LAGOS STATE MINISTRY
OF ENERGY AND MINERAL
RESOURCES

LAGOS STATE ELECTRICITY POLICY

PROVIDING UNIVERSAL AND RELIABLE
ELECTRICITY ACCESS TO OUR CITIZENS

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GOVERNOR'S FORWARD

Lagos State is the commercial centre of the country with a considerable number of manufacturing and service industries. Lagos State accounts for about 30% of the national GDP and 50% of the non-oil GDP. This is powered by less than 1,000 Megawatts (MW) of electricity supply from the national grid delivered to the two electricity distribution companies (Discos) in the State. In reality, Lagos is dependent almost entirely on a fleet of no less than 15,000 MW of back-up generator capacity fuelled by expensive and heavily polluting distillates like fuel oil, petrol and diesel. No progressive and modern economy in the world has thrived in the face of such combination of electricity inadequacy and supply imbalance.

"Making Lagos A 21st Century Economy", a key component of our T.H.E.M.E.S. agenda, is strategically aimed at growing the critical sectors in the State which is only possible with reliable access to electricity.

Lagos State has resolved to drive a new Policy and Strategic Framework that will significantly improve the viability of investments in the Lagos State Electricity Market. The State Government will take direct responsibility for developing, growing, and regulating a Lagos Electricity Market as prescribed in the 1999 Constitution (amended).

Our aspirations, as espoused in the forthcoming Lagos State 30-year Development Plan (2021 – 2051), will be a mirage without the availability of a reliable electricity sector. The desire for the achievement of universal electricity access in the State is a collective one in which all stakeholders from the Federal Government to our people at the grassroots must recognize their respective roles and commit to acting in good faith.

On behalf of the State Government, I am grateful to all those who have engaged in providing feedback to the State Government as we went through the consultation process leading to this Policy document. I expect that the citizens and residents of the State will find this Policy and the Law emanating therefrom not merely acceptable, but more importantly, the enablers of a better quality of life.

I look forward to seeing this major initiative of the State Government produce good results for our people and in advance, thank all the citizens and residents of Lagos for giving us yet another chance to be of service to you. Working with you and for you, we will together make Lagos State a 21st Century Economy.

DATED AT IKEJA THIS 19th DAY OF OCTOBER 2021

BABAJIDE SANWO-OLU
GOVERNOR

EXECUTIVE SUMMARY

Lagos, in addition to being the commercial centre, is the most populous state in Nigeria. It is home to one of the largest megacities in the world and is growing each minute. The State is very important to the survival of a non-oil dependent Nigeria. It is home to Nigeria and Sub-Saharan Africa's most important financial centre outside Johannesburg, South Africa and is home to the two most important seaports and domestic and international airport hubs in the country. Lagos State would be the fifth largest economy in Africa if it were a country. This makes Lagos a major centre for both domestic and international trade as well as labour mobility.

Energy supply is currently the single biggest infrastructure and developmental challenge in the State. 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 compact land mass.

The uneven supply across the State for no more than half a day, on average, makes off-grid generators, self-generated electricity critical to socio-economic activity despite being extremely costly and environmentally unfriendly. ***The Lagos State Electricity Board (LSEB) conducted research in 2014 that demonstrated that 15,000MW of the estimated 45,000MW of off-grid generators in Nigeria is located within Lagos State alone.*** Lagos has continued to witness a continuous flow of new residential, commercial, and industrial developments and investments. 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, the State needs to establish the enabling environment for an electricity market that supports the huge demand that this growth generates. This Lagos market must be separate from the national electricity grid, but also be connected with and complementary to the latter. Lagos cannot rely on the national grid alone for its long term, sustainable socio-economic growth and significant growth in the standard of living of its citizens.

A major challenge the State must contend with is the highly skewed ratio between public electricity supply and highly expensive, highly polluting, and economically inefficient off-grid generators that actually powers Lagos State. Several 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) collaborative Federal and State Government support for market growth/customer satisfaction.
3) an autonomous, credible regulatory body.
4) an integrated resource plan.
5) competitive and transparent procurement of generation resources.
6) a bankable commercial framework.
7) well-funded, well-managed generation, transmission, and distribution players.
8) an Independent System Operator.

This Policy articulates the vision of LASG on the necessary constitutional, legal, engineering, and commercial foundations for creating a viable sub-national electricity sector that 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.

CHAPTER ONE
INTRODUCTION

» 1.1

Lagos has historically been the location for “firsts” in electricity development in Nigeria; the first ever electricity generating set, the first streetlights and first electric lamps in the country were installed in Lagos in 1896 at the site of what is now the Eko Electricity Distribution Company Limited’s headquarters at Marina. These occurred even before Nigeria came into being. The Nigerian Electricity Supply Industry (NESI) has since gone through several evolutions leading to its present status.

» 1.2

After over 50 years of various piecemeal arrangements, the Electricity Corporation of Nigeria (ECN) was established in 1951 as a statutory corporation to take over the various generation projects around the country. The generation projects were to be linked via a newly built transmission network and the energy distributed to customers all over the country. This was followed by the Niger Dams Authority (NDA) in 1964, established to oversee the construction of a hydroelectric plant at Kainji on the River Niger.

» 1.3

The supply of electricity to Lagos by ECN continued until 1972 when NEPA was created. Supply into Lagos State was provided through NEPA’s Lagos Zone, which evolved into today’s Eko and Ikeja Electricity Distribution Companies (Discos) that were established following the enactment of the Electric Power Sector Reform Act, 2005.

The Generation Sector and Natural Gas Supply in Lagos

» **1.4**

There is a single grid-connected generating plant within Lagos State as of today; this is the 1,320MW Egbin Power Plc. In keeping with the central dispatch operation of Nigeria's single electricity market, energy from Egbin is delivered to the national grid from where some of it is transmitted back into Lagos.

» **1.5**

Nigeria is dependent on natural gas to provide more than 75% of its daily supply from the national grid. Today, all gas thermal plants, including Egbin, connected to the national grid are supplied with gas by Nigeria Gas Marketing Company's Escravos – Lagos Pipeline System (ELPS). The ELPS recently doubled in capacity from 1bcf to a 2bcf system that supplies industrial and generation customers in the Western part of the country. At the moment, the ELPS system has the additional capacity to transport at least another 1bcf (enough to deliver at least 3,500MW of generation capacity) to existing and prospective Gencos and IPPs in and around Lagos State.

» **1.6**

Apart from the prospects of natural gas supply to Lagos State via from ELPS, the Nigeria LNG Limited has recently announced that it has signed contracts for the supply of liquefied natural gas to the Nigerian domestic gas market. While this is an exciting prospect, it will be difficult to translate this into a steady and sustained commercial reality without a market, such as Lagos State, creating the opportunity for it.

The Transmission Sector in Lagos

» **1.7**

Electricity transmission in Lagos State is undertaken by the Transmission Company of Nigeria (TCN). TCN holds two separate licenses from the Nigerian Electricity Regulatory Commission (NERC) under which it operates two separate businesses. The Transmission Services Provider (TSP) responsible for the construction and maintenance of the 330kV and 132kV transmission grid, comprising transmission towers, lines, switchyards, and substations. Even though TSP's Lagos Transmission Region covers five generating companies (Gencos) at 3 sites, Egbin, Olorunsogo and Papalanto, Lagos State has just Egbin Power Plc but constitutes the Region's largest single largest sub-market in the country, with four of Lagos Region's five sub-regions and thirty-three (26 x 132kV and 7 x 330kV) of its thirty-eight sub-stations dedicated entirely to the State.

» **1.8**

TCN's 4 Sub-Regions and 33 substations in Lagos State and their respective transformation capacities are:

REGION	SUB-REGION	SUB-STATION	SUB-STATION VOLTAGE	SUB-STATION CAPACITY RATING(MVA)
LAGOS	**Ajah**	Ajah	132kV	280
		Lekki	*	120
		Alagbon	*	340
		Akoka	*	85
		Amuwo-Odofin	*	160
		Apapa Road	*	60
		Ikorodu	*	280
		Oworonshoki	*	150
	Sub-total sub-region 132kv capacity			**1,475 MVA**
	Akangba	Akangba	132kV	360
		Ilashe-Island	*	30
		Ijora	*	135
		Ilupeju	*	105
		Isolo	*	105
		Itire	*	70
		Ojo	*	120

REGION	SUB-REGION	SUB-STATION	SUB-STATION VOLTAGE	SUB-STATION CAPACITY RATING(MVA)
	Sub-total sub-region 132kv capacity			**925 MVA**
	Egbin	Egbin Ikorodu Maryland Odogunyan	132kV * * *	30 280 180 240
	Sub-total sub-region 132kv capacity			**925 MVA**
	Ikeja-West Sub-Region	Alausa Alimosho Ayobo Ejigbo Ogba Oke-Aro	132kV * * * * *	135 230 120 300 165 120
	Sub-total sub-region 132kv capacity			**1070 MVA**
GRAND TOTAL REGION 132kV CAPACITY IN LAGOS STATE				**4,200 MVA**
LAGOS	**Ajah**	Ajah Alagbon Lekki	330kV * *	450 300 300
	Sub-total sub-region 330kv capacity			**1,050 MVA**
	Akangba	Akangba	*	960
	Sub-total sub-region 330kv capacity			**960 MVA**
	Egbin	Egbin	*	300
	Sub-total sub-region 330kv capacity			**300 MVA**
	Ikeja-West	Ikeja-West Oke-Aro	* *	1050 600
	Sub-total sub-region 330kv capacity			**1,650MVA**
GRAND TOTAL REGION 330kV CAPACITY IN LAGOS STATE				**3,960MVA**

» **1.9**

1.9 The second transmission licence is for System Operations. This concerns the safe operation of the transmission grid and the movement of energy across this grid from Gencos to Discos and large (or eligible customers) in accordance with the Grid Code. System Operations has a National Control Centre at Oshogbo and a Regional Control Centre at Ikeja-West that serves the entirety of Lagos State and parts of Ogun and Oyo States.

The Distribution Sector in Lagos

» **1.10**

In 1972, Decree N0. 24 was promulgated to merge the distribution and generation activities of ECN and NDA under one corporate umbrella, National Electric Power Authority (NEPA), thereby creating a single electricity market for the country. The reform of the sector introduced by the Electric Power Sector Reform Act, 2005 did not change the unitary structure of the NESI. Rather, it simply took the NEPA organisational structure and corporatized it. Each Zone of NEPA's Distribution Department became an incorporated company.

» **1.11**

Each company thus created covered a number of States; and was responsible for providing every aspect of electricity distribution business from wires to customer care within those States. Lagos State was, however, treated differently. Due to its large population and sophisticated customer base, two Discos were created in 2006 to serve the State. These are Eko Electricity Distribution Company Limited (Eko Disco) and Ikeja Electricity Distribution Company Limited (Ikeja Disco).

» **1.12**

Eko Disco serves 1,500km2 in the southern part of Lagos, extending from Epe LGA in the East to Badagry LGA in the West and as far north as Mushin LGA, an area with an estimated population of 8m – 10m people. It serves over

585,000 connected customers in 3 “Circles”, themselves subdivided into 10 “Districts”. The EKEDC network is supplied from 2 of TCN’s 4 Lagos Sub-Regions and 12 of TCN’s 38 Lagos transmission sub-stations. The Disco aggregates total transformation capacity of 2500MVA. During the 2013 privatisation, the 60% core investor interest in the Disco was acquired by West Power and Gas Limited, comprising a group of private investors with varied energy sector experience.

» 1.13

Ikeja Disco covers a larger population of Lagos State, approximately 17m people in an area about 2,077 km2 in size in the northern LGAs of the State. The Disco operates a network that serves over 1,300,000 connected customers via a network comprising 87 x 33kV feeders, 272 x 11kV feeders, 72 injection substations and over 14,000 distribution substations. The Ikeja Electric network is supplied via another 2 of Sub-Regions of TCN’s Lagos Region and 17 of its Sub-Stations. As with Eko Disco, in 2013, 60% equity was transferred in a privatisation sale to a core investor group controlled by the NEDC/KEPCO Consortium.

» 1.14

In spite of the significant nominal or nameplate transformation capacities that TCN has in Lagos State, the sum total of generation capacity centrally dispatched into Lagos State from the national grid has rarely been more than 1000MW on a typical day, over an average 12 hours daily. For a population just under 27 million this is grossly inadequate. TCN has enough capacity to take up to a further 2,500MW of capacity into Lagos State through its 132kV transmission network in the State. In turn, both Discos also have the nominal capacity to receive and distribute that much capacity through their networks.

» 1.15

A study by the Lagos State Electricity Board (LSEB) in 2014 reported that Lagos State aggregates total off-grid generator capacity approximately 15,000MW, clearly indicating a level of demand currently beyond the capacity of the two Discos. This is still the case today, perhaps even more so. In an increasingly distributed market and with the two Discos unable to serve a fraction of demand with little more than 12 hours of supply daily on average, socio economic activity in Lagos State is powered by its fleet of power back-up generators and renewable energy systems.

Lagos State

» 1.16

Lagos State is the commercial and financial services capital of Nigeria and one of Africa’s few megacities. It houses the headquarters of all major financial service providers, corporate organisations and NGOs in Nigeria. Nigeria’s 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, the Americas and the rest of Nigeria. Lagos has also been the first choice for investors within and into Nigeria since long before independence.

» 1.17

Lagos State also 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, 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. However, industrial capacity utilization in Lagos has hovered for over a decade below 50%, indicating huge potential for growth. The primary reason for this underutilization is not the absence of markets but the poor supply of electricity to the State. The Manufacturers Association of Nigeria estimates that its members in Lagos experience a daily average of 6 power outages, with only about 4 hours of electricity supply of uncertain quality.

» 1.18

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, reliable and affordable energy supply. Commercial and industrial activity have been significantly curtailed and made costlier for decades. Industries have been forced to resort to expensive off-grid generators, which makes their products uncompetitive with imported goods. Consequently, many establishments, particularly multinationals, have had to leave Lagos State or even Nigeria entirely. Those that have remained, particularly small and medium scale businesses that would ordinarily employ the largest number of Lagosians, have been compelled to self-generate electricity. The consequent adverse effects are even more significant taking 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.

Lagos State’s Electricity Supply Challenge

» 1.19

Eko and Ikeja Discos together receive less than 12,000MWh (12,000,000kWh) daily from the national grid. On the other hand, running 15,000MW of back-up capacity for another 12-hour daily average, is equivalent to 180,000MWh (180,000,000 kWh) of energy. This would mean that only 6.25% of the demand in Lagos is provided by the national grid. When we compare a grid cost of ~N50/kWh and a diesel generator cost of ~N130/kWh, this means that Lagosians pay at least an additional N14.4 billion (Fourteen billion, four hundred thousand Naira) daily or N5.3 Trillion (Five trillion, three hundred billion) per year for electricity. This is money that could be invested or spent of more productive use with a part of it captured by the Federal and State Governments as tax revenue. These are also direct revenue losses to the two Discos

that could have been reinvested in delivering additional capacity and savings to customers. The losses to both State and national GDP are significant and manifest in low manufacturing capacity utilisation, attendant under-employment and unemployment and the massive socio-economic dislocation that they cause, high rates of crime, poor health and education outcomes, low public sector productivity, low fiscal/ tax collection rates, etc, not to mention the issues of national security that affect both Lagos and Nigeria.

» 1.20

The State Government, in its 2014 report, "Future Proofing Cities: The Lagos Energy Sector, Risk and Opportunities for Resilient Growth of the Lagos Energy Sector" projected that demand for that year in Lagos was a total of 9,574MW, with 69% being residential and 31% commercial/industrial. This projection was expected to grow to 29,212MW by 2030. This was set against a backdrop of a projection that the national grid would, by 2015, have 20,800MW available for supply to the country, 33,500MW by 2020 and 55,350MW by 2030. Suffice to say that the national grid is nowhere near close to these meeting these projections and demand for electricity in Lagos State continues to grow by the day.

» 1.21

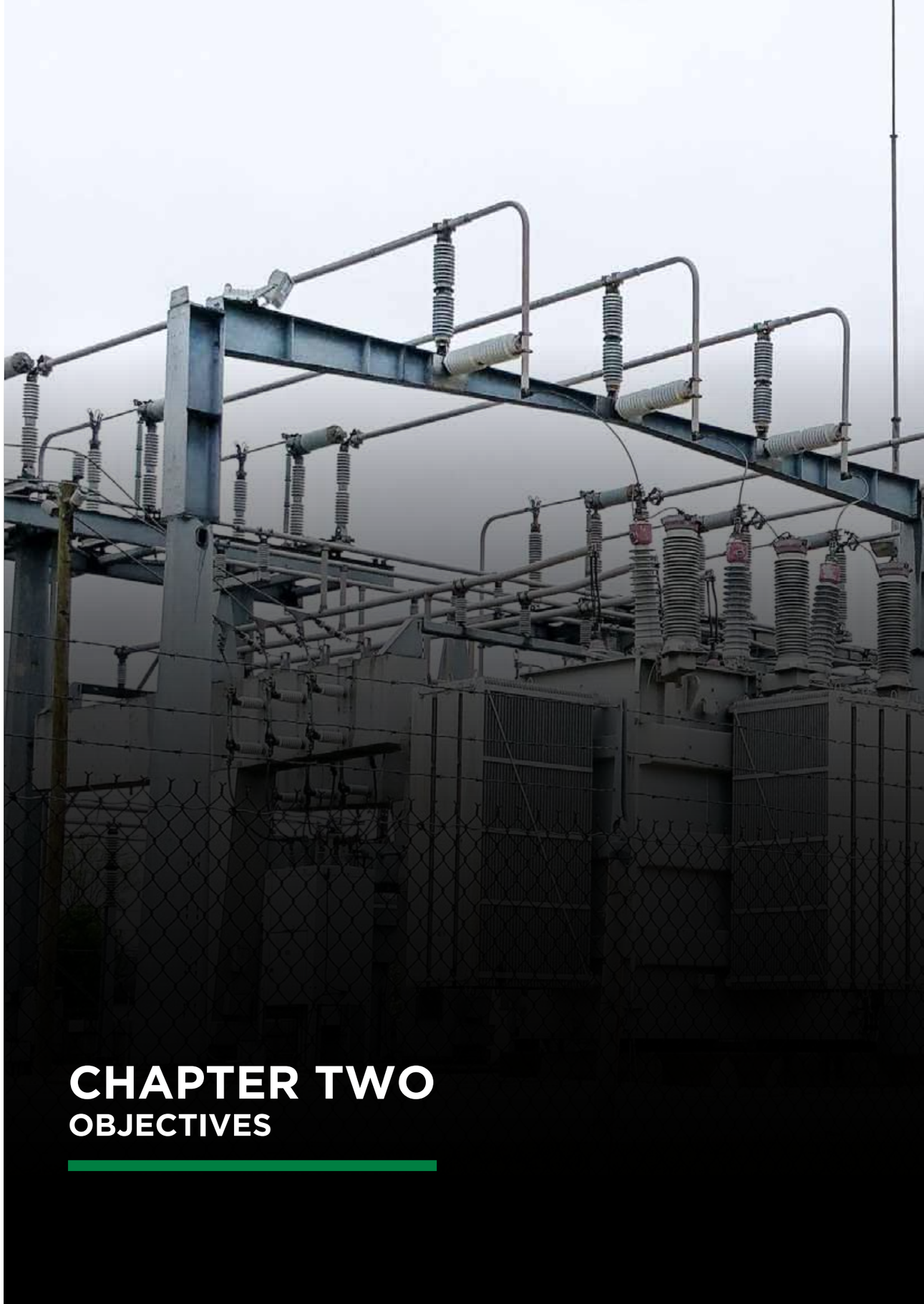
This current state of affairs was anticipated in the 2014 Report, which noted that "intervention may be needed at State level" to meet the State's electricity demands. It has become clear that decisive intervention is indeed needed in the State and immediately. The apparent imbalance in sources and quantities of electricity supply, the inability to meet demand and their attendant massive financial and economic losses, combine to make the case for reform of the electricity sector in Lagos State extremely urgent.

» 1.22

Finally, there is the reality that socio-economic activity in Lagos State, particularly from its 15,000-MW fleet of petrol-, diesel- and fuel oil-burning off-grid electricity generators, produces a very significant amount of environmentally damaging emissions. As a signatory to the 2016 global protocols on climate change and with the 26th Conference of Parties scheduled to hold in November 2021, we see the increasingly strident calls to impose limitations on the use of natural gas to fuel electricity generation and transportation as a warning and a call to dramatically increase its natural gas utilisation before it is too late. Naturally, this means a geometric increase in electricity generation, which cannot happen without multiple efficient electricity distribution markets, rather than the extremely inefficient single electricity market Nigeria has today.

» 1.23

This Policy sets out the State Government's proposals on increasing the quantity and quality of the energy delivered to residents of Lagos State via a Lagos Electricity Market. In other words: this policy maps a path to assure Lagos State residents of "electricity reliability", a phrase defined here as electricity that is available to any customer in the State Electricity Market in the desired quality and quantity, at the time it is needed with an adequate reserve margin, growing at a rate faster than population growth.



CHAPTER TWO
OBJECTIVES

» 2.1

This Policy seeks to provide to Lagosians and the wider public full clarity as to the perspective of the State Government regarding the size of the prospective Lagos Electricity Market, the stakeholders and players in this Market, their respective roles, and the constitutional, legal, regulatory, technical, and commercial foundations of this prospective Market. These must all fit together to form a fully functional, steady, and reliable framework that provides universal access to electricity to all residents of the State. Considering that the sector is largely owned, operated, and funded by the private sector, and the State Government's conviction that the private sector is the primary engine of growth, it only stands to reason that this Policy (and the Law that will implement it) are clearly be seen to enable and deepen private sector investment.

» 2.2

Accordingly, this Policy will provide a path to attaining a number of primary objectives:

Short Term

» 2.3

Short term objectives (2021 – 2022) include:

2.3.1 Enact a comprehensive electricity law by June 30, 2022 to implement the policy principles detailed herein and establish an empowered Lagos Off-Grid Electrification Agency and a Lagos Electricity Regulatory Commission.

2.3.2 Establish a regulatory framework for, and license, all relevant electricity market entities in Lagos State no later than 31st December 2022; and

2.3.3 Delineate the LEM from the national electricity market by 31st December 2022.

Medium Term

» 2.4

Lagos State's medium-term objectives (2023 – 2028) for its electricity market are:

2.4.1 To commence shadow trading of the commercial and technical framework of the LEM by 30th June 2023.

2.4.2 To commence full commercial LEM operations (credible, commercially-sound, technically compliant, well-funded, financially viable) by 31st December 2023;

2.4.3 Establish the Market with a clear focus on ensuring minimal adverse environmental impact and minimal recourse to Lagos State Government subsidies or guarantees.

2.4.4 A minimum of 30% year-on-year growth in capacity and 75% reliability (average 18 hours of supply daily) 5 years from 2023 with growth in peak energy traded in Lagos State from 1000MW and 12,000MW/h daily in December 2022 to 4,500MW and 81,000MW/h (including a 15% reserve margin) by June 2028.

2.4.5 A significant reduction in off-grid generator emissions and the fostering of a natural gas market in Lagos through implementing a programme to transit from distillate fuels to natural gas and renewable sources to fuel the off-grid generator fleet located in the State.

2.4.6 The adoption of the cleanest, commercially viable modern technologies to deliver electricity to residents of the State using diverse and secure sources of energy.

2.4.7 The implementation by the Lagos Off-Grid Electrification Agency of a sustainable programme for delivering a minimum of 50MW and 1000MW/h of new capacity and energy per annum to the unserved and under-served areas of the State; and

2.4.8 The development of Lagos State as a major global centre for innovation in the provision of electricity access to populations in megacities.

Long Term (Post 2028)

» 2.5

In the long term, the State Government expects that by 31st December 2036, there will be a reliable supply of electricity in the Lagos Electricity Sector deploying the most efficient generation technologies and providing clean, adequate and constant access to all citizens without general recourse to off-grid generator capacity.

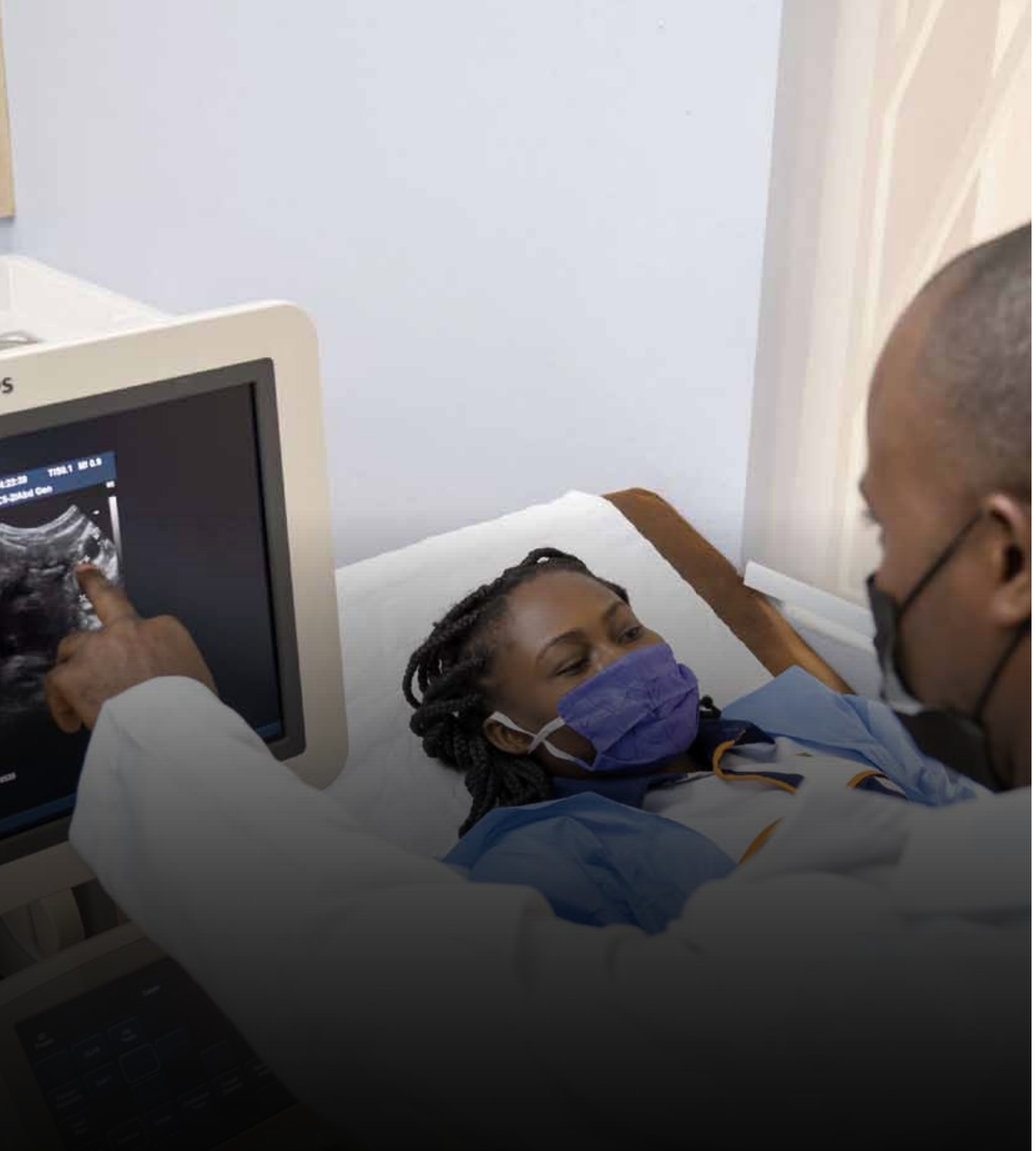
Policy Reviews and Expected Changes in Strategic Objectives

» 2.6

This Electricity Policy is necessarily dynamic. As the years go by, its stated objectives and the methods for attaining them will be reviewed and updated to take account of key factors such as technological innovation and commercial developments in international and domestic electricity markets. Other key factors to consider are climate change and the constant evolution in environmental management policy and practice, feedback from consumers, citizen groups, investors and capital providers and input from within the State Government itself.

» 2.7

The MEMR will establish channels of communication with various stakeholders and groups within and outside the State Government and the State, to enable feedback to be given and discussed. This feedback will be used to adjust in policy execution as often as is necessary. In addition, the Ministry will organise Electricity Policy Review workshops no less than once every five years and the outcomes therefrom will be processed and inputted into the Policy to produce subsequent editions of the Policy.



CHAPTER THREE
KEY REQUIREMENTS FOR ESTABLISHING THE LAGOS ELECTRICITY MARKET

» 3.1

Electricity is increasingly becoming an unbundled, decentralized service for good reason and this global trend is clearly irreversible. Having pioneered electricity sector reform on the continent by unbundling its single State-owned electricity company starting in 2001, it is antithetical that the country remains a single electricity market, despite having in place the constitutional, demographic, social and economic conditions for continuing the unbundling of its single national electricity market to its logical conclusion.

» 3.2

It is also clear that as with other successful jurisdictions like Lagos with a significant base of private sector activity, electricity, as a manufactured commodity, is best provided 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 population at the base of the societal pyramid.

» 3.3

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

An Enabling Constitutional/ Legal Framework

» 3.4

A viable, State-focused electricity system cannot be established without a proper legal framework. This is provided by Sections 13 and 14 of the Concurrent Legislative List, Part II, Second Schedule to the 1999 Constitution. Section 13 provides: "13. The National Assembly may make laws for the Federation or any part thereof with respect to-

(a) electricity and the establishment of electric power stations.

(b) the generation and transmission of electricity in or to any part of the Federation and from one State to another State.

(c) the regulation of the right of any person or authority to dam up or otherwise interfere with the flow of water from sources in any part of the Federation.

(d) the participation of the Federation in any arrangement with another country for the generation, transmission and distribution of electricity for any area partly within and partly outside the Federation.

(f) the regulation of the right of any person or authority to use, work or operate any plant, apparatus, equipment, or work designed for the supply or use of electrical energy.
Section 14, in turn, 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."

» 3.5

It is noted that Paragraph 3.1.3 of the National Electric Power Policy, 2001 defines the role of States in the Nigerian Power Sector thus:

"The State Governments will carry out their responsibilities for the development of off-grid electrification and their joint responsibilities with the Federal Government on the establishment of power stations as set out in the 1999 Constitution. The State role will also include regulation of ***off-grid non-centrally despatched electricity operations***, which are wholly limited within the State boundaries."

» 3.6

Reading these constitutional provisions along with the National Electric Power Policy, it becomes apparent that all electricity market operations, including generation, transmission and distribution carried on entirely within a State, that are outside the instructions of the Nigerian Electricity System Operator, are "off-grid" operations. Such off-grid operations are the responsibility of State law and regulation.

Collaboration between the Federal and State Governments and within LASG

» 3.7

The 1999 Constitution makes clear that retail electricity markets (the distribution sector) are the responsibility of the States; and the National Electric Power Policy clearly anticipates that there will be State electricity markets. The Federal Government has hitherto exercised regulatory responsibility by default, including over the distribution sector that is constitutionally the exclusive responsibility of the States. Lagos State is now taking on its electricity responsibilities and it is expected that there will be an organised transition of responsibility for electricity operations from the national electricity regulator to the State electricity regulator. This effectively means that electricity distribution entities, independent electricity distribution networks (IEDNs), captive generators, embedded generators and non-grid scale renewable energy licensees focused entirely on the Lagos market, will be transited to regulation by the LASG-established regulator. It is also anticipated that the FG, through NERC, will continue to regulate cross border or wholesale electricity trading, that is, generation and transmission across the Lagos State border.

» 3.8

This Policy is not proposing, and does not envisage, dual regulation of entities by both Federal and State electricity regulators. At all times, there will be only a single regulator – Federal or State – for any relevant activity. The State Government will engage with the Federal Government to establish a transitional arrangement with unambiguous milestones for passing specific regulatory responsibilities from the Federal to the State regulator. The various FG MDAs the State Government will engage with include the Office of the Vice-President, the National Council on Privatisation/ Bureau of Public Enterprises, the Central Bank of Nigeria, the Nigerian Electricity Regulatory Commission (NERC), Federal Ministry of Power, Nigeria Bulk Electricity Trading (NBET) Limited, the Nigerian Electricity Management Services Limited (NEMSA) and the Federal Competition and Consumer Protection Commission (FCCPC).

» 3.9

Within the State Government, existing MDAs with key roles to play in the creation of a functional electricity market include the Lagos State Environmental Protection Agency, the Lagos State Consumer Protection Agency, their sector Ministries, the Ministry of Finance and the Ministry of Budget and Economic Planning.

An Autonomous and Credible Regulatory Entity

» 3.10

An autonomous and credible regulatory body will 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 ade quacy for the State in accordance with the IRP discussed above.
2) ensure a tariff methodology reflective of an efficient operating process and enables market participants to transact with each other on a willing seller/willing buyer basis.
3) ensure safety, reliability and quality of service in the movement of electricity within the Lagos electricity market.
4) license participants in the State electricity market.
5) with the ISO, undertake market surveillance and monitoring; and
6) perform other activities that promote the efficiency and reliability of the Lagos Electricity Market.

» 3.11

The State electricity law will uphold the regulator's autonomy in its decision making, funding, the appointment of its leaders and the operation of its daily functions. The key tools for these, which the law will also mandate and enable, are consultative public participation, access to non-governmental funding for the substantial part of its operations, the recruitment and continuous training of leaders and management staff, and, very importantly, curtailing the scope for political interference. These are the vital enablers of accumulating the competence and experience that are the primary safeguards of the regulator's existence and credibility.

The regulator will act with competence and autonomy and focus on designing and fostering an efficient energy market in Lagos State and ensuring delivery of quality wholesale and retail service between players and customers. The regulator will also have to deal with various cross-cutting issues that require collaboration with other State MDAs, particularly in the areas of environmental protection and remediation and consumer protection.

An Integrated Resource Plan (IRP)

» **3.12**

The Lagos Integrated Resource Plan (IRP) will outline a framework to meet future electricity demand in the State by establishing the availability of fuel and electricity generation resources available within the State and ensuring that these resources are transparently allocated to credible and capable private sector players who will then deliver energy into the Lagos Electricity Market. Implementing the Plan requires the deployment of power system planning tools with the objective of determining the least cost method of meeting 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 with regard to meeting projected future energy needs.

» **3.13**

Lagos State commenced the process of developing its IRP in H2 2022 with the support of the USAID Power Africa Nigeria Power Sector Program (PA-NPSP). The State now has a draft IRP, which will be refined and updated. A completed plan will be issued and adopted as a foundational document for the establishment of the Lagos Energy Market by Q4 2021. The IRP will thereafter be regularly reviewed in line with regulations to be issued by the Regulator to ensure that it remains relevant to the needs of Lagosians.

» **3.14**

The IRP will be in the custody of, and its implementation will be overseen by the State electricity regulator, until such a time as an independent system operator (ISO) is established for the State electricity market, at which point the ISO will take over custody of the plan and oversee the execution of its processes.

Competitive and Transparent Procurement of Resources

» **3.15**

A competitive and transparent framework for procuring new generation capacity based on projections made in the IRP will be mandated by the State Regulator. The procurement of new generation will in turn be a major factor in determining end-user tariffs by the contracting buyers and sellers, based on their different transaction cost components. Such willing buyer-willing seller negotiations will in turn be guided by the tariff methodology established by the Regulator.

A Bankable Commercial Framework

» **3.16**

The Lagos Electricity Market (LEM) will be owned and operated substantially by the private sector under a commercial framework, also guided by the IRP and the State tariff methodology. TCN will be encouraged to incorporate its transmission network in the State under a separate corporate entity that would seek and obtain a transmission licence from the State regulator. The Lagos ISO, when established, will also be owned by all market participants, possibly including key fuel suppliers, on a mutual, not-for-profit basis that guarantees its full transparency and non-preferential operations.

» **3.17**

Given the steady progression towards decentralisation and the increased use of technology in providing energy services to customers, there will be significant scope for the further disaggregation of distribution services within the State. All such services, depending on their sophistication and capital/management requirements will be subject to some form of licensing. Licensing processes will be simple, automated, and efficient. The relationships between players in the Market will be governed by a set of typical industry codes and guidelines established by the regulatory body via a consultative process. The Market will also have an industry-led dispute resolution mechanism that emphasizes alternative dispute resolution. These essential elements will be provided for in the State electricity law and the focus will be to establish a commercially and financially viable and technically sound LEM into which entry is via a simple, uncomplicated licensing mechanism, with most of the energy consumed by customers being based on willing buyer/willing seller transactions.

» **3.18**

Also important to the success of the LEM is the need to identify clusters of credit worthy wholesale and retail end-customers that will buy electricity from the Market. Provision would be made for sustainable arrangements for funding either or both capital and recurrent costs of providing access to vulnerable or economically under-privileged citizens. For the sound financial health of the LEM, the IRP of the State will consider the ability of the targeted end consumers to pay for services to forestall financial debts or shortfalls in the market.

» **3.19**

The bankability of this commercial framework is based on revenue streams derived via a tariff methodology founded on the following basic principles:

3.19.1 Transparent generation procurement processes.

3.19.2 Consistent and apolitical response to macroeconomic signals.

3.19.3 Willing buyer-willing seller transactions in every sector of the Lagos electricity market from fuel supply through generation and transmission to distribution (wholesale and retail).

3.19.4 Competition in the generation and distribution retail sectors, although probably not in the wires business; and

3.19.5 Accounting separation between each business segment of the Market

» **3.20**

The methodology or methodologies by which electricity tariffs in the State are to be determined will be established following consultations undertaken 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 support measures implemented by the LSEB or its successor agency.

Capable Licensees and Market Participants

» **3.21**

The Lagos Electricity Market will have at least six sets of players: fuel suppliers (likely natural gas suppliers), generation companies, a transmission entity, an independent system operator (ISO), distribution entities and electricity trading companies. Each of them, individually, must be capable of playing their part in the LEM; which means that they must be well-funded and competently managed. It is likely that natural gas suppliers, whilst they are not to be directly regulated by the Regulator, will have a key role in the Market and therefore, membership of key electricity stakeholder groups, by virtue of which they will have the responsibility to support compliance with relevant electricity industry codes and regulations.

» **3.22**

Given the State's relatively small physical footprint and its substantially built-up nature, a number of IPPs may be located outside the State but sell their output directly into the Lagos electricity market. This wholesale cross-border trade will be regulated under rules established by NERC but once the energy so traded arrives in the Lagos electricity market, its retail, by State-licensed distribution entities, will be based on commercial and technical rules established by the State electricity regulator.

» **3.23**

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 under procurement rules established by the latter. The nature of the ISO is outlined below.

» **3.24**

The envisaged rules on energy efficiency and the control of emissions from the State's huge fleet of off-grid generator sets and the prospect of multiple IPPs locating in and around Lagos State mean that increasing quantities of natural gas will be required year-on-year in a market whose growth will be steadily progressive and exponential and will not plateau in the foreseeable future.

An Independent System Operator (ISO)

» **3.25**

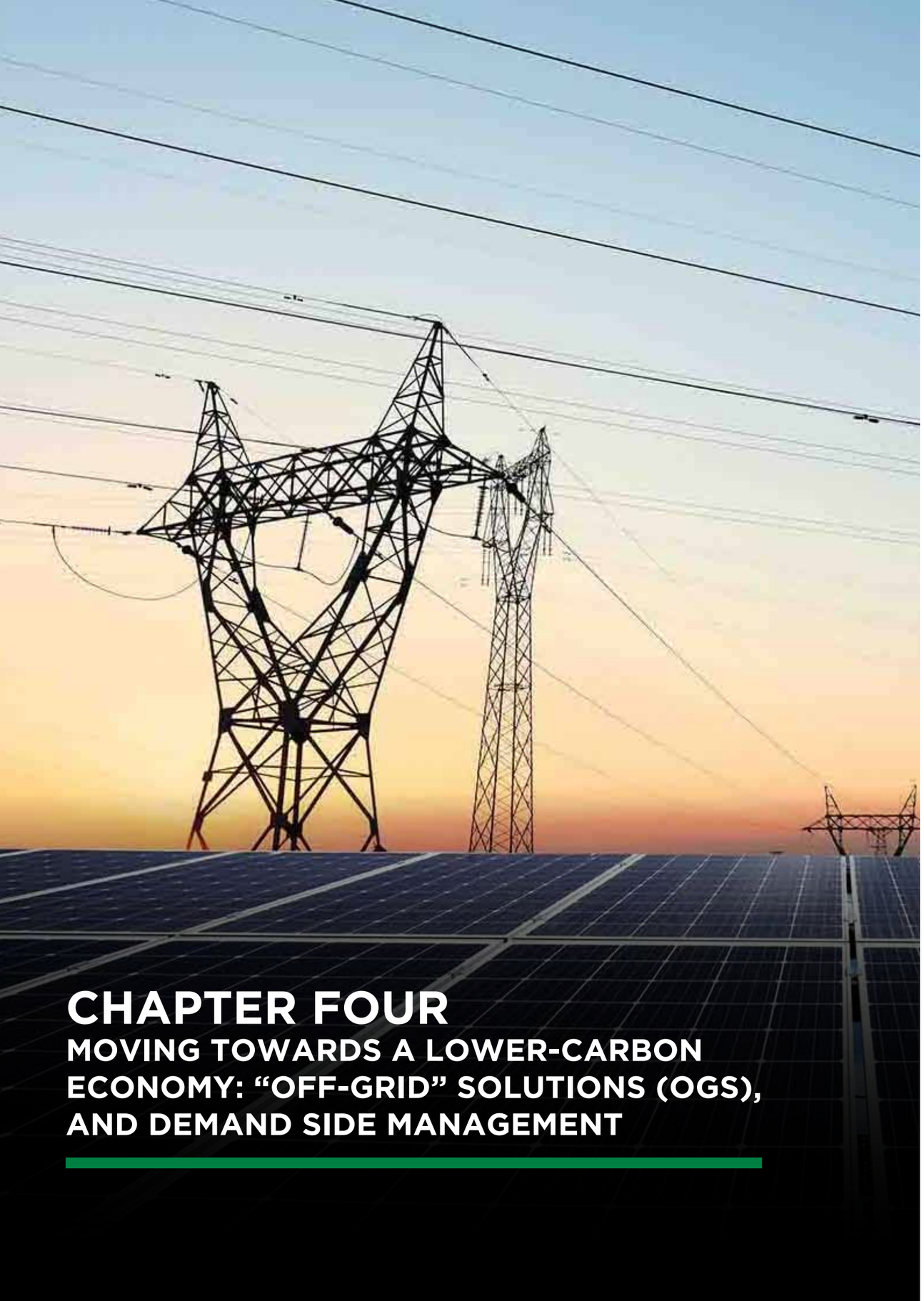
Apart from the envisaged increase in natural gas-fired generation in the State from both onshore and offshore resources, there are also prospects for electricity supply from grid-scale and (perhaps in future) home-based renewable energy systems. These potential sources of supply create the prospects for developing multiple generation and transmission connections in and around the State to receive bulk energy from IPPs and move them to customer clusters within the State.

» **3.26**

As new bilateral PPAs are agreed and existing ones are expanded under the IRP, new and expanded transmission grid capacity will be required to receive and deliver increasing amounts of energy. The prospective expansion both in sources of supply and grid connections to deliver supply to customers will in turn create a need for a State-based independent system operator (ISO). In any of these scenarios, an ISO is vital to the efficient, non-discriminatory scheduling and dispatch, as well as the reliable and timely administration of trading and settlement systems based on contracts between multiple generation, transmission, and distribution market participants.

» **3.27**

The opportunity therefore arises for all market participants in the Lagos Electricity Market to establish a mutually owned independent entity to develop relevant market rules and apply them in directing the flows of bulk electricity and equivalent cash amongst these market participants. The Lagos ISO will also manage the State electricity market's connection with the national grid; especially given the future prospect of traders located inside Lagos State buying from IPPs outside the State. The ISO, being mutualized and not-for-profit, will be empowered to take responsibility for systems planning and the competitive procurement of bulk electricity and ancillary services for least cost trading of electricity in the State under the Lagos IRP.



CHAPTER FOUR
MOVING TOWARDS A LOWER-CARBON ECONOMY: "OFF-GRID" SOLUTIONS (OGS), AND DEMAND SIDE MANAGEMENT

» **4.1**

As Lagos State's population continues to grow and the State itself continues along the inevitable road towards mass urbanization, its energy needs will also continue to grow. Just as it is impossible to ignore the global demand for economies to deploy policy tools in lowering their carbon emissions/footprint, so also is it apparent that the State cannot continue to depend for its energy needs on the fleet of distillate-burning off-grid generators that are the true baseload source of electricity in the State. The demand on the State Government, therefore, is to develop policy options and tools that contribute to meeting the demand for access to electricity while steadily lowering in real terms the carbon emissions that meeting this demand generates.

» **4.2**

Today, Lagos State's electricity needs are met by approximately 16,000MW of electrical capacity comprising 1000MW from the grid (and in turn, this is supplied approximately 25% by hydroelectric and 75% by natural gas thermal plants). On the other hand, the other 15,000MW – the off-grid generator fleet that really drives Lagos forward – is powered almost entirely by distillate fuels, with a very small percentage being generated by renewables and an even smaller percentage being natural gas-fired. This vividly illustrates the extent of work that is yet to be done in significantly reducing carbon emissions generated in the State from this activity.

Off-Grid Solutions

» **4.3**

Regardless of the significant stock of generation capacity in Lagos, there are still significant populations in various areas within the State that are underserved or even unserved by the existing national grid and who have no access to, or cannot afford the cost of maintaining off-grid generators. The draft Lagos IRP load forecast estimates that 31% of households in Lagos were connected to the national grid in 2020 based on the total number of registered customers. This implies that currently, 69% of households in Lagos are effectively unconnected or off-grid. The load forecast also assumes that the highest number of registered customers in Lagos as at 2019 are residential customers (1,294,448) compared to those in the commercial (341,582) and industrial (6,323) customer classes. These numbers demonstrate that it would take an inordinately long time to get Lagos State's 27 Million residents, particularly those in the unserved and under-served households to be grid connected even before taking demographic growth into account.

» **4.4**

Many unserved and under-served areas of the State aggregate sufficient demand but are perceived as being "unviable" or unable to afford service. According to a Power for All Report , the cost of a single grid connection is about $2,500. On the other hand, a typical Solar Home System project typically costs less than $100 per connection which can be delivered within a matter of hours, with an extensive reach constrained only by the availability of technical personnel, project management capacity and capex funding. Furthermore, although mini grid projects are more expensive, they are faster and cheaper than grid extension projects as they typically cost about $500 per connection with a delivery timeline of about 4 months. (Power for All Report (2016) *Decentralized Renewables: The Fast Track to Universal Energy Access*.)

» 4.5

In Lagos, where issues of poverty reduction, social equity and inclusion are critical, OGS presents solutions that enable the delivery of clean energy access to the people, particularly to the poor and vulnerable. Very importantly, OGS also offers the prospect of cost-effective, fast, and cleaner means of electricity for the SMEs that are the backbone of the State's economy. Effectively deployed, OGS can play a significant role in catalysing job creation and socio-economic development.

» 4.6

OGS also offer a cost-efficient way to improve the resilience and independence of public and social infrastructure, which is a key element of this Administration's T.H.E.M.E.S. agenda. From 2015 till date, Lagos State, with funding support from the UK Government under the Solar Nigeria Programme, has 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. These existing programmes will be expanded, and new ones will be initiated in an institutional and structured manner.

» 4.7

The Ministry of Energy and Mineral Resources will be the coordinating authority for OGS schemes in the State. It will and develop a State OGS Strategy and Plan that:

4.7.1 Defines the State's short-, medium-, and long-term targets for OGS.

4.7.2 Maps areas, communities and clusters that would be best suited for the utilization of OGS

4.7.3 Articulates the role of the State in incentivizing and providing the enabling environment to catalyse private sector investment in creating an OGS ecosystem.

4.7.4 Establishes a Lagos State Off-grid Electrification Agency as the executing agency for the State OGS Strategy and Plan working with relevant State, Federal Government MDAs and private sector players.

4.7.5 Provides a basis for developing education, research, sensitization, consumer protection, and capacity building programmes for OGS in the State.

4.7.6 Sets out regulatory principles applicable to OGS and e-waste in the State.

4.7.7 Promotes gender and social inclusion in driving electricity access;

4.7.8 Recognizes OGS as a vital component of the State IRP; and

4.7.9 Provides a Monitoring & Evaluation (M&E) framework to track the implementation of the State OGS Strategy and Plan, and attainment of the State's OGS objectives.

» 4.8

The OGS Plan will identify all unserved or underserved areas and communities of the State by name and identify the OGS most likely to be cost-effective in serving each identified area or community. It will also discuss the nature of incentives that may be provided to these areas and communities and the operators that wish to undertake connections to these communities; identify the key players in implementing the Plan and the roles they will be expected to play either on their own or in collaboration with the Lagos State Off-grid Electricity Agency.

Demand Side Management (DSM)

» 4.9

The State Government will promote strategies to conserve energy and reduce overall demand for electricity (particularly during identified peak periods). These DSM measures are expected to benefit all stakeholders – Lagos residents, electricity utilities, and the society at large; reduce electricity bills, reduce the overall electricity demand, improve reliability, reduce public electricity expenditure, and improve economic development.

» 4.10

Electricity supply has remained inconsistent, unreliable, and inadequate thus far, and large commercial and industrial users are largely self-supplying. Nevertheless, supply is expected to grow, and the State Government will establish and drive the implementation of 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 growing the Lagos Electricity Market becomes more efficient and reliable.

» 4.11

The Ministry of Energy and Mineral Resources will be the coordinating authority for DSM schemes in the State and develop a State DSM Strategy and Plan that:

4.11.1 Defines the State's short-, medium- and long-term DSM program targets and incentives.

4.11.2 Articulates the role of the State in incentivizing and creating an enabling environment to encourage the DSM measures.

4.11.3 Defines the role of key stakeholders in the implementation of the policy.

4.11.4 Outlines 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.

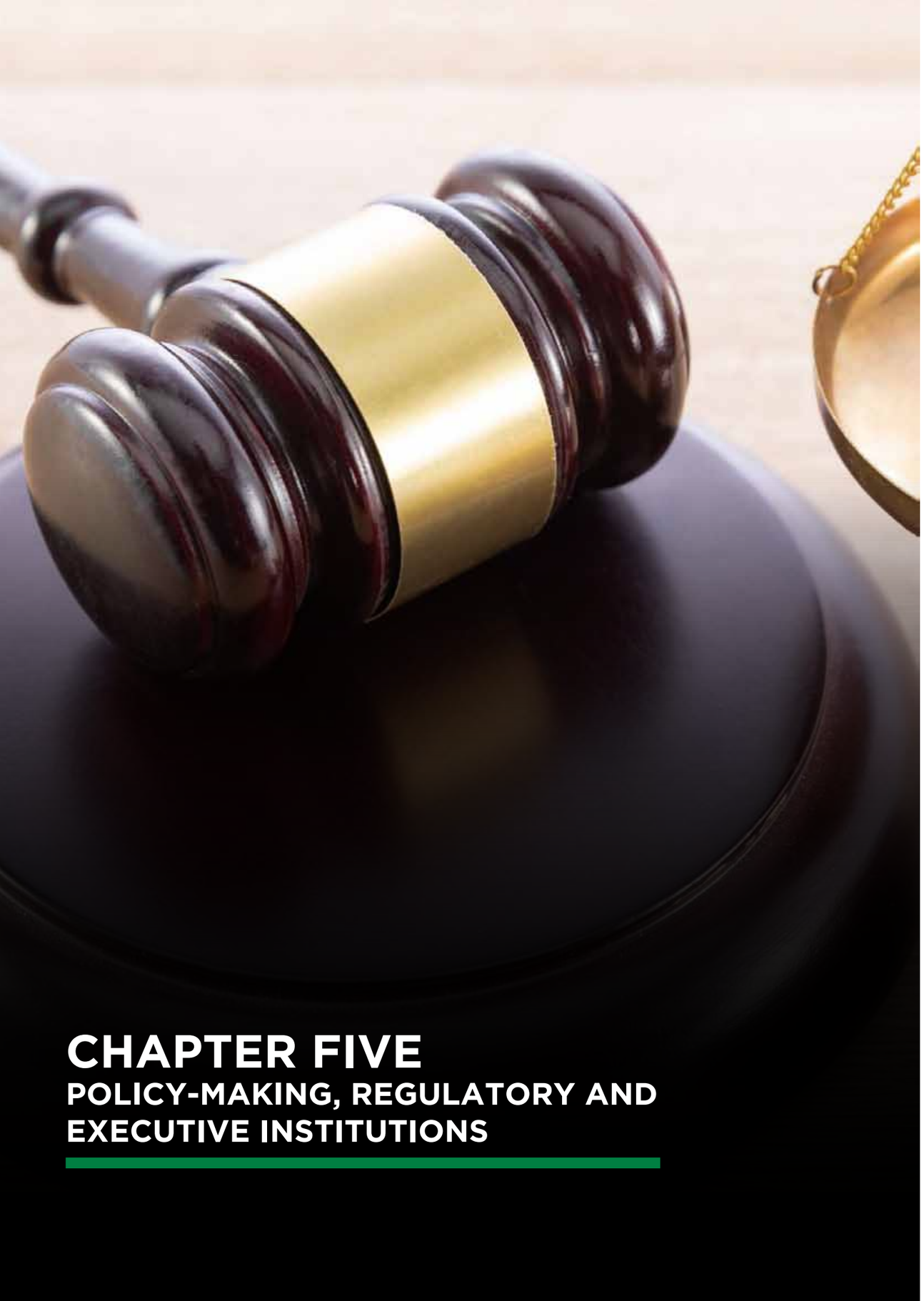
4.11.5 Establishes priority activities to be implemented annually.

4.11.6 Ensures a DSM program monitoring system for data collection and track impact.

4.11.7 Incorporates DSM in the State's Integrated Resource Planning and Data gathering.

4.11.8 Assigns responsibility for the specification, collection, storage, maintenance, and supply of relevant DSM data, according to the requirements of the IRP and international standards; and

4.11.9 Provides for annual reviews, audits and reporting to the DSM programs including their costs and benefits (including targets and achievements).



CHAPTER FIVE
POLICY-MAKING, REGULATORY AND EXECUTIVE INSTITUTIONS

» 5.1

The key public sector institutions in the Lagos Electricity Market and their roles are:

5.1.1 The Lagos State Government:
The three arms of Government in the State will provide a platform for the coordination of policies by the Executive, the making of laws by the Legislature and subsidiary legislation by the regulator. The Judiciary will continue to play its established role in interpreting relevant laws and resolving disputes involving market participants that are properly brought before it. The Judiciary will also exercise jurisdiction in adjudicating all cases of electricity theft, malpractice, and other criminal matters under the enabling Law to be enacted hereafter. Special arrangements will be made by the Ministry of Energy and Mineral Resources, working with the State Ministry of Justice and the Lagos State Police Command to focus directly and sharply on electricity-related crimes and ensure their immediate prosecution.

5.1.2 The Lagos State Ministry of Energy and Mineral Resources:
The Ministry will lead the Executive Branch role, and represent the State, in policy development in all aspects of electricity, energy and their related issues. In addition, the Ministry will have supervisory responsibility for the Lagos State Off-grid Electrification Agency and manage the relationship between the Executive and the State House of Assembly in the latter's exercise of its oversight responsibility.

5.1.3 The Lagos Electricity Regulatory Commission: The nature and regulatory responsibilities of the Lagos electricity regulator have been discussed in Paragraphs 3.10 – 3.11 above. The Regulator's primary objective will be the creation of a credible, rules- and contract-based electricity market for the State into which capable, well-managed, well-financed entities are incentivised to enter and remain. To this end, the State Government will seek out and appoint well-qualified citizens as Commissioners and staff of the Regulator and provide them with enough financial, physical and training resources to enable them settle down quickly to their very important tasks.

5.1.4 The Lagos Independent System Operator: The nature of the Lagos ISO has also been discussed previously in Paragraphs 3.25 – 3.27. The Lagos State Government, through the Ministry of Energy and Mineral Resources will foster the establishment of the ISO by creating a unit that will take custody of its draft IRP already prepared and design the various processes and the technical and commercial frameworks for establishing the Lagos ISO.

5.1.5 The Lagos State Electricity Board (LSEB): The LSEB is the implementing agency under the Lagos State Ministry of Energy & Mineral Resources responsible for the State's independent power project and public lighting programmes. Its 1980 enabling Law also confers on it the power to undertake generation, transmission and distribution of electricity to areas not covered by the national grid system within Lagos State. The Law to implement this Policy will re-establish this entity and focus it particularly on working with stakeholders to bring electricity access to the unserved and underserved areas Lagos through a State Electrification Fund that it will custody and deploy via transparent procurement process. This successor agency will also continue to maintain focus on the LSEB's historical responsibility for public lighting.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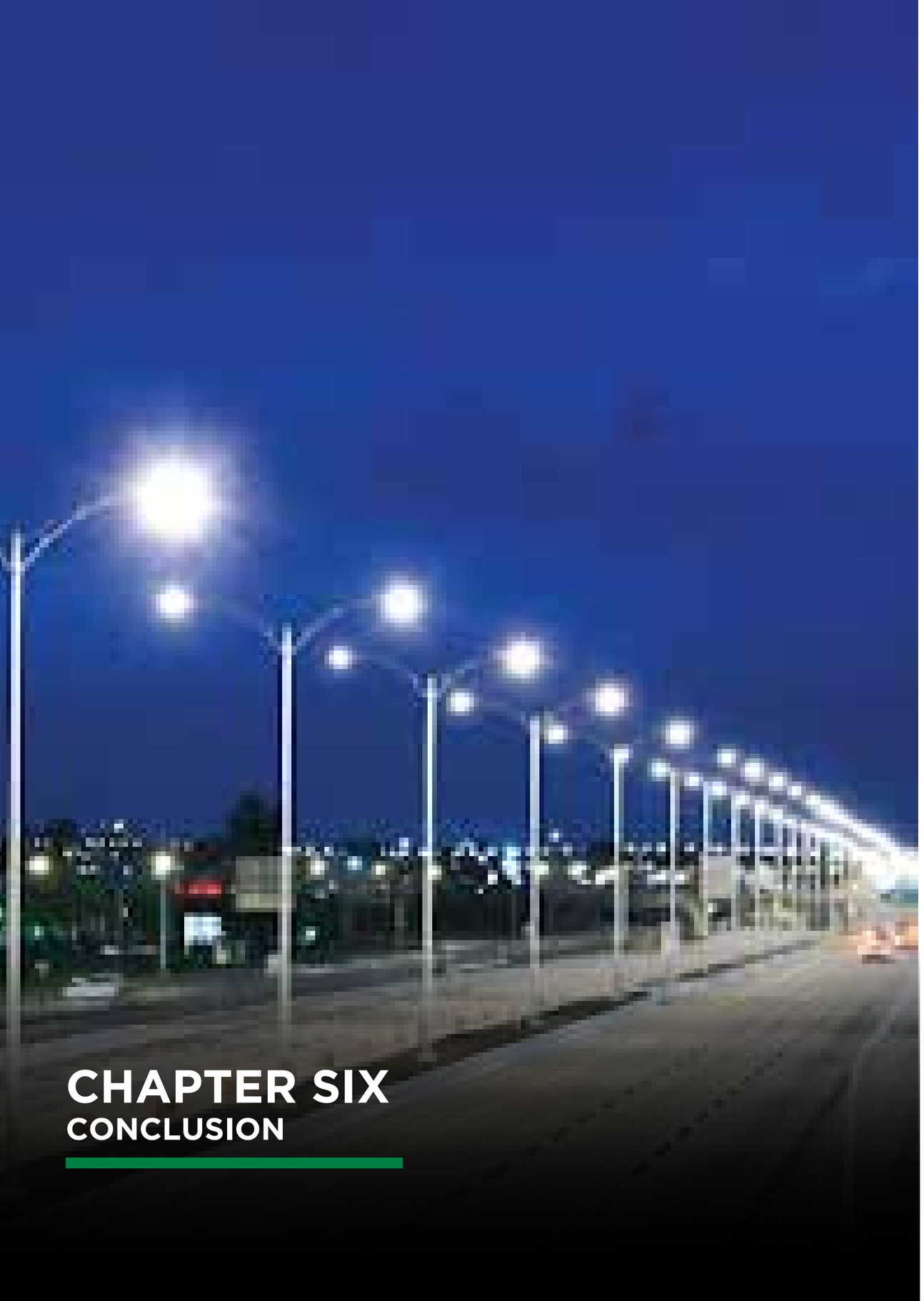

CHAPTER SIX
CONCLUSION

» 6.1

This Lagos State Electricity Policy details the Lagos State Government's strategic intent for assuring universal reliable electricity supply to the residents of Lagos State. The framework described here will be more particularly enacted in a law that identifies key stakeholders in the market and defines their roles in delivering service to residents of Lagos State. It will also establish the key elements of the commercial framework in which electricity procurement and market operations are to be carried out. In addition, the Law will provide for a standard regulatory framework for enabling participation and operations in the market as well as enhancing and protecting consumer rights. Furthermore, the Law will outline the methods for enabling universal access to electricity by the unserved and underserved population in the State through the State Electricity Fund that it will establish under the custody of the LSEB.

» 6.2

The Lagos Electricity Market (LEM) will be independent of, but also connected with, the national grid system particularly regarding cross border electricity trading in both directions across the State border. The LEM will enable 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 and the establishment of an ISO for Lagos State. It will also develop a commercial framework to enable energy trading between generators and distribution entities within the State. Such a policy/legal framework will be the reference point for operations, financing and related activities in the Lagos electricity market.

» 6.3

This Policy will serve as a key enabler for Lagos State's aspiration to become an advanced economy by driving the achievement of universal access to reliable and affordable electricity in the State. This will improve the ease of doing business and boost the economic growth of the State. We look forward to the unqualified support of all relevant stakeholders as we seek to realise the laudable objectives of this Policy together.

ENGR. OLALERE ODUSOTE
HON. COMMISSIONER
MINISTRY OF ENERGY AND MINERAL RESOURCES
LAGOS STATE GOVERNMENT

APPENDIX ONE

These TCN sub-stations deliver energy into the EKEDC network through 42 x 132/33kV transformers. These in turn feed energy through 87 x 33kV feeders comprising 50 underground and 37 overhead feeders. These 87 feeders supply 104 x 33/11kV transformers across 52 injection substations. These 104 transformers feed into 300 x 11kV feeders. Delivering energy directly to customers from these 387 33kV and 11kV feeders are are 9,079 x 11kV/0.415kV distribution transformers and 1601 x 33/0.415kV distribution transformers. The Disco's total 415v line length is almost 8,000km. The current reported total transformation capacity of the EKEDC network is 1,537.5MVA (approximately 1,230MW of capacity).

APPENDIX TWO

TCN's Ikeja-West and Egbin Sub-Regions deliver a total transformation capacity of 2,375MVA via 17 TCN 132kV/33kv transmission sub-stations. 89 33kV feeders, comprising of 21 underground and 68 overhead feeders supply 33/11kV power transformers across 113 injection substations. 281 11kV feeders are energized for onward downstream power distribution. There are 16,412 11/0.415kV distribution transformers and 1,302 33/0.415kV distribution transformers served by Ikeja Disco, with a total line length of almost 37,000km. The total transformational capacity of the 11/0.415kV and the 33/0.415kV distribution transformers are 3,499.9MVA (4,200MW) and 991.9MVA (1,190MW) respectively.