



LAGOS STATE GOVERNMENT

THE LAGOS STATE ELECTRICITY POLICY - CONSULTATION PAPER

**MINISTRY OF ENERGY & MINERAL
RESOURCES**



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FOREWORD

I am pleased to present this Consultation Paper on the Lagos State Electricity Policy on behalf of the Babajide Olusola Sanwo-Olu (BOS) Administration. The Lagos State Electricity Policy will serve as a blueprint to achieve the Lagos State Government's vision for universal access to electricity in the State. It will also be a vital element in achieving the objectives of the BOS Administration's T.H.E.M.E.S. agenda. Above all, this Administration expects it to be a key driver of the social and economic development aspirations of the State as part of the Government's 30-year Development Plan (2021 – 2051), which is currently under development.

As the population in Lagos State and the attendant energy consumption levels continue to rise, it is important that we create an enabling environment for the sustainable production and supply of reliable energy for the residents of the State. Hitherto, our electricity supply system has been characterized by regular power outages, a non-viable commercial construct and inadequate institutional will to drive change that benefits Lagos State and its residents.

The policy resulting from this consultation process is expected to drive development towards a future where security and sustainability of electricity supply is assured. It should also contribute to reducing carbon emissions and thus improve the living conditions of all Lagosians.

We recognize that delivering access to reliable electricity in Lagos cannot be achieved by the State Government acting alone. We therefore call on key stakeholders in the State, the national and global community, especially industry experts and private investors to provide robust responses to this Consultation Paper.

All reactions, comments, queries and further enquiries should be sent for consideration by the State Government to memr@lagosstate.gov.ng on or before the **30th of April 2021**.

DATED AT IKEJA THIS 19th DAY OF APRIL 2021

**OLALERE ODUSOTE
HON. COMMISSIONER
MINISTRY OF ENERGY AND MINERAL RESOURCES
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EXECUTIVE SUMMARY

Lagos is the commercial nerve center of, and the most populous state in, Nigeria. It is home to one of the largest megacities in the world. Lagos State is very important to the survival of a non-oil dependent Nigeria. Home to Nigeria's and Sub-Saharan Africa's most important financial centre outside Johannesburg, South Africa and the two most important seaports and domestic and international airport hubs in the country, Lagos State would have been the fifth largest economy in Africa if it were a country. This makes Lagos a major centre for both domestic and international trade and labour mobility. With its explosive population growth coupled with the rapid expansion of urban ecosystems in Ikorodu, Badagry, Lekki and Epe, the State faces the attendant challenges of urbanization and increased demand on its infrastructure assets. Successive governments of Lagos have taken action to tackle these challenges, particularly that of electricity supply, but not with enough success to keep up with its urban growth and the demand that follows such growth.

Energy supply is currently Lagos State's single biggest infrastructure and developmental challenge. Lagos depends entirely on Nigeria's national grid for its public electricity supply, as does the rest of the country. Through its two resident electricity distribution companies (Discos) – Eko and Ikeja – it receives just about 1000MW for an average of no more than 12 hours daily, i.e., 12,000 megawatt-hours (MWh), for a population exceeding 27 million spread over a comparatively compact land mass. The fact of an uneven supply across the State for no more than half a day on average makes alternative, self-generated electricity critical to socio-economic activity despite its significant cost and environmental hazards. ***The Lagos State Electricity Board (LSEB) conducted some research a few years ago, which demonstrated that 15,000MW of the estimated 45,000MW of alternative power supply in Nigeria was located within Lagos State alone.***

It seems clear, therefore, that Lagos cannot rely on the national grid alone for a sustainable, long term, socio-economic growth and significant growth in its citizens' standard of living. It is also clear that current estimates of unmet demand are grossly understated. Lagos is witnessing the continuous flow of new residential, commercial and industrial developments and investments (Lekki Free Trade Zone, the Dangote Refinery, Eko Atlantic Project, numerous housing schemes and estates and single unit homes being built). As it tries to manage its evolution into a 21st century economy, with the attendant need to meet urban planning standards and satisfy the demand for various social amenities and economic opportunities, it has become clear that Lagos State needs to establish the enabling environment for a unique electricity market that is separate from (or off) the national electricity grid, **but is also connected** with the latter.

A number of requirements are critical to implementing a holistic solution that delivers clean, adequate and reliable electricity supply within the geographical territory of the State and to all its demographic/customer classes. These include 1) an enabling constitutional and legal framework; 2) an integrated resource plan; 3) an autonomous, credible regulatory body; 4) competitive and transparent procurement of generation resources; 5) a bankable commercial framework; 6) an Independent System Operator; 7) well-funded, well-managed generation, transmission and distribution players; and 8) collaborative Federal and State Government support for market growth/customer satisfaction.



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The Lagos State Electricity Policy will give insights into LASG's thinking about the legal, engineering and commercial frameworks required by the State to create a viable sub-national electricity sector that is entirely off-the-national-grid but nevertheless caters fully to the needs of its citizens, while enabling significant socio-economic growth and development both for Lagos State and the country at large. It is the outcome of a determination by the Lagos State Government that unless a conscious effort is made, the evolution of Lagos into a modern and inclusive city-state will be retarded to the point of reversal and socio-economic degeneration. The Lagos State Government will do everything possible to avoid this fate.



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1) INTRODUCTION

Lagos State (“Lagos”) is the commercial capital of Nigeria. It is the financial nerve centre of the country and one of Africa’s few megacities. It houses the headquarters of all major financial service providers and corporate organisations and NGOs in Nigeria. The diplomatic community, despite moving to Abuja, still maintains a significant presence in Lagos. With a population just under 27 Million, the State is ranked as having the fifth largest economy in Africa with a GDP of over \$91 Billion (2014 estimate), over 20% of Nigeria’s \$420 Billion GDP. The State hosts over 2,000 industries and about 65% of Nigeria’s commercial activities. It is also the location of Nigeria’s two largest and busiest seaports and its busiest international and domestic airport terminals. Lagos features a relatively good infrastructure stock, particularly in ICT (which is entirely privately operated) and is strategically located with land, air and sea connections to markets in the central and western Africa region, Europe and the rest of Nigeria. Its position as a major hub for international trade facilitates access to finance and labour and eases the flow of both raw materials and processed goods. Lagos has also been the first choice for investors within and into Nigeria since long before independence.

Lagos accounts for over 53% of manufacturing employment in Nigeria, which alone contributes to 7% of national GDP. Manufacturing industries in Lagos State include food, beverages and tobacco, chemicals and pharmaceuticals, rubber and foam, cement, plastic products, basic metals and foam, steel and fabricated metal products, pulp and paper products, electrical and electronics, textile manufacturing, furniture and wood products, motor vehicles and miscellaneous assembly. Overall, manufacturing contributes 29.6% of the GDP of the Lagos State. All this activity in what is the powerhouse of social, commercial and industrial activity in Nigeria and the ECOWAS sub-region is carried on within a land mass well under 4,000 sq.km.

Capacity utilization for industries in Lagos, however, has hovered for almost a decade below 50%, indicating huge potential for growth. The primary reason for this capacity underutilization is not the absence of markets but the poor supply of electricity to the State. According to the MAN economic review, manufacturers in Lagos experience a daily average of 6 power outages, with only about 4 hours of electricity. It is indeed near-miraculous that the growth of Lagos as a powerhouse of finance, trade and industry not only in Nigeria but in Africa has happened during the past 2 decades without universal access by citizens to publicly available, clean, adequate, reliable and affordable energy supply. This situation indicates, in a negative way, what could be if Lagos was not almost entirely dependent on alternative electricity supply.

Commercial and industrial activity have been significantly curtailed and made costlier for decades. Industries have been forced to resort to expensive alternative supply, which makes their products uncompetitive with imported goods, with a good number of establishments, particularly multinationals, leaving Lagos State and Nigeria entirely. Of those that have remained in Lagos, small and medium scale businesses that would ordinarily employ the largest number of Lagosians have suffered greatly because they are often compelled to self-generate electricity. Where they do so, their profitability is adversely affected; the socio-economic implications are even more significant when we take into account that many small business persons are women and young people for whom the difference between staying in business and losing their livelihoods is the availability of reliable electricity supply.

The massive growth in economic activity in the State during the past two decades has been powered by a population two-thirds of which, the World Bank estimates, live in slums that are



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grossly underserved by electricity. Residents who are further up the economic ladder enjoy better electricity supply only because they can afford to deploy small scale generators, often rated at 200kVa and below, depending on whether they living in single-family dwellings or in the large housing estates that are now the norm. The two-thirds who live in slums have to get by with kerosene lamps, torchlights, etc. Whatever the current options may be to an efficient public supply system, they present huge and unsustainable health and environmental challenges. The State's residential ecosystem is constantly expanding along the coastal axis from Epe in the east to Badagry; and suffers even more grievously from inadequate or even total lack of reliable service that constitutes the State's huge electricity supply deficit, even more so than the commercial and industrial sectors, which generally have access to alternative electricity supply that enables them to continue business independent of the national grid.

The Lagos State Government ("LASG") is focused on enabling its residents – citizens, businesses and ventures – to thrive and innovate through policies and programmes that raise the standard of living and reduce the cost of doing on business in the State. Key to this strategic objective is the continuous improvement of the State's infrastructure stock, particularly those deal with electricity supply. This is therefore an opportune time for the State to develop a robust framework for providing reliable, adequate and sustainable solutions to meet the State's urgent electricity needs. It is also vital that in doing so, the State depends less on an unpredictable and suboptimal national grid that currently delivers barely 20% of the actual electricity needs of the State.

The socio-economic benefits of dependable public electricity supply are glaring. From a social standpoint, it means a better standard of living for Lagosians; better opportunities for social mobility and wider access by all citizenry, not just the privileged few, to social and physical infrastructure. Economically, it lowers the cost of doing business and the cost of living; frees up investment funds for both the public private sectors and savings by the citizenry; it enables the creation of more jobs and a massive reduction in the numbers of those living below the poverty line; and, very importantly, it increases tax revenues and thus public funds for investment in (social and physical) infrastructure, law and order and programmes for enabling growth.

The most difficult challenges in attaining the State's electricity sector objectives are the gross inadequacy of publicly-available electricity supply and the numerous incidents of unplanned outages on the meagre amounts of what is actually available. This makes the electricity supply in Lagos essentially unusable for most manufacturing and industrial processes with the attendant blackouts imposing social and economic costs that are unacceptable. Consequently, large businesses and industry in Lagos self-produce the energy needed to run their processes. Many commercial and residential customers also rely on self-generation, with most of its residents lower down the economic scale not having any access at all to self-generation or at best resorting to candles, kerosene lamps and torchlights. Many residential customers, cutting across all economic strata, are not metered all, which is a huge source of aggravation against Discos; with the latter not even having full enumeration data on its customers. The greatest impact of this deficit is on the State's social (health and education) infrastructure.

The main source of alternative power for many residential, commercial and industrial customers is reciprocating engines ranging widely between 3kVA for many residential and small business customers to 1000kVA for large residential, commercial and industrial



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customers. The predominant fuel sources are petrol, diesel and LPFO, with the use of compressed natural gas (CNG) becoming more widespread. Most of these engines are not well maintained and generate power inefficiently, while causing major noise and particulate matter pollution. In many cases, manufacturers have moved to other States or countries to take advantage of a more stable power. In addition, self-generation has made some companies to be less competitive in price with imported goods, leading to their eventual shut down. Many industries have closed down due to poor power supply and the exorbitant costs of self-generation.

Nigeria, in general, has not been able to meet the rising demand for power by its ever-growing population and no citizen has access to uninterrupted public supply of electricity. The national grid currently has a simultaneous continuous generation and transmission capacity of less than 6,000 MW. The growth of the national grid has been hampered by lack of adequate planning and misallocation of priorities and resources. The reality, that Lagos State now accepts and must plan for, is that the fast-growing megacity likely to double its population within the next 30 years cannot solely depend for its electricity supply on an unreliable national grid. The Federal Government's power sector reform has been on for 20 years but is yet to deliver the reliable electricity that Lagos State is deserving of. In the light of present reality, Lagos State must chart a supplementary or complementary course in seeking energy reliability for its citizens.

The Lagos State Government has made several attempts at tackling this electricity challenge over the years. First, by supporting the development of the Enron power barges in return for dedication of part of the output to Lagos Industries about 20 years ago. Ten years later, Lagos again promoted 5 IPPs across the State to serve LASG assets and infrastructure. This was followed by the enactment of the extant Lagos State Power Sector Reform Law, 2018. This Law was intended to provide a basis for significant private sector investment into the fledgling Lagos electricity market. It also provided for the Lagos State Electricity Board to take responsibility for driving "rural electrification" (a term whose definition is still imprecise). The general consensus of informed opinion from key stakeholders in the State is that in spite of the presence of all the elements - constitutional/legal, engineering, commercial and financial – necessary to establish a viable, vibrant and innovative electricity market for the State, the Law does not quite do enough to advance the State towards this vital strategic goal. Ultimately, in spite of these efforts, whole areas of the State are not served at all while all others are grossly underserved. The entire population of Lagos State, to varying degrees, lacks reliable public power supply. In other words, the legal framework for the State needs to be made clearer, more robust and more focused in identifying Lagos State's strategic objectives, key stakeholders and players, market structures, delivery methods and a regulatory framework for market development/ operations and consumer protection.

With the continuous flow of new developments and investment in the State (Lekki Free Trade Zone, a new airport, the Dangote refinery complex, the Eko Atlantic project, numerous new residential areas and housing schemes, etc.) and the tendency for urban planning to lag behind residential expansion, it has become imperative for Lagos to seek a holistic solution to its electricity supply challenges. Our strategic objective in Lagos State must be to build an electricity system that enables our collective prosperity and customer satisfaction in an environment that fosters the innovation, easy adoption of current and future technologies,



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market-focused competition and catering to the peculiar needs of vulnerable and disadvantaged citizens that can only be of benefit to our State. This policy consultation paper summarises the State Government's ideas for such a system and how it envisages these ideas could be implemented in creating this desirable goal.

2) KEY REQUIREMENTS

The reality today is that for Lagos State to achieve electricity sufficiency and reliability, it needs to have an electricity sector that is focused solely and entirely on serving the geographical space known as Lagos State. Electricity is increasingly becoming a decentralized service and this global trend is clearly irreversible. The earlier this trend is consciously assimilated and adapted to our local conditions, the better for the State. It is also clear that as with other successful jurisdictions, particularly those like Lagos with a significant base of private sector activity, electricity, as a manufactured commodity, is best provided commercially, that is, within an organised, orderly market, by private sector players; recognising always that there must be special focus on providing the same universal access to the vulnerable and disadvantaged populations at the base of the societal pyramid.

Eight factors may be considered as necessary for a viable electricity market in Lagos State. These are: 1) an enabling constitutional and legal framework; 2) an integrated resource plan; 3) an autonomous, credible regulatory body; 4) competitive and transparent procurement of generation resources; 5) a bankable commercial framework; 6) an Independent System Operator; 7) well-funded, well-managed generation, transmission and distribution players; and 8) collaborative Federal and State Government support for market growth/customer satisfaction.

i) An Enabling Constitutional/Legal Framework

A viable, State-focused electricity system cannot be established without a proper legal framework. Such a framework, given the novelty of what Lagos seeks to do, has to be situated on a firm footing under the 1999 Constitution. In doing so, the State Government takes its bearings from Section 14 of the Concurrent Legislative List of the 1999 Constitution as the foundation for creating a proper legal and commercial framework for a Lagos-centric electricity market.

Section 14 provides:

“14. A House of Assembly may make laws for the State with respect to:

- (a) electricity and the establishment in that State of electric power stations;
- (b) the generation, transmission and distribution of electricity to areas not covered by a national grid system within that State; and
- (c) the establishment within that State of any authority for the promotion and management of electric power stations established by the State.”

It should be noted that Section 13 of the Concurrent Legislative List, which sets out the ambit of the Federal Government's powers **does not specifically mention “distribution”** as a sector for which the National Assembly may make laws, similar to the **specific inclusion of “generation” and “transmission”** therein. We take this to mean that the “electricity



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distribution” sector is peculiarly left to local and sub-national entities to manage, which accords both with engineering sense and the constitutional/legal practice in large federal jurisdictions like Nigeria, such as the United States and India.

Furthermore, Section 14 of the Concurrent Legislative List requires the interpretation of a number of key words and phrases. First, we read “electricity” in Section 14(a) as a general word or matter that is disjunctive from “the establishment in that State of electric power stations”. It is in this regard that the State Government proposes to enact a comprehensive law with respect to “electricity” in the State. This is all the more so taking into account the literal meaning of Sections 16(1)(d), 16(2)(b) and 16(2)(c) of the 1999 Constitution and the fact that electricity is itself a matter on the Concurrent Legislative List. These three provisions, we believe, make it clear that “electricity” is not a “major sector of the economy” such as would preclude State Governments from making comprehensive laws for the provision of electricity within the boundaries of their respective States. The earlier-noted point that “distribution” is not mentioned in Section 13 emphasises this point.

Second, is the question whether Lagos State is “covered by a national grid system” within the context and expectations of the 1999 Constitution. If “covered” and its derivative, “coverage”, are defined as mere presence of electricity wires in the State, then Lagos is covered. On the other hand, however, if we consider that the national grid delivers daily average capacity of less than 1000MW to the entire population of Lagos State and all its commercial, industrial and human residents, as compared to the alternative backup capacity resident within the State (at least 15 times what the national grid delivers) then this coverage must be seen as so grossly inadequate that it in socio-economic terms, it is almost non-existent.

The State Government is convinced that the constitutional requirement or expectation that the national grid system will “cover” all areas, and therefore, all residents of Lagos State, has not been met. The national grid system has historically, particularly since 1999, not being capable of supporting Lagos State and its enterprising citizens to develop an “efficient, dynamic and self-reliant economy” (see Section 16 (1)(a), 1999 Constitution). While we are aware that Chapter II of the 1999 Constitution, including Section 16 is not justiceable, it is also abundantly clear that the intention expressed in that Section has been given practical actionable expression by making “electricity” a concurrent legislative matter per Section 14, Part II, Second Schedule, 1999 Constitution. In determining that Lagos State is not “covered by a national grid system”, we assume:

- a. Population estimated at 27 million individual, commercial, industrial and other residents (schools, research institutes, streetlighting, religious places of worship, etc)
- b. Current average daily capacity delivered via the national grid = 1000MW or 1GW
- c. Current average daily energy availability via the national grid = 12 hours
- d. Required daily energy availability = 24 hours
- e. Required daily capacity at = 9,000MW or 9GW (or 300MW/0.3GW per million residents)

This Administration believes that coverage ought to be measured not by the mere physical presence of a single generating plant, transmission assets and distribution assets connected in Lagos State to a national grid system. Instead, a more functional definition, as is the global standard, is by a simple energy-based per capita formula of capacity multiplied by availability.



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If so, we will realise that the national grid delivers to Lagos residents barely 12,000 megawatt-hours (MW/h) or 12 gigawatt-hours (GW/h) daily or 444 watt-hours (less than 1 kilowatt-hour) per person per day; when in fact it ought to deliver a minimum of 216,000 megawatt-hours or 216 gigawatt-hours daily or approximately 8 kilowatt-hours per person per day. This minimum is itself significantly lower than what all known comparative (for example, Cairo, Djakarta, Sao Paulo) indices of development require for a metropolitan area like Lagos State. In other words, Lagos State receives barely 5.5% of its required electricity supply needs from the national grid. The rest is self-generated by the citizens and residents of Lagos themselves, particularly the business community. By no standard of definition can this be defined as “covered by a national grid system”. Rather, it is a case study in extreme energy inefficiency.

Another way to appreciate the dire situation in Lagos is to note that the entire energy stock for Nigeria delivered via the national grid system to all consumers in Nigeria (assuming a daily average 4,500MW of which 80% is delivered to all 11 Nigerian Discos for an average 12 hours daily) is 43,200 MW/h daily. In other words, ALL THE ENERGY delivered by the “national grid system” across the country is grossly inadequate for Lagos alone, if it could all be delivered here. Yet another point of view is to note the fact that electricity reliability for Lagos residents is provided by the residents themselves via their own alternative sources, largely diesel- and petrol-fired generators. In 2014, this stock of self-generation was measured by the Lagos State Electricity Board at 15,000MW of capacity, over three times the capacity nationally available from the public electricity grid today.

It is impossible to say credibly that Lagos State is covered by a national grid system as presumed and anticipated by the 1999 Constitution. Lagos does not have, and has never really had electricity reliability, that is, clean, adequate, constant and sustainable public electricity access for all who demand it when they demand it. This has been the case for as long as our citizens remember; and certainly not since 1999. Therefore, the State Government’s intended electricity policy proposals must be seen as an initiative that is absolutely necessary to provide electricity coverage and reliability to the citizens of the State, which falls within the ambit of Section 14 of the Concurrent Legislative List, Part II, Second Schedule to the 1999 Constitution

ii) An Integrated Resource Plan (IRP)

The Lagos Integrated Resource Plan (IRP) will meet future electricity demand by establishing the availability of fuel and electricity generation resources that are available within the State. Implementing the Plan requires the deployment of human resources and cutting-edge power system planning tools with the primary objective of determining the least cost method by which these fuel and generation resources can be combined to meet all identified demand. It will also consider the wide range of supply- and demand-side resources, their potential means of deployment, the constraints to such deployment and their financial, economic and environmental impact in regard to meeting projected future energy needs.

However, it is also a non-negotiable strategic necessity that the Lagos IRP will require that any energy solution deployed in the State must be environmentally-friendly and climate efficient. The use of distillate fuels such as petrol, diesel and LPFO over the decades to power socio-economic activity has had incalculable polluting and environment-damaging effects. Therefore, two key objectives of the State electricity policy will be to ensure that, first, that future electricity solutions will be the most environmentally-friendly available; and, second, environmentally-damaging alternative power backup solutions will wherever possible be phased out of use or



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reverse-engineered to use cleaner fuels, for example, solar home systems; while future solutions must be designed to run on clean natural gas or be derived from viable renewable energy options, both of which fuel sources are in abundant supply in and around the State.

The State Government recognizes the growing importance of various renewable energy options, particularly off-grid solar, not only in the development of an energy mix for the State but also as a vital element in delivering on its vision for universal energy access. Accordingly, the Lagos State Electricity Policy, and the Law to be enacted for its implementation, will provide clarity on the importance and place of renewable energy (RE) solutions in a credible IRP for the State. The Policy will also highlight the importance of mainstreaming gender and social inclusion as a key objective of the entire IRP itself and propose ways and means of doing this. Furthermore, it will discuss the availability of State Government incentives in the execution of the Lagos IRP, particularly in the early stages of the development of the Lagos Energy Market.

Accordingly, Lagos State commenced the process of developing its IRP in Q4 2019 with the support of the USAID Power Africa Nigeria Power Sector Program (PA-NPSP). A final report will be issued and adopted as a foundational document for the establishment of the Lagos Energy Market.

iii) An Autonomous and Credible Regulatory Body

An autonomous and credible regulatory body is needed to enable the State to fulfill its desire to have a robust state electricity supply system. The regulatory agency will: 1) approve the competitive procurement of entities to provide generation adequacy for the State in accordance with the IRP discussed above; 2) ensure that the prices charged by market participants, particularly in the absence of competition, are reflective of an efficient operating process and are fair to end users and customers; 3) ensure the safety, reliability and quality of service in the movement of electricity within the Lagos electricity market; 4) license participants in the State electricity market; and 5) undertake market surveillance and monitoring; and 6) perform other activities that make the Lagos electricity market more efficient.

The word “autonomous” has been used here advisedly in preference to “independent”. The State Government believes that true independence is impossible to attain for any government entity. It is important, however that its enabling law upholds the regulator’s autonomy in its funding, the appointment of its leaders and the operation of its daily functions. The key tools for these, which the law will also permit and promote, are consultative public participation, access to non-governmental funding of the substantial part of its operations, the recruitment and continuous training of leaders and management staff, who do not necessarily all have to be of Lagos State origin and, very importantly, firmly curtailing the scope for political interference. These are the vital enablers of accumulating the competence and experience that are the primary safeguards of the body’s existence and credibility.

Lagos State already has a water regulatory body and it is an open question whether the remit of this entity should be expanded to include electricity or whether a separate electricity regulatory entity should be established. It is also apparent that until a dedicated consumer protection entity is established by the State, consumer protection issues relevant to the electricity sector will also fall within the purview of this State regulatory entity.



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iv) Competitive and Transparent Procurement of Resources

Ideally, a competitive and transparent procurement framework ought to be developed and managed by a mandated neutral entity, which in this case will probably be either the ISO or the regulatory entity. Competitive procurement tends to give the lowest cost for financing, constructing and operating a project. A transparent process will create the space for interested and capable parties to bid to build and operate new generation sources and deliver energy therefrom to customers. Competitive procedures will be used, wherever possible, for the development of new electricity supply sources; and for determining end-user tariffs based on the different cost components of the electricity value chain.

There is also the reality that there are two electricity distribution companies (Discos) in Lagos that are effectively de facto monopolies. Furthermore, one of these Discos is part an energy holding group that includes Nigeria's single largest generating company (Genco). These are factors to be borne in mind as we consider the universe of players, and the manner in which procurement rules may be designed to meet the peculiarities of Lagos, that may want to venture into the various sub-sectors – fuel supply, generation, transmission, independent distribution and its various segments – in the State electricity market.

Nevertheless, given the fact that there is likely to be no competition once entry into the Lagos market has been secured, it is indeed desirable that LASG puts in place a legal framework for the competitive procurement of electricity generation, transmission and, possibly, distribution, particularly in those grossly under-served spaces that are today regarded as “off-grid” and allegedly not commercially viable.

v) A Bankable Commercial Framework

The putative Lagos Electricity Market (LEM) is expected to be owned and operated substantially by the private sector. In this regard, LASG, through the Ministry and the regulatory body will focus on enacting the relevant policies (particularly a State electricity policy), law or laws and implementing the IRP that speaks to the promotion of State-based generation projects that are connected to capable, well-managed and credit-worthy energy buyers in a holistic and joined up manner. These constitutive public documents will establish a clear, focused, actionable and measurable basis for identifying and evaluating investment opportunities in LEM. The State Government also expects that the relationships between players in the LEM will be governed by rules established by the regulatory body via a consultative process and contracts willingly entered into by them with each other, with an industry-led dispute resolution that emphasises alternative dispute resolution processes over resort to the State courts, which latter must be seen as a very last resort when all else fails.

Also important to the success of the Lagos State Electricity Market is the need to identify clusters of credit worthy wholesale and retail end-customers that will buy power from the Lagos grid; as well as the need to make sustainable arrangements for funding either or both of capital and recurrent costs of providing access to vulnerable or economically less-endowed citizens. For the sound financial health of the LEM, the IRP to be implemented in the State must take into account the ability of the targeted end consumers to pay for services in order for the market (and as a last resort, the State Government) not to be burdened with financial debts or shortfalls. It is non-negotiable that from the Start revenues derived from the market must cover the cost of delivering service; and equally that quality of service is a paramount and strictly



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enforceable consideration for all classes of consumers. This is not as politically volatile an objective as some might believe, since recent history of the Nigerian electricity sector amply demonstrates that customers, particularly in Lagos, WILL NOT resist market-based pricing if high standards of reliability (that is, availability, adequacy and quality) of service are met.

The methodology or methodologies by which electricity tariffs in the State are to be determined will be the subject of consultations enabled by the regulatory body. These consultations will also identify those vulnerable and less economically viable segments of the market that will benefit from capital cost and/or tariff payment support measures.

vi) An Independent System Operator

A critical element of an integrated and reliable electricity system in a geographical space like Lagos is an Independent System Operator (ISO). Presently, Lagos State has within its borders two Discos with networks today theoretically capable of receiving and delivering over 1,500MW of electrical capacity and 36,000MW/h of energy to customers. The State also hosts a transmission network owned by the Transmission Company of Nigeria and maintained by its Lagos Region. This network is capable of receiving and delivering over 3,000MW of capacity to Discos and large industrial customers. There is also the 1320MW Egbin Generating Company, a thermal generation plant, which operates 6 x 220MW steam turbines, five (5) of which are connected to the national grid. There are also a number of companies active in the off-grid solar space delivering electricity to underserved and unserved areas of the State.

Lagos State has a large and industrious population, identified natural gas resources off its coast line, with great prospects for localizing significant electricity generation capacity from both thermal and renewable energy sources that will be sold to a variety of residential customers (including housing estates), large commercial and heavy industrial buyers, quite apart from the two existing, traditional Discos. We note the very significant demand for cost-efficient electricity supply across all customer classes, the relatively small land area of the State and the prospects for developing low voltage transmission networks (between 33kVa and 132kVa) across the State. These factors indicate that significant amounts of electrical energy can already be wheeled across the State with prospects for more capacity to be procured for buyers within the State. As these capacities get built out, new and expanded transmission grid capacity will be required to be built to receive and deliver increasing amounts of energy, just as new bilateral contracts are agreed and existing ones are expanded. The State Government does not assume that these new transmission capacities should and will be financed, built, operated and maintained solely by TCN.

Where a transmission grid exists to serve the needs of multiple and diverse generators and buyers, an ISO is vital to operate such a transmission grid efficiently and administer non-discriminatory wholesale electricity market operating and trading reliability. Such a platform is an essential element in executing the scheduling and dispatch of generation and transmission access as required by the multiple bilateral contracts between buyers and sellers of electricity in the State, the more so as they trade increasing amounts of electrical capacity and energy for delivery to 27m citizens and residents across the almost 5000 sq.km land mass of the State. In these circumstances, the enablers of electricity reliability – adequate fuel/generation resources, accurate forecasts of load and generation adequacy, reliable transmission hardware (towers, wires and transmission substations) and, finally, reliable system operations,



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i.e., the systems (largely ICT-driven) and procedures that ensure that energy – are provided by an independent system operator that ensures safe market operations and the matching of energy sent out by generators with revenues received from electricity buyers.

The ISO will also manage the State grid's connection with the national grid. Most important, given its neutral (and perhaps, not-for-profit) nature and corporate structure, the ISO may also be empowered to take responsibility for all system planning (generation and transmission resources) and procurement of energy, capacity, ancillary and other needed services that will facilitate competitive and least cost trading of electricity in the State under the Lagos IRP, not only for on-grid but also for off-grid generation sources.

The ISO will be, as noted above, the agency responsible for the implementation of the Lagos IRP and the competitive procurement processes outlined herein. Ideally, its corporate/ownership model will be one that ensures a not-for-profit status and mutually beneficial ownership of all generation sources that aggregates/balances the interests of all stakeholders in the Lagos energy market.

vii) Well-Funded, Well-Managed Players/Operators

We envisage that when it is established, the Lagos electricity market will have at least four sets of players. These are generation companies utilising various sources of thermal and renewable energy, a transmission entity, an independent system operator (ISO) and distribution entities carrying on various aspects of the downstream, customer-focused service segment. All these entities shall be located within the State and focused on serving customers also located in the State. Ideally, we would prefer that all generating entities locate within the State and trade with State-based electricity companies.

For now, there is just one licensed, grid-connected Genco in the State, no Transco, no ISO and two Discos connected to the national grid. There are however, quite a number of generation companies licensed by NERC in the “off-grid” and “captive generation” spaces. These are really all methods that cherry-pick the best of the commercial and residential customer classes. Generally, these customers, particularly in the captive generation space, cause significant environmental harm (without doing anything to remedy that harm) due to their copious use of heavy distillate fuels. Yet, they do not address the other residential and small business users who are by far the largest number and the foundation of the socio-economic wellbeing of the State. Since such entities are, by definition, “off-the-national-grid”, it is clear that they ought to be wholly regulated by the State Government to serve customers in the State.

It is important to note, however, that Lagos State is covered by the Transmission Company of Nigeria's (TCN) Lagos Region. While the Lagos Region operations of TCN belong to the Federal Government (FG), they are dedicated exclusively to serving Lagos State. It is therefore an open question, which the State Government will explore, as to whether the Federal Government is willing incorporate the TCN Lagos Zone as a subsidiary entity that is an integral part of the Lagos Electricity Market (LEM) with full accounting separation, full regulatory oversight by Lagos State and financially/operationally independent of the TCN structure (for



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example through possible ownership of equity by other financial investors, such as Nigerian pension funds). This is one viable path to setting up a Transco for the State in a manner that is beneficial, participatory and non-adversarial with the Federal Government of Nigeria (FGN). The alternatives are that private sector players will set up a transmission entity within the State and/or the Discos will deploy low voltage transmission or high voltage distribution grids. The large population, their collective economic power, the availability of significant amounts of capital, the small land mass of the State, all mean that any of these options is viable and will be fully supported by LASG to ensure its realisation.

This leaves us with the need to create a Lagos Independent System Operator (Lagos ISO). Experience indicates that it is imperative that the Lagos ISO should be initiated as early as possible, perhaps even before the start of the LEM, ideally with separate and distinct legal form, corporate structure and ownership. The ISO will be the custodian of the State's IRP in accordance with the expectations of Section 14, Concurrent Legislative List of the 1999 Constitution. The Lagos IRP will be implemented by the ISO in consultation with stakeholders in the State and will be subject to the approval by the State regulator. The definition of "system operations" and the nature of the ISO will be more comprehensively addressed in both the State Electricity Policy and the Law.

It is expected that all these players, being focused entirely on Lagos State, would find it easier to create individual business cases that would appeal to operating partners and capital providers within and outside Nigeria. We therefore expect that financing the capitalization of these various entities will provide significant opportunities for the growth of Nigeria's financial and insurance services, private equity and infrastructure finance players, most or all of whom are themselves citizens of the State.

viii) Collaborative Federal and State Government Support for Market Growth

The State Government, with its Ministry of Energy and Mineral Resources and the regulatory body at the forefront, will develop a policy framework that provides clarity on:

- The role of the Ministry
- The role of the regulator
- Market design and players
- The ideal relationship with the FGNs Ministries, Departments, and Agencies (MDAs)
- Consumers and consumer affairs
- The role of an ISO
- Market players/licenseses and their governance
- Access to markets by licensees
- Investment
- Tariffs
 - Bases for their determination
 - Cost Reflectivity
- Fuel neutrality
- Technology neutrality
- Market surveillance
- Funding the capital and/or the recurrent costs of serving vulnerable citizens



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The regulator must be seen to act with competence and autonomy, while the ISO must be seen to focus entirely on the need to foster efficient energy markets in Lagos State and ensure delivery of quality wholesale service to the players and customers of these markets. Perceptions of politically-motivated decision-making by either the regulator or the ISO will be damaging to the survival of the LEM and must be avoided completely. The Ministry of Energy and Mineral Resources will, however, play a key role in articulating the State Government's vision set out in the State Electricity Policy, in supporting and enabling the execution of this Policy and the Law that implements it and in promoting investment into the Lagos electricity markets.

We recognise that in terms of policy and practice these are entirely uncharted waters for Lagos State. There is no State electricity market in the country today. However, it is clear during the past 20 years, States have had ample opportunity to learn what not to do. The policy proposals presented herein are grounded in the harsh reality that States must wherever possible take their destiny into their hands, but at all times within the constraints of the federalism that is the constitutional foundation of the country. This is why we will engage with the Federal Government, in the spirit of federalism and collaboration, to establish this market particularly with regard to a transmission entity and an ISO for the State and the carve-out of electricity regulatory and consumer protection responsibilities for entities created by State Law.

3) OFF GRID ELECTRIFICATION IN LAGOS STATE

The following is the State's proposal for increasing energy access through the utilisation of off grid solutions ("OGS") in parallel with the proposals made above. This will provide a framework for the utilisation of the clean energy products in electrifying primarily un-served and underserved areas, boosting macroeconomic activities through SMEs, building resilience in social and public infrastructure, and improving the quality of life for the vulnerable population and those below poverty line.

Off Grid Solutions, in the context of this Consultation Paper, shall mean:

- Standalone Solar Systems ("**SAS**") comprised of solar home systems ("**SHS**"), solar energy systems, and productive use appliances powered by both SAS and SHS, and,
- Mini grids, comprised of isolated mini grids and inter-connected mini grids
- Other renewable energy systems such as wind, mini-hydro, waste to energy solutions etc.

JUSTIFICATION FOR OFF-GRID ELECTRIFICATION

a) Demand and Electricity Deficit

A Long-Term Load Forecast developed in February 2021 as part of the Lagos IRP ("**Load Forecast**") estimates that 31% of households in Lagos were connected to the grid in 2020 based on the total number of registered customers. This implies that currently, 69% of households in Lagos are unconnected or off-grid. The Load Forecast also assumes that the highest number of registered customers in Lagos as at 2019 are residential customers



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compared to commercial customers (341,582) and industrial class customers (6,323). Based on current estimates and grid connection rate, it would take another 20 years for unserved households (without consideration to population increase) to be grid connected.

b) Fast and cost-effective way to accelerate energy access

The further an area is from the grid, the more expensive the cost of grid extension becomes especially in a privatized electricity market like Nigeria. Also, according to a Power for All Report, the cost for a single grid connection is about \$2,500 and such projects have a duration of 9 years for a connection with a potential reach of 57,716 persons. On the other hand, SHS projects cost \$30 per connection which can be done within a few hours to days at the most per system and has a projected reach of 3,000,000 persons within a year and 15,600,000 persons within 10 years. The Report also points out that although mini grid projects are more expensive, they are cheaper than grid extension projects as they cost about \$500 per connection with a timeline of 4 months and potential reach of 576,000 persons within 10 years.

c) Improves resilience for public and social infrastructure

OGS has the potential to improve resilience for public and social infrastructure given its cost efficiency and independence. Between 2015 till date, Lagos State with funding support from the UK government under the Solar Nigeria Programme powered 172 schools and 11 rural primary health care centres in the State via off-grid solar systems. In addition, off-grid solar systems were deployed to public health centres and medical laboratories during the COVID-19 pandemic by the private sector and government. This highlights the focal role of OGS solutions in powering critical infrastructure in the State and improving resilience.

d) Facilitates economic growth, social equity and inclusion and environmental sustainability

Former UN Secretary General Ban Ki Moon describes energy as the golden thread that connects economic growth, social equity and environmental sustainability. In Lagos where issues around poverty, social equity and inclusion are critical, OGS presents solutions to dealing with these issues whilst delivering clean energy access to the people. OGS potentially provides a cost-effective, fast and cleaner means of electricity for small and medium sized businesses who are the backbone of the State's economy. Effectively deployed, OGS will play a significant role in catalyzing job creation and socio-economic development.



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e) Relevance for Lagos States Development and Energy Access Vision

The provision of OGS is also imperative for meeting the Lagos State THEME Agenda which is the economic agenda for the BOS Administration. Specifically, OGS would be critical in delivering elements of the THEME Agenda like Health and Environment, Education and Technology, and Making Lagos a 21st Century Economy based on the current economic empowerment opportunities OGS presents. More so, OGS are key for achieving the Solar Initiative (part of Lagos State Ministry of Energy & Mineral Resources 10-point Agenda) which seeks to expand existing/past solar program to schools and health facilities.

As part of its holistic electricity plan for the State, the following will form the framework for developing the State's OGS strategy under its State Electricity Policy:

1. The State's short-, medium-, and long-term targets for OGS.
2. Mapping out of areas, clusters and sectors that would be best suited for the utilisation of OGS.
3. Articulating the role of the State in incentivizing and providing the key enabling environment provisions to catalyse private sector investment into the State including for local solar assembly and manufacturing.
4. Designating and defining the relevant authority for OGS in the State, and coordination with relevant State and federal government MDAs and private sector players. This will also include the role of key stakeholders in the implementation of the policy.
5. Incorporating OGS into the State's Integrated Resource Planning and Data gathering.
6. Education, research, sensitization, consumer protection, and capacity building.
7. Relevant regulatory provisions as applicable to OGS and e-waste in the State.
8. The role OGS plays for gender and social inclusion in driving energy access.
9. Timelines for phasing out the use of dirty fuels.

4) DEMAND SIDE MANAGEMENT (DSM)

Along with the parameters outlined above, the State intends to drive Demand Side Management (DSM) measures. These cover the activities and approaches utilized by government, electricity utility, businesses and residents in the State to modify energy consumption patterns in order to reduce electricity usage.

The State Government will establish and drive the implementation of various measures designed to encourage residents of the State to modify levels, patterns, timing and quantities of electricity that they consume; such that the cost of building out the Lagos Electricity Market is made more efficient, and reliability is better assured.

The Lagos DSM measures may be grouped into support for two broad categories:

- i. **Energy Efficiency (EE)**, to drive using less energy to deliver the equivalent electricity services, which could include upgrading to light-emitting diode (LED) lightbulbs, and other energy saving electrical appliances such as refrigerators and air conditioners;



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- ii. **Demand Response (DR) and Energy Conservation**, with the intention to encourage consumers to adjust the time of their energy use based on price or availability of supply and decreasing overall installed capacity waste.

The DSM measures will benefit all stakeholders – Lagos residents, electricity utilities, and the society at large: reduced electricity bills, reduced the overall electricity demand, improved reliability, reduced public electricity expenditure and improved economic development of sectors dependent on reliable electricity.

The electricity policy will outline the key entities responsible for implementing DSM measures in Lagos including the Ministry of Energy and Mineral Resources and relevant agencies under the Ministry, as well as the distribution companies in the State. Key targets will be set to cover lighting, buildings, appliances and any other relevant areas.

The following will form the framework for developing the State's DSM strategy under the Lagos Electricity Policy:

- The State's short, medium and long term DSM program targets and incentives;
- Articulating the role of the State in incentivizing and creating an enabling environment to encourage the DSM measures;
- Designating and defining the relevant authority for DSM in the State and the role of key stakeholders in the implementation of the policy;
- Outlining a process to periodically identify the gaps between current and target levels, develop action plans on how, when, and by whom the gaps will be addressed;
- Establishing priority activities to be implemented annually;
- DSM program monitoring systems that will help collect data and track impact;
- Incorporating DSM in the State's Integrated Resource Planning and Data gathering.
- Relevant regulatory provisions as applicable to DSM in the State to facilitate the specification, collection, storage, maintenance and supply of relevant data, according to the requirements of the IRP and international standards;
- Annual reviews, audits and reporting to the DSM programs including their costs and benefits (including targets and achievements).



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CONCLUSION

The State Government will undertake necessary consultations, starting with this policy consultation paper. It is expected that input from comments and suggestions made on this consultation paper will go towards drafting the State Electricity Policy. The draft electricity policy will be presented to the public during the early part of this quarter (Q2, 2021). It is envisaged that later in Q2 2021, the State Electricity Policy will be published. In addition, a Bill for a new electricity law for the State will be submitted during Q3 to the Lagos State House of Assembly for legislative action.

This Bill will codify LASG's objectives for the development of a State electricity market independent of, but also connected with, the national grid system. The focus of the Bill will clarify the roles of all stakeholders in the market and enable the evolution of a Lagos Electricity Market focused entirely on enabling the location of more electricity generation companies using various technologies within the State, the construction of both low and high voltage transmission lines across the State, the establishment of an ISO and the development of a commercial framework to enable energy trading between generators and distribution entities within the State.

The Bill will establish an electricity regulatory body and specify its functions in terms of regulating and enabling a functioning State electricity market, licensing of participants and other regulatory matters, including enabling, enhancing and vindicating the consumer rights of electricity consumers in the State. This policy/legal framework will be the reference points for policy implementation, operations, financing and related activities in the Lagos electricity market.

This consultation paper outlines a vision that defines the future viability of Lagos State and its continued role as Nigeria's premier investment destination and Nigeria's Centre of Excellence. Without exaggeration, it is safe to say that this future depends very significantly, if not entirely, on LASG's ability to articulate and oversee the implementation of an electricity market that focuses on the socio-economic needs of the State. Hard work, strong, consistent, focused political will, persistence, collaboration, strategic thinking and an understanding of the role of the private sector in attaining this vision will be repeatedly called upon in this endeavour. Hopefully, this consultation paper demonstrates the required bold strategic thinking and sharply-focused political will to build strong institutional foundations that will be sustained as it upholds Lagos State's leading role in the national economy.

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MINISTRY OF ENERGY AND MINERAL RESOURCES
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