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Ghana's Power Emergency - Microcosm of a Broader Crisis

On March 17th the Volta River Authority (VRA)¹ announced a nation-wide program of load-shedding, citing a power-generation deficit of approximately 400 MWH, equivalent to 16% of installed capacity. This emergency is emblematic of the looming financial crisis facing Ghana.

Background to the Emergency

The crisis gripping Ghana's state-dominated power sector is the product of years of under-investment² in both generation capacity and the infrastructure for the transmission and distribution. This has led to repeated instances of equipment failure, by far the most dramatic of which triggered the nationwide black-out that Ghana experienced in February 2012.

■ Defective Infrastructure

Since the beginning of this year, there have been more than two dozen occasions – 11 in January alone³ - on which a mechanical malfunction has triggered a sufficiently sharp drop in electricity output to warrant emergency rationing. The announcement of the current load-shedding program one week ago, was accompanied by the explanation,

*"We have quite a number of plants that are undergoing ... maintenance works. T2 one of our plants at Aboadze is undergoing repairs and...we need to put the gas turbines off creating a deficit of about two [hundred] megawatts."*⁴

■ Generator Feed-stock

- No domestic supply

Quite apart from these infrastructure deficiencies, Ghana has found it very challenging to fuel the eight thermal plants that generate 48% of its total electricity output. In theory, this should have presented no problem for a country with natural gas reserves estimated at 23 billion m³. However, due to funding problems⁵ the Atuabo Gas project intended to process gas from Ghana's Jubilee Field is now more than three years behind schedule. As a fallback, Ghana has had to resort to importing natural gas from Nigeria – with catastrophic results⁶.

Location of Ghana's Power Plants



Sources: Volta River Authority; Grid Co. of Ghana

¹ This state-owned corporation is Ghana's primary power producer.

² Ghana's generation system has a peak load factor of 93%. Attributable to widespread equipment deficiencies, transmission and distribution losses are estimated at an astronomical 22% of total electricity output.

³ Source: 'Requested Load-shedding by Gridco for the Month of January', published by [Joyonline](#) on Feb. 28, 2014, in article "Inadequate supply forces ECG to ration power".

⁴ William Boateng, public relations officer of the Electricity Co. of Ghana in [XYZnews](#) interview, as reported by [Joyonline](#), Mar. 17, 2014.

⁵ Disbursements under a USD 3 billion China Development Bank loan have been repeatedly delayed, for reasons as yet unspecified.

⁶ In August 2012 deliveries of Nigerian gas ceased completely as the result of a shipping accident that inflicted massive damage on an offshore section of the West African Gas Pipeline. When deliveries resumed in July 2013, they averaged a mere 60 million ft³ per day, barely half the volume that the Nigeria Gas Co. (NGC) had contracted to supply.

● *Unreliable Nigerian supply*

Over the last two months, the volume of gas delivered by the Nigeria gas Co. (N-Gas) has plunged to an average of only 30 million ft³ per day⁷ - even though repairs to the Escravos-Lagos pipeline system⁸ were completed in early February. This is because domestic demand for this feed-stock-stock has spiked since the late 2013 privatization of Nigeria’s power-generation sector, creating a supply shortfall in excess of 400 million ft³ per day⁹.

Unlike the VRA’s thermal plants, none of which is dependent on natural gas, the Sunon Asogli IPP, is only designed to run on this feedstock. Because of the fuel shortage this 200 MWH plant has had to be taken offline, eliminating 8% of Ghana’s generation capacity.

● *Punitive cost of light-crude alternative*

Although the VRA plants are able to run on LCO this feed-stock has to be procured on the international market – at considerable expense¹⁰. The significant pressure weighing on Ghana’s external reserves has almost certainly constrained the VRA’s ability to import the volume of LCO required¹¹ to make up for the daily shortfall of 90 million ft³ in deliveries by NGC.

On the optimistic assumption that 50% of the gas shortfall is actually being replaced¹² this would imply a residual output gap of 160 MWH - equivalent to the combined generating capacity of the two Tema thermal plants, TT1&2.

Overview of Ghana’s Power-Generating System

Plant	Installed capacity	Plant Type	Fuel Source	Plant Operator
Akosombo	1,020	Hydro	Water	VRA
Kpong	160	Hydro	Water	VRA
TAPCO (T1)	330	Thermal	LCO/Gas	VRA
TICO (T2)	220	Thermal	LCO/Gas	VRA
T3	132	Thermal	LCO/Gas	VRA
TT1PP	110	Thermal	LCO/Gas	VRA
TT2PP	50	Thermal	DFO/Gas	VRA
Mines Reserve	80	Thermal	DFO	VRA
Navrongo	2	Renew.	Solar	VRA
Sunon Asogli	200	Thermal	Gas	IPP
CENIT	110	Thermal	LCO/Gas	IPP
Bui	133	Hydro	Water	IPP
Total	2,547			

Sources: Volta River Authority

Implications for Growth

Although as yet unquantified, this acute power shortage entails a significant cost to Ghana in terms of lost economic output. A 2010 study commissioned by the Ghana Grid Co. estimated the annual cost at \$974 million¹³.

Coming on the heels of the sharp deceleration experienced in 2013, Ghana’s 2014/Q1 performance is all but guaranteed to disappoint, calling into question the IMF’s full-year target of 5.5% - and by definition, the government’s rather fanciful target of a 7.5% expansion.

⁷ i.e. Barely enough to fuel the Tema Thermal 1 Plant (TTP1) with an installed capacity of 100 MWH.

⁸ This network of pipelines, through which gas is pumped from the Escravos field in the Niger Delta to the Itoki export terminal in Lagos, has been repeatedly bombed by the Movement for the Emancipation of the Niger Delta (MEND).

⁹ As the Nigeria National Petroleum Company (NNPC) pointedly observed at the Abuja Power Investors’ Summit on March 21st, ‘There’s no use being an exporter of gas, but then be using candles at home.’ [Reported by Bloomberg, in “Nigeria to Increase Gas Prices to Boost Supply to Power Plants”, Mar. 21, 2014]

¹⁰ During the period Aug. 2012-July 2013, when the supply of gas was interrupted by massive damage to the West African gas pipeline, the VRA reported that it was spending an additional USD 3 million daily to import the light crude oil substitute.

¹¹ There has been no official statement on the volume of the substitute feedstock that VRA is currently importing.

¹² i.e. 45 million ft³ per day.

¹³ See Chapter 6, “Ghana Wholesale Power Reliability Assessment (2010)” by Power Systems Energy Consulting (PSEC), commissioned by the Ghana Grid Co.

¹³ Equivalent to approximately 2.5% of GDP, this figure is consistent with the World Bank’s estimate that the annual direct cost of power outages to African nations is typically about 2% of GDP.

In search of funding

It is evident that Ghana's power sector requires a significant capital injection¹⁴ – first to make up for the years of under-investment and then to keep pace with the rapid growth in electricity demand which is growing at approximately 9% annually. What is far less clear is how this capital is to be sourced.

At the end of 2013/Q3, the VRA announced plans to issue a USD 500 million eurobond in early 2014, to fund three key projects to increase the supply of power to the national grid¹⁵. Those plans were quietly shelved in December in response to the clear evidence that investors had no interest in financing a prospective issuer obliged by the local tariff regime to run at a negative operating margin¹⁶. That experience may well prove prophetic.

Metaphor for Ghana's economic predicament?

It is in fact far from clear how the country can continue to finance its twin deficits, given its mediocre growth rate, significant debt load and soaring domestic interest rates.

The indications are that, following the 'successful' issue of Ghana's second eurobond last August, the Government has been counting on the international capital market to provide funding on more attractive terms than available domestically¹⁷. Indeed, as recently as last month, the President felt confident enough to advise Parliament that,

*"[O]ur domestic debt and the current high interest rates are a major challenge to the economy. The Hon. Minister for Finance is currently implementing measures to refinance a portion of the domestic debt, thereby reducing the pressures these obligations are placing on the budget."*¹⁸

It remains to be seen whether this optimism will be vindicated come April, when Ghana plans to issue a USD 1 billion eurobond in an environment that is likely to be particularly challenging. Over and above the uncertainties in international bond markets arising from the unexpectedly hawkish tone of the new Fed chairperson,

- The road-show could well coincide with the release of the IMF's 2013 Article IV report, scheduled for the third week of April, that is bound to make uncomfortable reading for the Government, given the latter's failure to meet an array of macro-economic targets;¹⁹
- Prospective investors will be aware that, whatever the stated purpose, a sizeable proportion of the issue proceeds will go towards satisfying the backlog of USD orders at the Bank of Ghana;²⁰
- Without explanation²¹, the Finance Ministry has just cancelled this month's auction of 5-year bonds – historically the preserve of offshore investors.

¹⁴ In May 2013, the National Planning Development Planning Commission cited a World Bank-sponsored infrastructure study estimating Ghana's annual infrastructure funding gap at about US\$1.1 billion, mostly related to power and water.

¹⁵ Statement by CEO Kweku Awotwi, as reported by [Citifmonline](#) in "VRA to issue \$500 million bond next year", Sept. 13, 2013.

¹⁶ 'The current bulk electricity tariff covers just 60 percent of the VRA's cost of production.' Statement by CEO Kweku Awotwi, quoted by [Business & Financial Times](#) in "Doubts over VRA's planned eurobond", Nov. 12, 2013.

¹⁷ E.g. "The main idea is to finance infrastructure development - but if it makes sense to refinance some domestic debts because it is cheaper to borrow abroad at the time we sell the debt, we may do so." - Deputy Finance Minister Kweku Ricketts-Hagan, as quoted by [Business & Financial Times](#) in "Next Eurobond targets at least US\$1bn", Nov. 27, 2013.

¹⁸ See 'Pillar II: Building a Strong and Resilient Economy' in 2014 "State of the Nation Address", delivered by Pres. John Mahama on Feb. 25, 2014.

¹⁹ Viz.: inflation (the economy's nominal anchor); fiscal balance, public debt level; current account balance; international reserve levels.

²⁰ *Inter alia* from offshore investors waiting to repatriate the proceeds from more than USD 500 million in matured 3-year Govt of Ghana bonds.

²¹ The decision was almost certainly prompted by a lack of interest on the part of offshore investors and therefore bodes ill for the GHS 300 million, 3-yr. issue scheduled for April; the GHS 300 million, 7-yr. deal planned for May; or the GHS 400 million 3-yr. issue scheduled for June. Each of these transactions will have been planned on the assumption of significant offshore participation that can no longer be taken for granted and therefore calls into question the financing of the 2014 budget.