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NLNG T7:

a Way to Euthanize the Nigerian Power Sector

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Authors:

Andrey Maslov
Editorial Board Member of the Russia-Africa Shared Vision 2030 Expert Report.

Vsevolod Sviridov
Bachelor student at the African Studies Department, St. Petersburg State University (Languages and culture of West Africa, Hausa).

reviewed by:

Abba Usman
Chairman of the Diligent Oversight Center Board of Directors.
Executive Chairman of EFORCE-InterService.

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Is the Final Decision About to be Taken Again?

Nigeria LNG (an incorporated venture consisting of NNPC, Shell, Total and ENI) signed the LOI for the EPC-contract with the SCD JV Consortium (Saipem, Chiyoda and Daewoo) to build the plant's 7th train on September 11th 2019, in Abuja, Nigeria. This brings the interested parties closer to taking the FID (Final Investment Decision), which was earlier announced as being "by the end of 2019."

It is not the first time that the FID has been promised for NLNG. It was probably in 2007 when the shareholders spent their money on FEED[1] of the fore-mentioned train 7 for the first time with the deliberate intention of taking a decision before "the end of the year." On that occasion the year was 2007. Since then the situation has repeated itself a number of times. Studies and negotiations, followed by promises. Years go by. After signing (yet more) FEED contracts on July 2018 the target date was declared as Q4 2018. Once again nearly a year passed. Subsequently, in September 2019, the Managing Director and CEO of NLNG Tony Attah claimed that: "Our ambition is to take that [final] decision on October 31,"[2] which also did not happen.

However, the FID for T7 has never been as close to happening as it is right now.

For many years the delay of the development of export facilities was regarded as some sort of good news for Nigeria: FID, if taken, would undermine all the long-term efforts to develop the domestic gas market and power generation, and would eliminate the last chance for the growth and steady development of the Nigerian economy.

7th train of NLNG plant would require additional supplies of 388 bscf/y, which is approximately 25% of the current marketed gas production in Nigeria

The NLNG T7 Expansion Project would increase the installed capacity from 22 MTPA to 30 MTPA. The capacity utilization of the 7th train of NLNG plant would require additional supplies of 1066 mmscfd[3] (11 bcm/year), approximately 25% of the current marketed gas production in Nigeria. In the meantime, on October 11th 2019, a USD 2.5 billion prepayment agreement between NNPC and NLNG for upstream gas development projects to supply gas to NLNG Trains 1 – 6, was signed. The delay has already deprived Nigeria of 1.2 tscf every year.

1 Rigzone. KBR, Partners Execute FEED Contract for NLNGSevenPlus. Access: https://www.rigzone.com/news/oil_gas/a/44472/kbr_partners_ execute_feed_contract_for_nlngsevenplus/, accessed 24.11.2019

2 World Oil. Nigeria LNG in talks with lenders to fund $10bn expansion. Access: https://www.worldoil.com/news/2019/9/17/nigerialng-in-talks-with-lenders-to-fund-10b-expansion, accessed 20.11.2019

3 At a conversion factor of 1 million tonne of LNG to be equal of 320 mmscfd or 1.36 bcm per year

NLNG plant construction began in 1996 by a consortium of Technip, Snamprogetti, M.V. Kellog and Japan Gas Corporation (TSKJ). The first gas transport system was put into operation in 1998; the second train with a capacity of 3.3 MTPA was commissioned in 1999, the 1st train — 3.3 MT in 2000. From 2002 to 2007, four more trains were commissioned: the 3rd train — 3 MT, the 4th — 4.1 MT, the 5th — 4.1 MT and the 6th — 4.1 MT.

Shareholders of NLNG are Nigerian National Petroleum Corporation (49%); Shell (25.6%); Total (15%) and ENI (10.4%).

Investments for the first two trains of NLNG plant amounted to USD 3.6 billion; the third train cost USD 1.8 billion, the fourth and fifth train — USD 2.2 billion, the 6th train — USD 1.748 billion. Capital investments of NLNG Ltd. amounted to USD 15.7 billion for the period 1999-2015.

NLNG Plant project is designed for 12 trains (6 have already been built). Current gas consumption at maximum load is 3472 mmscfd (35.8 bcm/y) a year, existing gas transporting infrastructure is capable of providing 6206 mmscfd (64 bcm/y).

According to IGU, utilization of NLNG plant in 2018 totaled 94% with 20.5 MT produced. Half of the LNG was marketed in Europe. The global market share of Nigerian LNG amounted to 6.5% (5th place worldwide).

Foreign shareholders started to outline their additional gas supply scheme to feed the 7th train. For instance, Total's contribution will come from the Ima field[4] (OMLs 112 and 117); the field has estimated resources of 1.4 tscf. Interestingly, Total undersupplied 1tscf under its DGSO per last decade, so these resources would be perfect in assisting Total in fulfilling its obligations.

Financial Implications

According to an NNPC press release, the estimated cost of the project is USD 4.3 billion. However, in September 2019, Tony Attah stated that the 7th train would cost USD 7 billion to build, with another USD 3 billion for gas-collecting projects and pipelines to feed the new train. NLNG plans to raise USD 2 billion from domestic lenders such as the Guaranty Trust Bank and Zenith Bank, with the remaining 8 billion from foreign lenders, backed by exportcredit guarantees.

Meanwhile, recent developments in the global energy markets (e.g. growing competition in the Atlantic basin) make the viability of the project itself uncertain.

> **Recent developments in global energy markets make the viability of the export-oriented project itself uncertain**

The global market is becoming tougher to compete in, as the US has become an exporter. Collectively, their overall LNG capacity is significant – by the end of 2018, total regasification capacity in Europe's 28 large-scale LNG terminals was 227 bcm of gas, which is sufficient to cover

4 Africa Oil & Power. Nigeria: Total expects year-end FID on Train-7 expansion project. Access: https://africaoilandpower.com/2019/09/26/nigeria-total-expects-year-end-fid-on-train-7-expansion-project/, accessed 9.11.2019

approximately 40% of Europe's demand for gas, but their load factor is hardly reaching 35%. The market is oversupplied. Current market conditions make gas sales only possible at low prices.

These developments are creating new opportunities in Nigeria's internal market as investments in isolated markets are becoming more attractive for global players.

Before 2018, NLNG paid USD 24 billion (USD 13.4 billion to NNPC and USD 11 billion to IOCs) to gas suppliers. This revenue was hardly sufficient to make any difference to the NNPC budget — expenditure of NNPC in 2018 alone exceeded USD 13 billion (N 4.87 tn)[5]. At the same time, the value of that gas on global markets was about USD 80 billion. All this raises questions about the economic benefits Nigeria gains from export facilities.

What is USD 10 Billion for Nigerian Infrastructure?

As mentioned above, the total cost of the T7 project was estimated at USD 10 billion. That would be enough to provide gas to most of Northern Nigeria and the Middle Belt. For instance, taking into account that the price for 1 km of gas pipeline is USD 5 million (average pricing, based on contract agreements for AKK gas pipeline construction, which is still almost three times higher than the average price worldwide) a possible AKK extension to Maiduguri would cost about USD 2.5 billion. Other cities, which could possibly be supplied with gas include Katsina, Jos, Bauchi, Daura, Sokoto and others. A well-developed gas transmission system would be created with little additional funding. Providing gas to the North would help in resolving social and economic problems, which Northern Nigeria is currently facing.

Infrastructure Deficit

NLNG CEO Tony Attah is one of the key promoters of the T7 project. He claims[6]: "We [Nigeria] have been riding on the back of oil for more than 50 years. Now it is time to fly on the wings of gas". It seems that soon NLNG and IOCs will fly on the wings of Nigerian gas, but not Nigerians themselves.

Domestic sales in Nigeria grew from 142 bscf in 2001 to 432 bscf in 2018. Although, over the last three years domestic market growth has slowed. The main beneficiary of production growth in 2017 and gas-flaring reduction is the export sector.

	2016	2017	2018
Marketed production	1569	1647	1660
Domestic consumption	431	422	430
Export	1138	1225	1229

Source: NNPC ASB, bscf

5 Fixouroil. NNPC's 2018 performance analysis. Access: http://fixouroil.com/wp-content/uploads/2019/07/2018-NNPCPerformance-July-1st-2019_8_31PM.pdf, accessed 30.10.2019

6 The Africa Report. Nigeria LNG CEO Tony Attah: "We are the largest tax player". Access: https://www.theafricareport.com/17370/nigeria-lng-ceo-tony-attah-we-are-the-largest-taxpayer/, accessed 10.11.2019

Nigeria's ability to harness its vast natural gas resources for the domestic market is hampered largely by a lack of investment in critical infrastructure for transporting gas. With a land mass of over 920,000 sq.km and a population of about 196 million people, Nigeria's 4,000 km of gas pipelines is inadequate to meet its domestic demand.

The gas supply infrastructure of NLNG can be used to meet the needs of the growing domestic market

Meanwhile almost every domestic gas project has stalled. A landmark case here is the AKK (Ajaokuta–Abuja–Kaduna-Kano) project, which seems to have been forgotten while all the attention is drawn to the T7 project. AKK development has made little progress since December 13th 2017 when the Federal Executive Council of Nigeria announced the approval of contracts for the construction of the AKK gas pipeline. The cost of the project was estimated at USD 2.8 billion with its designed capacity ranging from 1 to 1.5 bscfd (10-15 bcm annually). "7 critical gas projects" and OB3 (the Obiafu-Obrikom-Oben Gas Pipeline) are other initiatives that are being sacrificed for T7. OB3 is a critically important project linking the east and west gas transport systems and is fundamental to growing the Nigerian domestic gas market.

Even existing pipeline systems, for example the pipeline gas supply infrastructure of NLNG plant with a capacity of 6 bscf daily is operating at less than 50% load factor and can be better used for the needs of the growing domestic market. This will provide an opportunity to double domestic supply while maintaining the current level of export at 3-3.4 bscf daily.

The future economic development of Nigeria is only viable with the freezing of gas exports at the current level. For Nigeria, investments in domestic gas supply will have a huge multiplier effect on GDP: it will create new jobs, bring power to the people and moribund industries and add value to the economy by unlocking Nigeria's true potential as a market. This will support Nigeria's claims to being the continent's leading economy.

At the end of the day, in order to justify its investments in domestic gas infrastructure, any investor needs to see gas. If the T7 decision is taken it will be a clear signal that there will be no gas available in the foreseeable future.

The Competition is in Quality not in Quantity

One of the arguments by NLNG and other interested actors for the need to expand the installed capacity of the plant is the lag of the development of Nigerian gas liquefaction facilities behind the world's leading players. "We started our LNG industry 24 months after Qatar, but Qatargas has attained a production capacity of 77 MTPA," said[7] Tony Attah on July 11th 2018.

7 THISDAY Newspapers. Delayed NLNG Train 7 Set to Get Underway. Access: https://www.thisdaylive.com/index.php/2018/07/17/delayed-nlng-train-7-set-to-get-underway/, accessed 7.11.2019

In fact, there is a clear difference between the gas sectors in Nigeria and Qatar — as stated in GECF Annual Statistical Bulletin — in 2018 the domestic gas market in Qatar amounted to 1.5 tscf of gas, while the Nigerian market lags almost four times behind, with 430 bscf in 2018. The Nigerian domestic market occupies the 4th lowest place among GECFmember countries. Moreover, based on GECF data natural gas consumption (scf per capita) in 2018 was only 2200, which is the lowest result among GECF-member countries, while in Qatar the same proportion amounted to 520 thousand scf.

To go into further details, the domestic gas market in Nigeria is smaller than in Trinidad and Tobago (529 bscf), while Nigeria exceeds Trinidad both in land mass and population size by almost 200 times.

In addition to this Nigeria is the only country where the pricing of gas for export is lower than for the domestic market.

Gas-Fired Power Plants: No Gas, No Power

The gas-to-power industry is the main contributor to the Nigerian electricity generation with an installed capacity with 80% of power generation. According to TNC (Transmission Company of Nigeria), installed capacity of gas/steam power plants is now 9122,30 MW. In order to satisfy their needs it is required 2,434 MMscf every day, which is about 887 bscf per year[8]. According to the NNPC report, in 2018, supplies to the gas-to-power industry in Nigeria amounted to 267.5 bscf.

Though Nigeria has the largest GDP among African countries, the Nigerian electricity generation sector with an installed capacity of 12,910 MW lags a long way behind South Africa, Egypt and Algeria. Moreover, Nigeria has about 0,06 MW of installed capacity per 1000 inhabitants which is less than the same indicators not only in Algeria (0,44) and Egypt (0,46) but also in Ghana (0,14) and Ivory Coast (0,08).

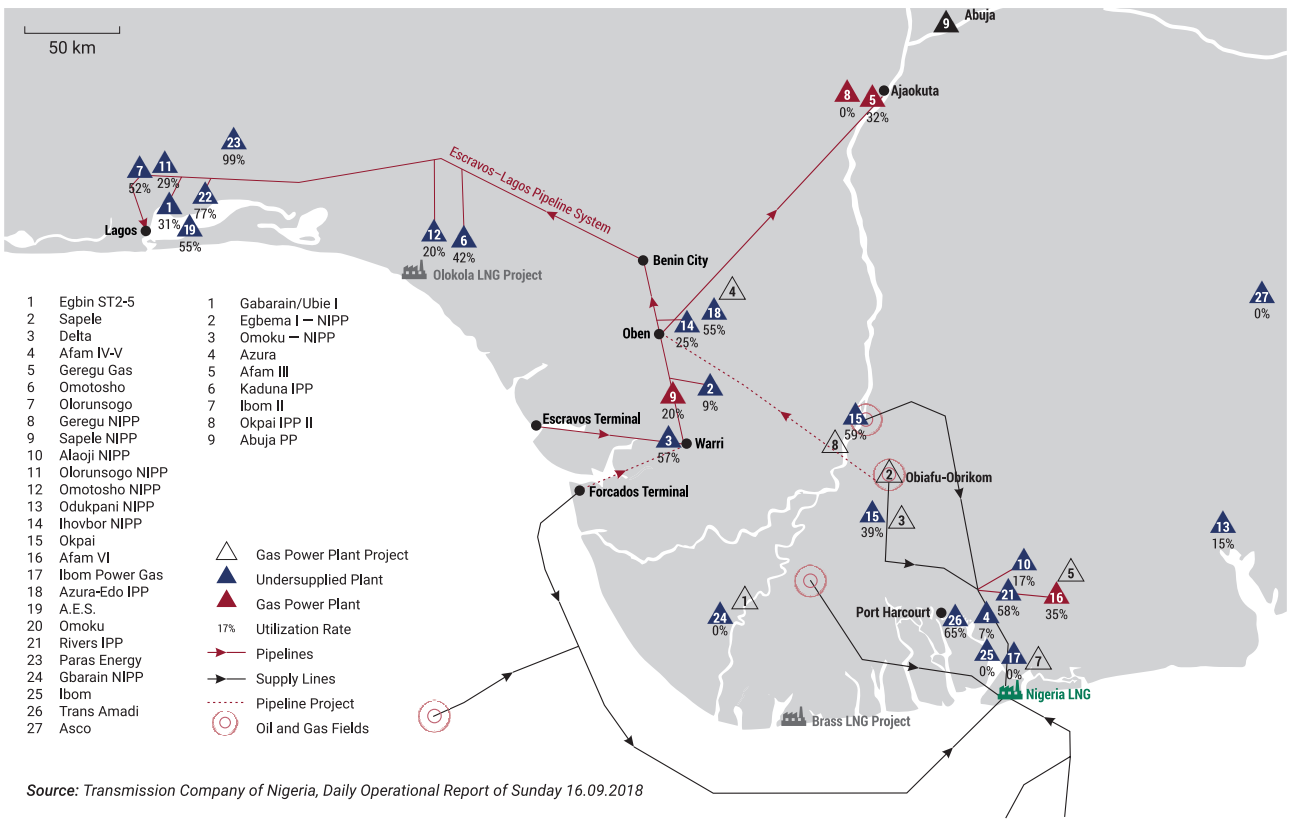
The Nigerian Electricity System Operator put the nation's available capacity at 7,652 MW and transmission-wheeling capacity at 8,100 MW, while the peak generation ever attained is 5,375MW. On October 20th, 2019, peak generation was 4,799 MW.

It is estimated that the current electricity access rate is 55% (rural — 39%) with about 20 million households without power supply. Current demand amounts to 25,790 MW.

As stated in daily operational report of TCN on October 27th, 2019, 7 gas power plants (Geregu Gas, Geregu NIPP, Sapele NIPP, Alaoji NIPP, Olorunsogo NIPP, Gbarain NIPP, Okpai) were unfit for generating electricity due to gas constraint. In the same time 4 more plants generation was limited due to the same reason (Egbin Steam, Delta Gas, Omotosho Gas, Olorunsogo Gas). Similar constraints became a regular practice: on October 15th — 7 plants were affected, on October 6th — 10. It is worth mentioning that a sufficient amount of gas-fired power plants are located in the Niger delta area where most of the natural gas in Nigeria is produced.

8 At a conversion factor of 1 MMscf = 3.75 MW

Gas-fired and Steam Power Plants in Nigeria



Source: Transmission Company of Nigeria, Daily Operational Report of Sunday 16.09.2018

The shortage of gas for gas-fired power plants raises the next, and one of the most important, points.

International Oil Companies and Nigeria — Who is to 'Win-Win'?

Gas demand and industrial consumption are addressed in the Domestic Gas Supply Obligation (DSO/DGSO)[9], but the petroleum companies systematically do not fulfill these obligations, and the Nigerian authorities have so far failed to make significant progress in this area. Their only response was the reduction of DGSO, and even reduced targets are not met.

In 2009-2018 gas supply in the framework of DGSO have never been higher than 1,340 Mmscfd and the level of compliance reached its highest level at 50%.

Domestic Gas Supply Obligations for 2018 was 2,520 Mmscfd, of which 450 for NNPC PSC, 390 for SPDC, 280 for NAOC and 160 for TEPNG. The operators mentioned above account for over 50% of DGSO.

Since 2009 foreign shareholders of NLNG have consistently failed to fulfil their domestic supply obligations (DGSO). According to the Department of Petroleum Resources of Nigeria, Total (TEPNG) supplied only 2.9 bscf to the domestic market in 2018. It is worth emphasizing that Total started trying to fulfil its obligations only in 2017, from 2009 to 2016 its domestic supply

9 Department of Petroleum Resources. 2018 Nigerian Oil and Gas Industry Annual Report. Access: https://www.dpr.gov.ng/wp-content/uploads/2019/11/2018-NOGIAR.pdf, accessed 24.11.2019

remained zero, which resulted in a shortage of about 1 tscf over the course of a decade. Shell (SPDC) supplied about 1 tscf per decade (2009-2018) out of more than 3.7 tscf of its DGSO, a shortage of — 2.7 tscf. ENI (NAOC) supplied 0.47 tscf from 1.4 tscf of DGSO, a shortage of — 0.9 tscf. In total, per decade IOC shareholders of the NLNG failed to supply 4.7 tscf of their obligations to the Nigerian domestic market.

Since 2009, IOCs undersupply to the domestic market has amounted to 4.7 tscf of gas

However, those companies are still enjoying exceptional conditions, not to mention the recent granting of an extension to their licenses. For the further development of the Nigerian domestic gas market it is essential to postpone all plans for NLNG extension until, at the very least, IOCs fulfil their DGSO.

The exporters' agenda can clearly be seen, for example, by their pricing policy: they sell gas for export 3-5 times cheaper than for domestic markets, and they are exporting it for themselves, being the offtakers and marketers at the same time. As a result, the bulk of the gas value along the chain is being added overseas with no income for the Nigerian budget.

Since the resource base for NLNG supply and the domestic market is the same, their competition for the gas is a fact, with the exporters armed with their lobbies within the Ministry, Parliament, mass media, etc.

Licenses for all the lucrative acreages have been given to the same majors on a non-competitive basis

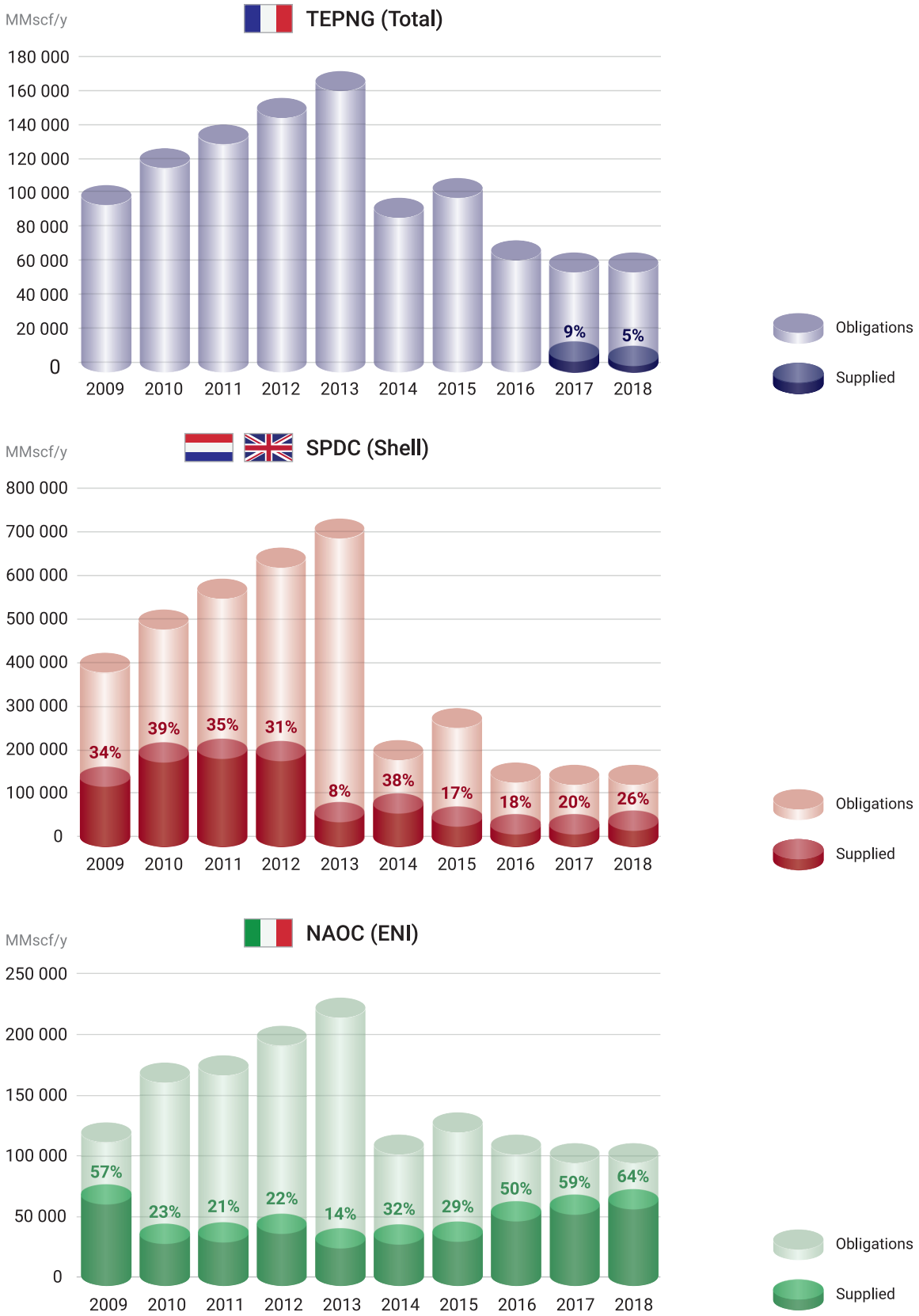
Obviously, the agenda of the IOCs to increase gas export is understanble, but FGN must not share this agenda.

Moreover, back home in Europe those companies are following Energy Packages[10] — regulations imposed in order to develop markets, while in Nigeria gas transmission is still dominated by a cartel of exporters.

The main reasons are as follows: 'oil majors' have no reason to pursue DGSO as they have their own markets abroad, others, keen on focusing on domestic gas, have no access to the assets, as licenses for all lucrative acreages have been given to the same majors on a non-competitive basis.

10 The third energy package – European Union legislation aimed at improving internal energy market. One of the measures is "unbuilding" – the separation of energy supply and generation from the operation of transmission networks.

Domestic Gas Supply Obligations



Source: *Department of Petroleum Resources. 2018 Nigerian Oil and Gas Industry Annual Report*

Alternative Options

If the question asked why all intentions and investments in domestic market are failed, the shortest answer would be: NLNG. If export alone is banned for 4 years, the problems of the domestic gas market and power supply will be resolved... but such tough decisions may have undesirable Implications for foreign relations.

Some possible options to discuss in the Nigerian gas sector to overcome the power deficit in the domestic market while sustaining the cash inflow from export sales could be suggested.

Equal Access to Infrastructure

In order to resolve the problem of gas shortages access to any gas transmission infrastructure may be provided to any interested party, including access to NLNG feedstock infrastructure that may be used by interested parties to supply the domestic market, NLNG, or both.

If successful, the same approach could be adopted later on to the liquefaction facilities themselves so that every producer, having completed its DGSO, will be able to supply its gas to NLNG for processing on a toll fee basis.

The toll fee for the processing of equity gas may be suggested not only to the new LNG facilities (including Train 7) but also to existing trains of NLNG after the expiration of the existing off-take contracts (they start expiring from 2021).

Upstream Gas Licensing

As mentioned above, investors interested in developing the domestic gas market sometimes cannot gain access to the resource base on a competitive basis. In order to develop a free-market system and to de-monopolize, it would be advisable to provide access to undeveloped gas fields within the current OMLs to any interested third party through ring-fencing it fiscally from the other operations on the OML, with the introduction of separate licenses for NAG field development or with the marginal fields model as an option, shall be provided with the Nun field being one of the cases.

Ownership

To guarantee the sustainable funds for infrastructure development the NNPC-owned 49% of NLNG should be transferred to the incorporated venture responsible for the gas transmission and processing infrastructure, as NLNG is physically an integral part of it. This 49% may be invested in the Nigerian Gas and Power Investment Company, or any other entity with the same mandate. Such developments will be an avenue to provide the required investments and guarantees for the gas transmission, processing and distribution network.

The NNPC shares in gas-prone blocks (there gas dominates in reserves in terms of oil equivalent) may be selected within the NAPIMS portfolio to form a kind of "NAPIMS-Gas" asset management company. The strategic partners may also be given the opportunity of sizable

shareholding in this "NAPIMS-Gas" asset management company or its subsidiary SPVs. This will also facilitate investments in domgas.

Taxes

The Federal Goverment also has an option to impose a specific gas sales tax for gas being sold to the NLNG. This may vary depending on DGSO compliance rate. A gas sales price of 200% is advised to balance risks of the domestic market.

These and other options may be considered to achieve both: sustainable budgeting and development of domestic gas infrastructure in the intersts of the people of Nigeria.

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The international network of experts requested by DOC/Intexpertise agree that the implementation of such a huge export project as NLNG Train 7 would be devastating for the domestic market and impractical from either a political or an economic point of view. It will be so until the industry stakeholders, including foreign investors of the Nigeria LNG plant, comply with the mandatory DGSO and until gas-based projects that are critically important for Nigeria, such as the Northern Network, would be provided with the guaranteed gas supply.

The risks and implications should be carefully studied by engaging unbiased expert teams who are not related to the IOCs and gas-importing countries

The risks and implications of the potential NLNG expansion should be studied carefully alongside with their impact on the development of the domestic gas market and power supply. Pricing policy should also be studied with reference to the best global practices for the price ratio of domestic and export gas.

Our advice is to engage partners and/or independent unbiased consultants who are not related to the IOC and gas-importing countries or even experts from the gas-exporting countries as in fact exporters already do have the relevant experience and successfully have overcome identical challenges, while the importers follow their own agenda.

Notes

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