

**Economic
Reports**

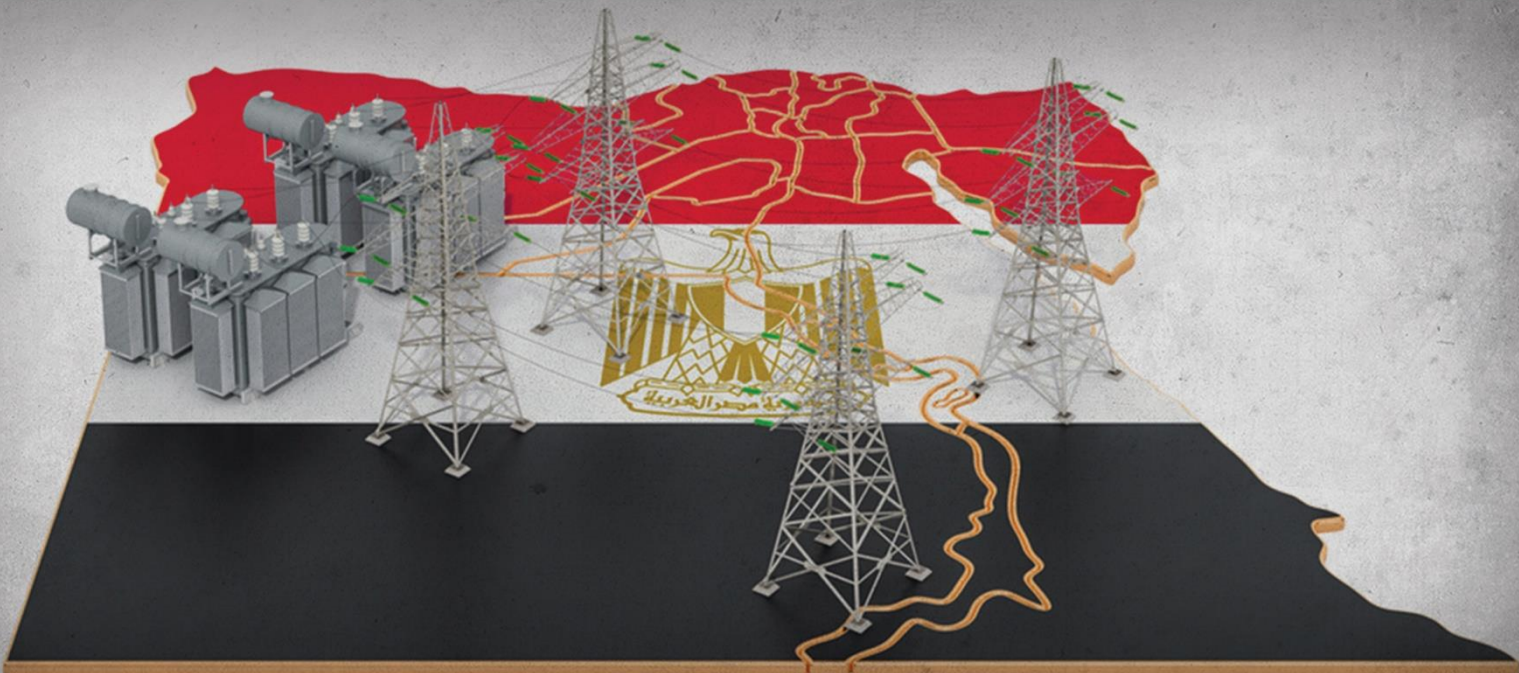
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**Egypt's Enormous Electricity Surplus
Achievement or Impasse?**

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Egypt's Enormous Electricity Surplus – Achievement or Impasse?

Mamdouh al-Wali

The Egyptian government boasts that it has achieved a surplus in power production amounting to about 25 megawatts over domestic consumption needs, as the current electricity production amounts to approximately 58 gigawatts, while the local consumption ranges between 30 to 32 gigawatts, which means that the surplus ranges between 26 to 28 gigawatts – where these figures are related to the power consumption peak during summer, but the difference certainly widens in winter with the decline in electricity consumption.

It is noteworthy that the normal power reserve rate in France and Germany is 15%, that is, that is only about 4.8 megawatts during the Egyptian consumption peak, which means that the power surplus in Egypt far exceeds the international rates.

As for those betting on the Ministry of Electricity's ability to benefit from this electricity surplus through export, they must know that the relative share of electricity exports last year (2018/2019) amounted to three per thousand of the total electricity generated domestically. On the other hand, the successive increases in electricity prices have caused a decline in domestic sales of electricity, especially regarding the household consumption that represents the largest component of domestic consumption despite the rising numbers of subscribers.

Hence, the benefit of those power surpluses, relying on investments funded through local and external loans, have been blocked. The loan balances of the Egyptian Electricity Holding Company (EEHC) had reached LE312.2 billion by the end of July 2019; and the annual burdens of these loans reached LE45.4 billion during the fiscal year 2018/2019, where the electricity production sector was dumped with money without provision of adequate planning.

The story starts with the increase in electricity consumption during summer months due to the high temperature in that time of the year, with an extra use of air fans and air conditioners in Egyptian homes, shops, workshops, industrial wards, cafes, restaurants, casinos, clubs etc., especially in the evening. Accordingly, the electricity consumption rises up to levels that the available production potentials cannot meet, especially in light of problems that may prevent utilization of the full

production capacity. This prompts some electricity production stations to disconnect the electrical current from some areas to reduce loads on the public electricity network, a method that has been followed in Egypt since 2008, especially during extremely hot summer days in the years that followed it, including the year in which President Mohamed Morsi took office, which the counter-media invested in defaming the president.

Even after the army took power in July 2013, the problem continued, reaching its peak in the summer of 2014, which embarrassed the military regime then after many ordinary people criticized the military performance, saying, to the effect that: "There used to be failure in the electricity supply during the Muslim Brotherhood's year in power, a crisis that is maintained under the army's rule; what is the difference, then?" In response to this, General Sisi directed all efforts to solving the problem of failure of the electrical current supply, giving it priority at any cost. Accordingly, the solution proceeded on more than one axis, including:

- 1- An urgent plan to add 3,636 megawatts before the next summer begins,
- 2- Accelerating completion of projects for the production of electricity that have been established over the past years,
- 3- Providing maintenance programs to raise the efficiency of production plants.
- 4- Raising the production efficiency of simple cycle plants,
- 5- Solving the problems of lack of fuel needed to produce electricity, especially natural gas, and encouraging the use of energy-saving lamps in homes and streets.

Indeed, the \$2.7-billion urgent plan that was carried out in several areas, including: Sharm El Sheikh, Port Said, Atakah, Mahmoudiya, Hurghada, West Assiut and West Damietta, in addition to mobile units in Upper Egypt cities, managed to add 3,626 megawatts within eight and a half months.

The axis of completion of electricity production projects whose implementation had already started in six areas, namely: Ain Sokhna, Banha, Sixth of October, North Giza and Suez, in addition to a wind station, was able to add 4,250 megawatts at a cost of \$3.98 billion. Also, the maintenance program in April before summer months was able to restore about 2,229 MW.

Unplanned power production frenzy

If there were a kind of rational planning, the government would have stopped any new power production projects after the generation capacity reached 38,857 gigawatts in June 2016, before the entry of electricity production from the stations of the German Siemens company, in order to assess the situation and determine the needs for electricity production during the following years in light of the expected consumption rates of different sectors.

However, the political factor intervened as usual by concluding a contract with the German company to establish three huge electricity production stations with a total capacity of 14,400 megawatts, without conducting a bid between international companies, where the contract was concluded by direct order to strengthen the relationship with Germany, as the international company was going through difficult circumstances at the time.

It was also agreed to expand projects of solar and wind renewable energy, producing electricity from coal and storing and pumping water, as well as nuclear energy; in addition to electricity production projects that were under completion. The result was a huge production surplus that the Ministry of Electricity could not benefit from due to the limited available options.

To overcome the problem, the Ministry of Electricity had to stop operating the old production stations, but this matter could expose the plants to rust; so, the alternative was scraping some of them, such as the Karmouz gas station in July 2018, a gas unit at the Al-Shabab gas station in October 2018, and the Soyouf gas station in November 2018.

However, reducing production was more likely, as happened with the Damanhur station in February 2019, the Hurghada gas station in April 2019, the Atakah steam station in June 2019, and the Talkha steam station in June 2019, among others. After reducing the operating period of the mobile units that were launched under the urgent plan to only 120 minutes/24h., it was completely suspended in February 2018. In this way, about half of the urgent plan projects have been suspended!

The problem also prompted the Ministry of Electricity to transfer electricity production projects scheduled for the 2017-2022 plan to the next five-year plan, that is 2022-2027, and to postpone the electricity production projects through coal and water storage and pumping.

Difficulties facing electricity export

The second alternative for the ministry was to take advantage of that surplus in operating desalination plants, as well as in operating underground metro lines in cities, but the decisions to establish such projects are not in the hands of the Ministry of Electricity, while the most appropriate alternative for this is to increase electricity exports to neighboring countries, especially as there is an Egyptian electrical interconnection grid with both Libya and Jordan since 1998.

Egyptian Electricity Sales -GWH-

Year	Sold Electricity	Purchased Electricity	Generated Energy	Exported to Generated Energy %
2007/2008	814	251	125129	0.7
2008/2009	1022	126	131040	0.8
2009/2010	1118	183	139000	0.8
2010/2011	1595	152	146796	1.1
2011/2012	1679	102	157406	1.1
2012/2013	474	77	164628	0.3
2013/2014	460	61	168050	0.3
2014/2015	730	51	174 875	0.4
2015/2016	747	54	186320	0.4
2016/2017	333	65	189550	0.2
2017/2018	425	81	196760	0.2
2018/2019	641	70	199843	0.3

Source: The annual report of the Egyptian Electricity Holding Company - various issues.

It is clear from the data in the above table drawn from the annual report of the Egyptian Electricity Holding Company (EEHC) that the export quantities represent only a small percentage of the electricity production. However, the quantities that were exported in the last years of President Mubarak's era, considering the lack of production at the time, are much more than the quantities exported after the army assumed power despite the increase in production quantities.

Hence, this alternative requires years to establish linkage lines with the destinations to which electricity will be exported, in addition to the cost of establishing those lines and the desire from the other party to import Egyptian electricity if it has a comparative advantage.

Postponing power linkage with Saudi Arabia until 2023

Although the Libyan power interconnection line is the oldest Egyptian power linkage line, built in May 1998, yet the main problem is its limited voltage, amounting to 220 GWH only, which does not enable it to receive large quantities of electricity. Moreover, the strained relations between Egypt and the Libyan Government of National Accord (GNA) has been a counter factor to developing the potentials of that line despite Libya's need for electricity. Instead, the Egyptian side is expected to take the lack of electricity supply in Libya as a means of pressure on the GNA.

The second and main Egyptian power linkage line for exporting electricity is the power grid with Jordan, which began in October 1998, with effort amounting to 400 GWH, where it was hoped, upon its establishment, that Egyptian electricity would reach Lebanon, then Syria, and other countries, but those hopes were faltered. Then, hopes turned to the Egyptian power linkage with Iraq, which suffers from a noticeable shortage of electricity, through Jordan, but a spokesman for the Egyptian Ministry of Electricity stated in July 2020 that studies on Egyptian electricity export to Syria and Iraq have been suspended due to the unfavorable internal conditions in the two countries.

In addition to small export quantities of about 32 megawatts to Palestine to solve the electricity shortage in Gaza, the electricity interconnection with Sudan was finally completed in late March 2020 after a series of postponements since December 2018, but the line operates at a capacity of 70 megawatts as a first stage.

Since 2010, there has been talk about the electrical interconnection between Egypt and Saudi Arabia, but it was postponed several times, including delaying operation to 2022 instead of 2020 due to changing the lines of the linkage line inside the Saudi part after the start of the giant NEOM tourism project. Then, it was announced in July 2020 that launch of the project was postponed until the end of 2023 due to the rerouting operations.

The Egyptian-Saudi linkage line's investments amounted to \$1.6 billion, where Saudi Arabia's share was \$ 1 billion, but experts expect the delay to increase the cost by 30%, targeting exchange of

3,000 megawatts between the two countries as a result of the difference in the peak demand period in Saudi Arabia (the afternoon hours) and in Egypt (at night).

Hopes for electricity linkage with Arab, European and African countries

In March 2018, a memorandum of understanding was announced for an electricity linkage project between Egypt and Cyprus with a capacity of 2,000 megawatts; and in September 2018, an agreement was announced that a European company, whose name has not been revealed, would implement the project, that the contract would be signed in late 2019, and that the grid would extend from Cyprus to Greece and then from Greece to Europe. However, the whole matter is still under study, with expectations to start the first phase of the project with a capacity of 1,000 megawatts in December 2022, but the practical reality has not witnessed any steps on the ground.

Egyptian electricity sector officials find the issue of electrical linkage projects a fertile field for aspirations that are not yet based on practical reality. With talk about the electrical linkage between Egypt and Jordan, it was repeated several times that it would be part of an electricity grid between eight countries, including: Egypt, Jordan, Palestine, Iraq, Lebanon, Syria, Turkey, and Libya, but there are no executive steps in this regard.

There was also talk about benefiting from the Egyptian-Jordanian linkage in inter-linkage with the power grid of the Arab Gulf states, which also did not show practical steps except for a memorandum of understanding in November 2019 between Egypt and Jordan on the one hand and the Gulf Cooperation Countries Interconnection Authority (GCCIA) on the other. Also, there has been talk about an Arab common electricity market, where the GCC issued a decision in September 2016 to approve it without practical steps on the ground.

Also, there was talk about benefiting from the power interconnection grid between Egypt and Sudan to reach Ethiopia and then to other African countries, as well as talk about power linkage projects between Egypt and the Arab Maghreb through the linkage grid with Libya, and then extension from the Arab Maghreb to Europe via the linkage grid with Spain.

Egyptian electricity exports – by one million dollars

Year	Value
2010	110
2011	282.4
2012	184.8
2013	62.5
2014	57.2
2015	50.4
2016	33.3
2017	0.3
2018	18.8
2019	52.5

Source: Data obtained from the Foreign Trade Bulletin, issued by CAPMAS - various issues

Thus, Egyptian foreign trade data indicate a decline in the return from exporting electricity compared to the large funds spent on investments of the electricity sector, where the government says it has made investments worth LE515 billion, a figure that needs to be checked for its contradiction with the Ministry of Planning's annual plan follow-up data, as well as with the data of the Egyptian Electricity Holding Company (EEHC), which is the parent company in the electricity sector, with affiliate electricity production, transmission and distribution companies. It is also noted that the value of electricity exports was greater before the army seized power in July 2013, that is, greater than the period of the huge electricity surplus.

Consumption decreased despite the rising numbers of subscribers

Accordingly, proportional distribution of electricity sold for different purposes in FY2018/2019 included: the household sector by 39.6% of the total, followed by the industry sector by 29.2%, shops and other similar activities 12.9%, government bodies 5.1%, agricultural activities 4.7%, utilities 4.3%, public lighting 3.5%, and sales to electricity grid countries 0.3%.

However, the electricity sold to the household sector, which represents the largest share of sales, saw a decrease in the quantities sold from 73,361 GWH in FY2015/2016 to 64,125 GWH in

FY2016/2017, despite the increase in numbers of subscribers during the two years from 32.430 million subscribers in FY2015/2016 to 33.658 million subscribers in FY2016/2017.

In FY2018/2019, the quantities sold to the household sector continued to decrease to 60,110 GWH, that is, less than it was in FY2013/2014, that is, five years before, something that officials were supposed to expect while planning these additional quantities of electricity.

The decrease in consumption was not limited to the domestic sector, as the purchases of the shops sector decreased in FY2015/2016 compared to purchases in the previous fiscal year, and continued to decrease in FY2016/2017. The decline in electricity consumption also occurred in other sectors, including utilities, public lighting, and government bodies in different years.

The result was that the total energy sold in FY2018/2019 amounted to 151.908 thousand GWH against 156,300 thousand GWH in FY2015/2016. Also, FY2016/2017 witnessed a decline in the sold quantities of electricity compared to the previous fiscal year.

This means that betting on absorbing that huge surplus of electricity production currently available through domestic consumption is unreliable over the next few years, whether for tendency by some to rationalize use of energy, for the decline in activities of some industrial and other fields due to the state of recession in markets, even before the outbreak of the coronavirus pandemic, which Ministry of Electricity data revealed that it caused a decline in electricity consumption in March 2020.

The most dangerous thing in the repercussions of the big surplus of electricity is that it will affect the targeted increase in the share of renewable energy in electricity production, where the government started to put restrictions on the production of renewable energy, as on May 20, 2020 the Electricity Utility and Consumer Protection Agency for example imposed a ceiling for the production of solar energy in the private sector, 20 megawatts, which does not apply to projects in the Benban area in Aswan. It also decided to reduce the price that the producers were charging to LE 0.40 instead of LE 0.70. The government has also frozen new tenders and contracts for large enterprises, which has already been implemented in two enterprises.

Thus, the above data indicates poor planning and predominance of political decisions in managing technical matters.

August 19, 2020

Even if the three companies implemented by the German Siemens company were sold, the government is obligated to buy their electricity production, which means that the problem of electricity surplus will remain.

If there had been proper planning, the resources would have been distributed wisely, and the electricity sector would have taken its actual needs only, where the rest of investments would have gone to other areas such as health, education, railways and others, instead of the current glut in the electricity sector and the scarcity of resources in a number of public service sectors.

