orascom and Siemens are currently constructing three 4.8GW combined-cycle gas-power plants, which will be among the largest in the world. The three mega-projects will represent 75% of the 20GW of projects under development and are expected to come on line between now and 2020. Overall, gas-fired power plants represent nearly 19GW of the 20GW of projects under development.

In terms of renewables, the country announced plans to develop 2.5GW of wind, 1.7GW photovoltaic (PV), and 100MW of Concentrated Solar Power (CSP) capacity by 2020, but has

been struggling to kick-start the programme. In the short term, the country will add nearly 400MW of wind capacity in Gebel El Zeit – expected on line in 2017. Overall, 20GW of generation capacity is in execution and ready for commissioning by the end of the decade, still leaving Egypt a little short of what is required for the period 2016-20.

Beyond the medium term, Egypt has signed memoranda of understanding with several companies for the construction of four coal plants with a combined capacity of 12GW. However, no investment decisions are expected until the end of the decade. Nuclear is also part of the diversification strategy, with preliminary agreements between Egypt and Russia in place to build four 1.2GW reactors. The deal involves a Russian loan of \$25bn to cover 85% of the cost of the project, while the Egyptian government will fund the remaining. Although a flurry of optimism surrounded Egyptian nuclear plans, many financial, political, and regulatory obstacles still need to be addressed before any concrete progress is made. This will leave coal and gas as the main components of new capacity beyond 2020.

### The financing debacle

Financing remains the biggest threat to the government's plans to increase capacity in power generation. Investments and capacity additions have long been the responsibility of the Egyptian government, but increasing demand and low government revenues have meant that the country has not been able to build capacity in time to meet rising demand. Consequently, the government is having to look abroad to provide the necessary financing.

Although there is strong overseas interest in the Egyptian market, the country's acute financial situation, diminishing foreign reserves, and weakening pound are all of major concern to international investors. Egypt's foreign reserves reached \$19.6bn in September 2016, down from an all-time high of \$36bn in December 2010. To help assure investors, the central bank agreed to give currency conversion priority to the utilities sector. This, though, is not enough, because international commercial banks will want currency availability guarantees, which the government is unlikely to give. Additionally, the government's insistence that it will purchase electricity from private generators in the local currency has also deterred potential investors at a time when Egypt has just adopted a flexible currency regime. The currency was devalued by 48% earlier this month while uncertainty of the pound's health could stall some projects. Earlier this year, Italian utility company Enel withdrew from a 47MW solar PV project due to further devaluation fears.

## The 10 largest power projects seeking financing in Egypt

Project	Cost (\$bn)	Capacity (MW)	Potential financiers	Estimated debt gap (\$bn)
Shanghai Electric/EEHC: Coal plant	6.4	4,640	Industrial Commercial Bank of China	N.A
Renewable energy feed-in tariff programme	8.0	4,300	Eight development banks	4.0
Al-Nowais Investments: Ayoun Moussa coal power plant	4.5	3,960	To be announced	3.0
Rosatom/EEHC: El-Dabaa nuclear power plant phase 1	4.0	4,800	Russian financial institutions	N.A
Orascom/Ipic: El-Hamarawein coal power plant	3.0	3,000	Local banks	2.3
Benchmark Power International Kafr: El-Sheikh power plant	2.5	2,300	To be announced	1.9
Acwa Power/Hassan Allam & Sons: Dairut IPP	2.0	2,250	Chinese financial institutions, development banks	0.0
EEHC: Damanhour power plant	1.3	1,800	Development banks and funds	0.0
Engie/Toyota Tshusho: Gulf of Suez wind farm	0.5	250	Japanese and French banks	0.0
Kom Ombo solar projects	0.4	200	Development banks and funds	0.3

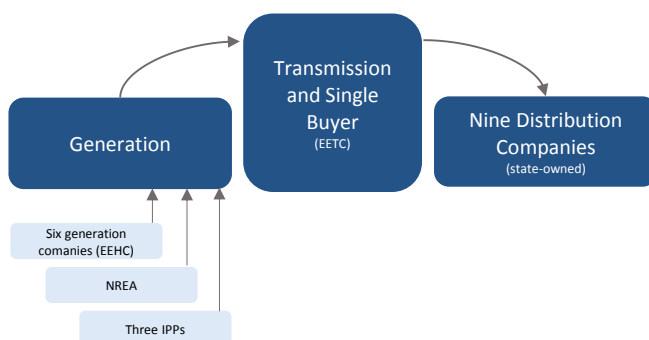
Source: MEED; MEED Projects

In response, the Egyptian government has also turned to international lenders such as the International Finance Corporation, part of the World Bank, and the European Bank for Reconstruction and Development (EBRD) for financing. The EBRD alone will provide \$500m in funding in 2016 for renewable projects. However, these organisations are not capable of providing sufficient financing for projects, nor are they interested in financing conventional power projects. The government is therefore having to step up efforts to secure alternative sources of financing. Moving forward, the UAE and Saudi Arabia are also set to invest in conventional power sources, while the Russian and Chinese governments, as well as private organisations in those countries, are potential financiers for mega nuclear and coal projects.

### Much needed reforms finally taking place

Egypt's financing struggles are also catalysing power sector reforms. The country still relies on the single-buyer model, with EEHC the government-owned state utility that is responsible for the oversight of production, transmission, and distribution through its subsidiaries. The sector is vertically and horizontally unbundled, with several companies operating in generation and distribution, although most of these companies are state owned and fall under EEHC. The Egyptian Electricity Transmission Company (EETC) holds a monopoly on transmission. It also acts as the single buyer from the generation companies.

### Power market structure



In total, six generation, one transmission, and nine distribution entities operate in the electricity market under the umbrella of EEHC. Additionally, three IPPs and the National Renewable Energy Agency (NREA) provide private sector generation to the market.

Like most power markets in the region, Egypt is undergoing reforms with ambitious plans to promote renewable energy and increase private sector participation. In 2015, the government issued a new law to create a competitive electricity market throughout the value chain. This will essentially pave the way to end the single-buyer model and allow private generation to sell directly to end users. At the same time, third parties will have access to grids while the role of the EETC will become that of an independent transmission system operator. The new law also allows for the creation of two electricity markets. The first market will permit large consumers to negotiate and purchase electricity directly from various suppliers. The second market will be more closely regulated where consumers will purchase electricity from distribution companies at regulated prices. The transitional period to complete the restructuring is expected within eight years.

The government is also stepping up efforts to reform electricity prices. Residential and commercial electricity prices have substantially increased across all usage bands, with the government claiming that these increases will reduce Egypt's electricity subsidy bill to 29bn Egyptian pounds (LE), down from LE48bn had prices remained the same. Residential consumers were hit the hardest, seeing increases of up to 47% in July, while commercial customers will see their bills rise between 9-19% in the same month with the government keen not to put additional strains on businesses. Several factors pushed the government to introduce these price hikes. First, a weakening Egyptian pound has made imports of LNG and refined products more expensive. Second, rising costs of new generation and transmission have placed additional financial pressure on an already constrained government budget. Third, international development organisations – such as the IMF – have demanded economic reforms as a condition for providing much-needed loans. Price reform measures were fundamental in securing the \$12bn aid package by the IMF.

## New Electricity Tariffs as of July 2016

Band	Old price (LE/kWh)	New price (LE/kWh)	Change (%)
<b>Household</b>			
0-50 kWh	0.075	0.110	47
51-100 kWh	0.145	0.190	31
101-200 kWh	0.160	0.215	34
201-350 kWh	0.305	0.420	38
351-650 kWh	0.405	0.550	36
651-1,000 kWh	0.710	0.950	34
Over 1,000 kWh	0.840	0.950	13
<b>Commercial</b>			
0-100 kWh	0.320	0.350	9
101-600 kWh	0.580	0.690	19
601-1,000 kWh	0.810	0.960	19
Over 1,000 kWh	0.860	0.960	12

Source: MEES, Apicorp research

### IPPs are crucial to the sector

The primary objective of the government's ambitious reform agenda is to attract the private sector. Currently, IPPs have limited presence in Egypt. Three IPPs were introduced in the early 2000s with a combined capacity of near 2GW – offering very competitive tariffs of 2.5¢/kWh. Like most IPPs in the region, 20-year power purchase agreements were signed with the state utility. Although there were plans to introduce twelve additional IPPs, the currency devaluation in 2002 and 2003 shelved these projects. However, the government is now becoming increasingly aware of the importance of IPPs in its sector.

First, IPPs allow investments in power generation without the need for the government to pay the entire upfront cost. This is especially important for Egypt, as falling government revenues need to be allocated towards other sectors such as education, health and infrastructure. Second, IPP projects are usually more cost effective than government power plants. Contracts under the IPP model are usually awarded to developers who provide the lowest levelised cost of electricity (LCOE) - the price per kWh that represents all fixed and variable costs of a project throughout its lifetime. Egypt's first IPPs offered some of the lowest tariffs at the time. Third, IPP projects are quicker to execute. With at least 20GW of capacity that needs to be added in the next five years, projects must be implemented swiftly. IPPs provide governments with the flexibility to identify projects and capacity needs while leaving developers to execute. This is especially important in Egypt where project delays due to financial and technical issues are frequent.

Egypt's power industry stands at a crossroads. An unfavourable balance between rising demand and insufficient capacity can only be addressed through investment, which we estimate to be as high as \$28bn. But low foreign reserves, concerns about currency devaluation, and an outmoded industry structure and pricing regime make financing harder to source. In the face of these challenges, the government has little choice but to restructure its power sector, remove subsidies and allow competition in order to attract investment. But despite the recent increases in electricity prices, the government will be reluctant to pass all costs to consumers quickly. The good news is that the restructuring of the power sector and the electricity pricing reform have already begun. The government must ensure that it completes these reforms; otherwise, the power outages will persist.

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