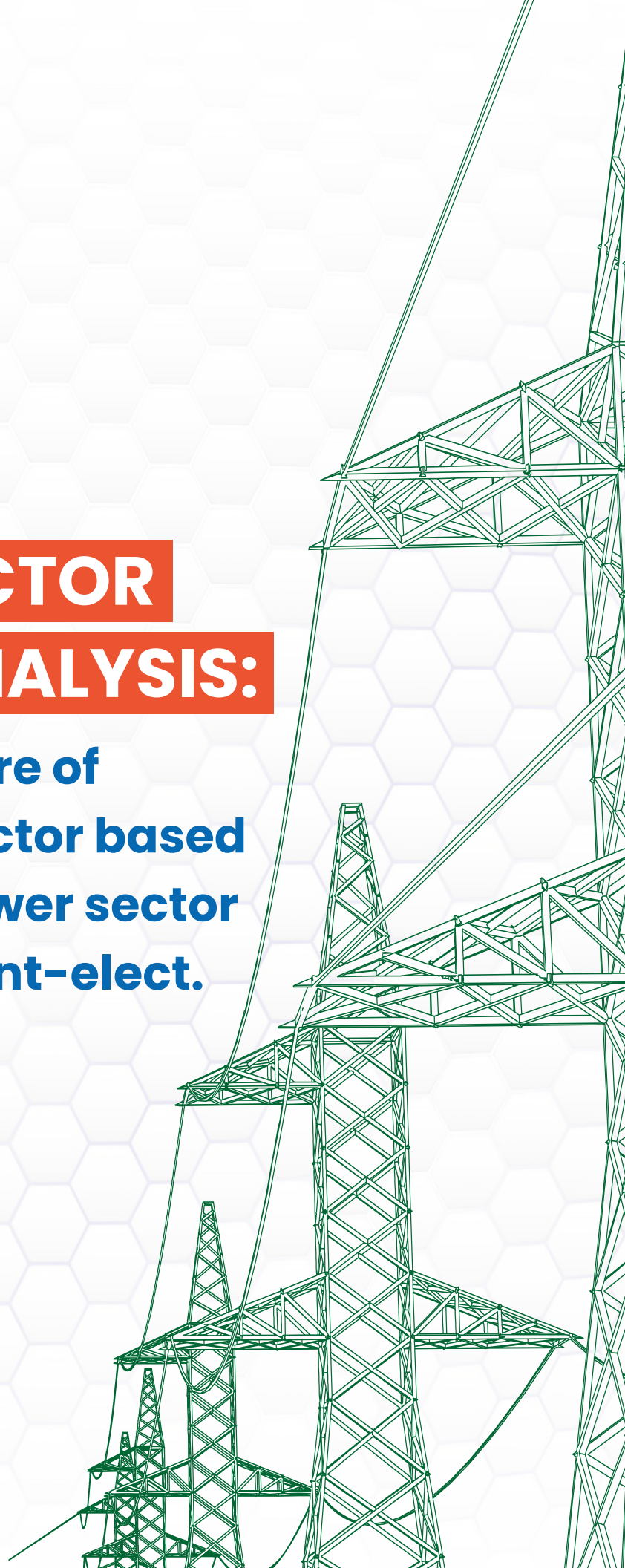


EL POWER SECTOR SCENARIO ANALYSIS:

**Projecting the future of
Nigeria's power sector based
on the six point power sector
plan of the President-elect.**



Content

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Table of Abbreviations

APC	All-Progressive Congress
bcf/yr	Billion standard cubic foot per year
bscfd	Billion standard cubic foot per day
BAT	Bola Ahmed Tinubu
BAUS	Business-as-usual Scenario
CBN	Central Bank of Nigeria
CCS	Carbon capture and storage
CCUS	Carbon capture, utilisation, and storage
CITA	Companies Income Tax Act
COP26	Conference of the Parties 26
Discos	Distribution Companies
EPSRA	Electric Power Sector Reform Act, 2005
FBU	Fully Built Unit
GACN	Gas Aggregation Company of Nigeria
GFP	Governance Framework Projection
GW	Gigawatt
GHG	Greenhouse Gas
Gencos	Generation Companies
IPP	Independent Power Producers
RATS	Reasonable Ambitious Target Scenario
REA	Rural Electrification Agency
H.E	His Excellency
HATS	High Ambitious Target Scenario
ISO	Independent System Operator

LMMA	Local Meter Manufacturers/Assemblers
LNG	Liquified Natural Gas
Mcf/mmscfd	Million standard cubic feet per day
MW	Megawatt
MAP	Meter Asset Provider Scheme
NAPTIN	National Power Training Institute of Nigeria
NBET	Nigerian Bulk Electricity Trading Company
NEDC	North-East Development Commission
NEEAP	National Energy Efficiency Action Plan
NEMSA	Nigerian Electricity Management Services Agency
NEPA	National Electric Power Authority
NEPP	National Electric Power Policy
NERC	Nigerian Electricity Regulatory Commission
GHG	Greenhouse Gas
NESI	Nigerian Electricity Supply Industry
NETP	Nigeria Energy Transition Plan
NGP	National Gas Policy
NIPC	Nigerian Investment Promotion Commission
NMMP	National Mass Metering Programme
NREEEP	National Renewable Energy and Energy Efficiency Policy
PIA	Petroleum Industry Act
REA	Rural Electrification Agency
REMP	Renewable Energy Master Plan
REPG	Renewable Energy Policy Guidelines
REREA	Rural Electrification and Renewable Energy Agency
SE4ALL	Sustainable Energy 4 All
scuf	standard cubic feet

INTRODUCTION: BAT'S (BOLA AHMED TINUBU'S) SIX POINT POWER SECTOR PLAN, 2022



INTRODUCTION: BAT'S (BOLA AHMED TINUBU'S) SIX POINT POWER SECTOR PLAN, 2022

In an Action Plan for a Better Nigeria titled “**Renewed Hope 2023**”, Asiwaju Bola Ahmed Tinubu (BAT), the political candidate for the All-Progressive Congress (APC) and now President-elect itemised 6 plans for the power sector under his leadership which are:

- 1) **Put an end to estimated billing in Nigeria**
- 2) **Promote domestic manufacturing of prepaid meters**
- 3) **Focus on solar energy**
- 4) **Increase rural electrification**
- 5) **Promote Gas-to-power on a priority basis**
- 6) **Update the power sector governance reform**

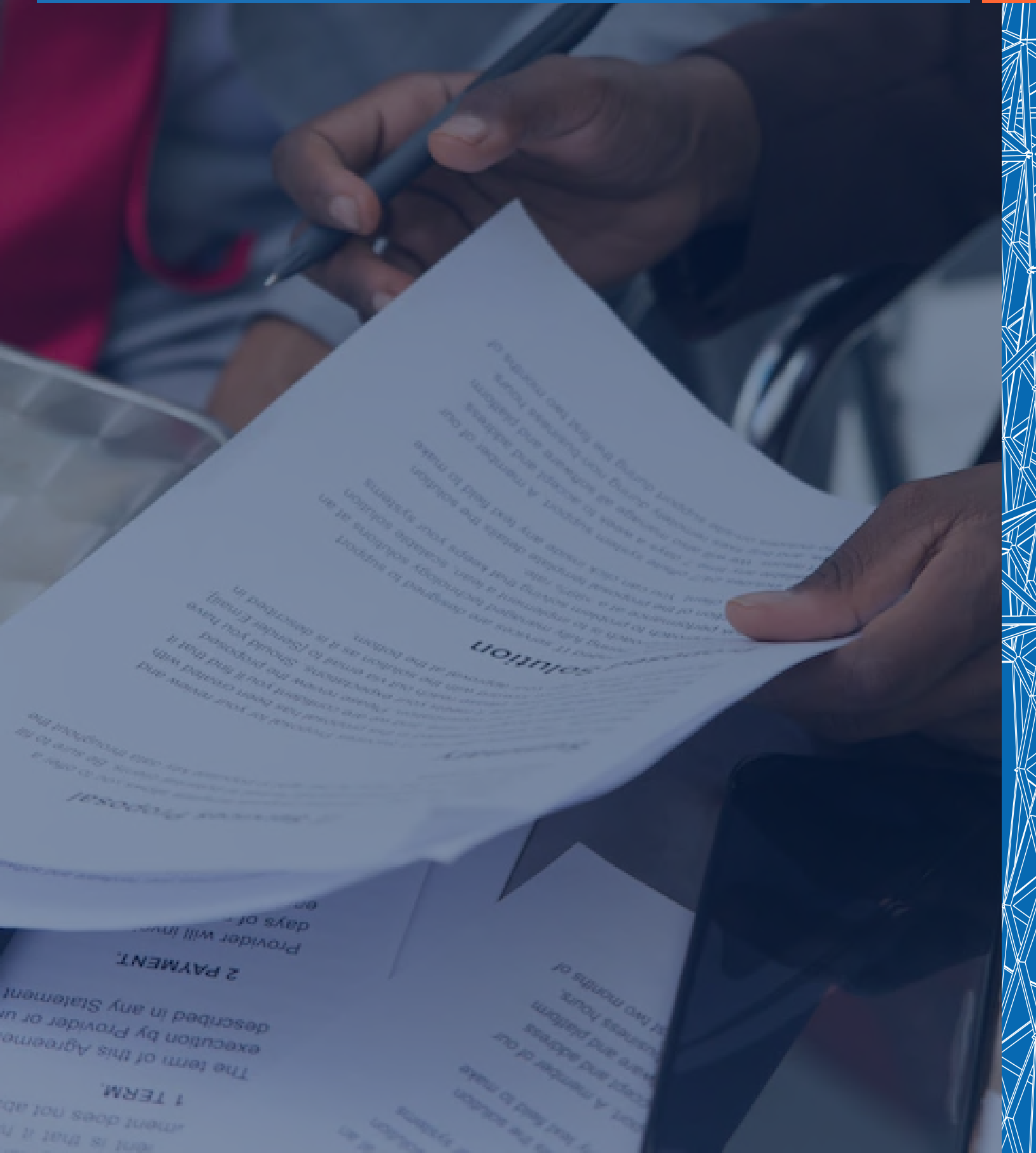
This report provides a detailed analysis of the six-point plans by deploying quantitative and qualitative methods including scenario analysis capturing the **business-as-usual scenario, reasonable ambitious target scenario and high ambitious target scenario**, to assess the current base case and project futuristic scenarios (target scenarios) drawing from the plan, alongside current realities.

The **business-as-usual scenario (BAUS)** examines the prospect of the plan based on a projected timeline in years, in line with current realities in the sector, the **reasonable ambitious target scenario (RATS)** examines the prospect of the plan following the introduction of a reasonable degree of change over a projected timeline in years and the **high ambitious target scenario (HATS)** examines the prospect of the plan based on an optimistic degree of change over a projected timeline in years; revealing the progression in the outcome(s) from the business as usual scenario across other target scenarios.

The report further assesses the legal and regulatory framework(s) for each identified scenario options, the legal, policy and regulatory gaps and where applicable, proffers key recommendations.

The Electricity Bill, 2022 is currently under consideration by the National Assembly. The Bill is set to replace the primary legislation governing the electricity sector (the Electric Power Sector Reform Act, 2005). Therefore, the analysis of each legal and regulatory framework concludes with a consideration of the provisions of the Electricity Bill with respect to each plan in anticipation of the possibility of its eventual passage into law.

EXECUTIVE SUMMARY



EXECUTIVE SUMMARY

1. This Report projects the future of Nigeria's power sector based on the six point power sector plan encapsulated in an Action Plan for Nigeria titled "**Renewed Hope 2023**", as postulated by the President Elect of Nigeria (Asiwaju Bola Ahmed-Tinubu).
2. The six (6) plans include: **(i) Put an end to estimated billing in Nigeria, (ii) Promote domestic manufacturing of prepaid meters, (iii) Focus on solar energy, (iv) Increase rural electrification, (v) Promote Gas-to-power on a priority basis, (vi) Update the power sector governance reform.**
3. The report provides a detailed analysis of the six-point plans by deploying quantitative and qualitative methods including scenario analysis capturing the **Business-as-Usual Scenario, Reasonable Ambitious Target Scenario (RATS) and High Ambitious Target Scenario (HATS)**, to assess the current base case and project futuristic scenarios (target scenarios) drawing from the plan, alongside current realities.
4. **Plan 1** focuses on putting an end to estimated billing and intends to ensure that all homes and businesses connected to the grid are metered by building on President Buhari's administration's National Mass Metering Programme (NMMP) and Net Meter Asset Provider Scheme (MAPS) and mandate Distribution Companies (Discos) to charge cost-reflective tariffs for power supply.
5. Using quantitative data by NERC which reported that 57.7% of electricity consumers in the country were still on estimated billing as of September 2021, the **Business-as-Usual Scenario**, anticipates a continuous decline in the number of metered customers attributed to the temporary suspension of the NMMP, resulting in a slow rise in the percentage of metered customers currently recorded to be 57.05%.
6. Under a **Reasonable Ambitious Target Scenario**, the result of the analysis anticipates a sharp rise in meter connections at a pace of 1,913,666 meters annually over the space of three (3) years, which will result in an estimated 33% increase per year in metered connections, amidst all unmetered customers, with 99%-meter connections by 2026.
7. Under a **High Ambitious Target Scenario**, a sharp rise in the percentage of metered customer is anticipated in a scenario where 2,870,500 meters (which is half of the unmetered customers) are provided annually in the space of two (2) years, leading to a 50% increase per year and all registered customers being metered by 2025.

8. **Plan 2** focuses on encouraging the domestic manufacturing of prepaid meters by reducing import levies on manufacturing inputs and providing other forms of support for domestic manufacturers.
9. On a **Business-as-Usual Scenario**, using available quantitative data by NERC, multiplication of meter manufacturing locally is expected to be slow as it continues to be riddled by mitigating factors including the lack of finance and other support mechanisms.
10. Under a **Reasonable Ambitious Target Scenario**, using the statistics regarding available manufacturing capacity while working towards the Federal Government's target to close the metering gap in 18 months, a reasonable ambitious target scenario is projected to produce 200,000 units of meters annually and a steady increase in capacity to about two (2) million meters within two (2) years, which is an estimated 25% increase in local manufacturing of meters by 2025.
11. Under a **High Ambitious Target Scenario**, building on available data regarding the manufacturing capacity and based on the target to close the metering gap of 8.1 million in 18 months, a swift increase in meter manufacturing is anticipated with increased meter manufacturing capacity, leading to about four (4) million additional meters in two (2) years. This is an estimated 40% increase of local manufacturing of meters by 2025.
12. **Plan 3** focuses on solar energy and projects to continue working with stakeholders to increase Nigeria's solar energy capacity and create more opportunities for policy development and increase investments to enable more solar-based projects for households and businesses.
13. Examining this plan under a **Business-as-Usual Scenario**, using quantitative data, electricity generated from solar power in Nigeria amounted to 40 gigawatt hours in 2020, which is a stable increase from the preceding year.
14. Projecting a **Reasonable Ambitious Target Scenario**, it is anticipated that if Nigeria produces 1.3 GW annually for seven (7) years, there will be a solar capacity of 9.1 gigawatts by 2030, resulting in an estimated 14.1% increase annually and a total of 99.6 % increase in solar capacity by 2030.
15. On a **High Ambitious Target Scenario**, using the same statistics of achieving 9 GW by 2030 based on the 30% policy target, and the introduction of higher tax incentives, if the country produces 2 GW of solar energy per year, a solar capacity of 10 GW is achievable by 2028 leading to an estimated 99.7% increase in solar capacity by 2028, and a 20% increase annually.

16. **Plan 4** aims to increase rural electrification by streamlining and relaxing regulations to enable the private sector, and local and state government actors to electrify rural Nigeria safely and securely.
17. On a **Business-as-Usual Scenario**, assuming the current rural electrification rate of 5.3% per year (revealed by quantitative data) is maintained for the period of 2023 – 2030, Nigeria can be projected to achieve a rural electrification rate of 81.4% by 2030.
18. On a **Reasonable Ambitious Target Scenario** projection, assuming a rural electrification rate of 90% by 2030, a 6.3% rural electrification rate is anticipated to be achieved per year for the period of 2023 – 2030.
19. On a **High Ambitious Target Scenario**, projecting a 7.6% of rural electrification per year for the period of 2023 – 2030, a rural electrification rate of 100% electricity access rate is anticipated by 2030.
20. **Plan 5** focuses on Gas-to-Power and aims to create policies to enable gas resources to be harnessed on a priority one basis, to be used to generate power and support power projects that can be delivered quickly to optimize power grid reliability, grid interconnectedness, and grid wheeling.
21. On a **Business-as-Usual Scenario**, the average operational capacity of 3879MW per day generated requires 887.6mmscfd gas-to-power utilisation.
22. On a **Reasonable Ambitious Target Scenario** projection, a gas-to-power supply based on the total average available power plant capacity of 7141MW per day on a priority one basis, anticipates a projected 1634mmscf gas to power supply by 2030, equivalent to 596.41bcf/yr; which is reasonably close to the Nigeria's Energy Transition Plan's projection of 504bcf/yr gas-to-power consumption by 2030 and can therefore be regarded as falling within the NETP's 2030 projection..
23. On a **High Ambitious Target Scenario** projection, if Nigeria achieves a gas-to-power supply based on the total installed power plants generation capacity of 12,522MW per day on a priority one basis, Nigeria can project 2865.5mmscfd gas to power supply by 2030.
24. **Plan 6** focuses on updating the power sector governance reform and aims to review and update the Electric Power Sector Reform Act of 2005 and reform the regulatory and governance structure of the country's power sector and to also expand Nigeria's power base to include coal, solar, hydropower, and other sustainable energy technologies.
25. Projections in Plan 6 are based on selected parameters including **State Participation in Electricity Value Chain activities in areas covered by the National Grid and Review of National Electricity Policies and Plans, Revamped Institutional Framework for the**

Nigerian Electricity Supply Industry, Market Stages – Phased development of the Electricity Market, Expanded Licensing Framework, Renewable Energy, Private Sector Investment in the Transmission Network, Independent System Operator, Industry Bundle: Tariffs, Subsidies, Distribution Franchising, and Electricity Theft and Resolving Disputes in the Power Sector which are all linked to key provisions in the Electricity Bill, 2022 in comparison to the status quo scenario, i.e., the Electric Power Sector Reform Act, (**EPSRA**) 2005.

26. Plan 6 also anticipates future policy projections relating to the expansion of Nigeria's power base to include coal, solar, hydropower and other sustainable energy technologies. Cleaner mechanisms such as carbon capture and storage (CCS) can be explored to allow for the utilisation of coal as a clean energy source; nevertheless, due consideration must be given to the policy elements in embarking on a CCS ready approach in Nigeria.

PLAN 1: PUT AN END TO ESTIMATED BILLING



PLAN 1: PUT AN END TO ESTIMATED BILLING

- **Ensure that all homes and businesses connected to the grid are metered by building on President Buhari's administration's National Mass Metering Programme (NMMP) and Net Meter Asset Provider Scheme (MAPS).**
- **To mandate Distribution Companies (Discos) to charge cost-reflective tariffs for power supply.**

➤ **General Overview**

A meter or electric meter is a device that measures the amount of electric energy consumed by a building or other related facility(ies). In addition to existing benefits of the use of meters, is its ability to enable utility companies adequately recover the cost of electricity distributed based on measured energy and the ability of electricity consumers to regulate their electricity consumption.

Estimated Billing is a system of charging unmetered electricity consumers for electrical energy consumed based on previous usage patterns, without considering the actual quantity of energy consumed. The Nigerian Electricity Regulatory Commission (**NERC**) reported that 57.7% of electricity consumers in the country were still on estimated billing as of September 2021. NERC further reported that 288,431 meters were installed in 2021/Q3, compared to 315,717 meters installed in 2021/Q2. Furthermore, of the 11,069,200 registered energy consumers as of September 2021, only 4,753,027 (42.93%) have been metered, compared to 4,404,013 (39.08%) metered customers as of June 2021, of the 11,058,939 registered customers.

In 2018, NERC introduced the **Meter Asset Providers ("MAP") Regulation** which requires a licensed Disco to attain metering targets for its customers. Discos are further expected to procure the services of a licensed MAP and make periodic disbursements to the MAP. The Federal Government also introduced the **National Mass Metering Programme (NMMP)** as part of its effort to bridge the metering gap in Nigeria. The programme in collaboration with local meter manufacturers is aimed at providing smart prepaid meters to all unmetered customers, thus accelerating the rate of metering in the country.

The newly elected administration promises that by ensuring that all electricity bills are based on metered energy quantities consumed, an end will be put to the controversial practice of estimated billing. It is expected that they will work to ensure that all power connections are accurately metered in the shortest amount of time by streamlining and speeding up current programs like the National Mass Metering Project and the Meter Asset Provider Scheme.

➤ **Current Status (Business as Usual Scenario)**

According to information provided by NERC in its most recent 2022 quarterly report, there were 10.514 million registered customers as of December 31, 2021, out of which only 4.773 million (45.40%) had meters installed. There was a significant slowdown in the deployment of meters in the 2022 report under review, according to NERC, who reported that just a pitiful 81,084 new end-user consumers were metered. When compared to the 288,154 meters deployed in Q3 of the reference year, this implies a decline of 71.86%. This considerable reduction was occasioned by the suspension of the phase two of the NMMP which had been the primary factor in the significant advancements in consumer metering that was documented throughout 2021. Report reveals that more meters were disbursed under NMMP compared to the Meter Asset Provider (MAP) initiative. Only 10,408 (12.84%) customers were metered under the Meter Asset Provider (MAP) intervention, according to NERC, out of the 81,084 meters installed for end users over the time, with 70,676 (87.16%) done under the NMMP scheme.

The decline in the number of metered customers attributed to the temporary suspension of the NMMP will continue to spiral under a [business-as-usual scenario](#), resulting in a slow rise in the percentage of metered customers currently recorded to be 57.05%.

➤ **Projected Scenarios (RAT and HAT Scenarios)**

Reasonable Ambitious Target Scenario (RATS)

Using the statistics of NERC in Q4 of 2022, there are 5,741,000 out of 10,514,000 customers who are still on estimated billing **Under a scenario where an equally effective mechanism is introduced in addition to the NMMP as proposed**

under the President elect's manifesto, subject to its effectiveness, and working with a target of three (3) years to close the metering gap, the country will likely experience a sharp rise in meter connections at a pace of 1,913,666 meters annually over the space of three (3) years, which will result in an estimated 33% increase per year in metered connections, amidst all unmetered customers, with 99% meter connections by 2026.

This is a Reasonable Ambitious Target Scenario depicted on the yellow line in figure 1 below.

High Ambitious Target Scenario (HATS)

Reiterating the statistics of NERC in Q4 of 2022, there are 5,741,000 out of 10,514,000 customers who are still on estimated billing. **To close this gap, if the President elect's administration re-instates the NMMP programme or a similar programme that instigates financial support to Discos and local meters manufacturers, and working with a target of closing the gap in two (2) years a sharp rise in the percentage of metered customer can be anticipated in a scenario where 2,870,500 meters (which is half of the unmetered customers) are provided annually in the space of two (2) years as intended, leading to a 50% increase per year and all registered customers being metered by 2025.**

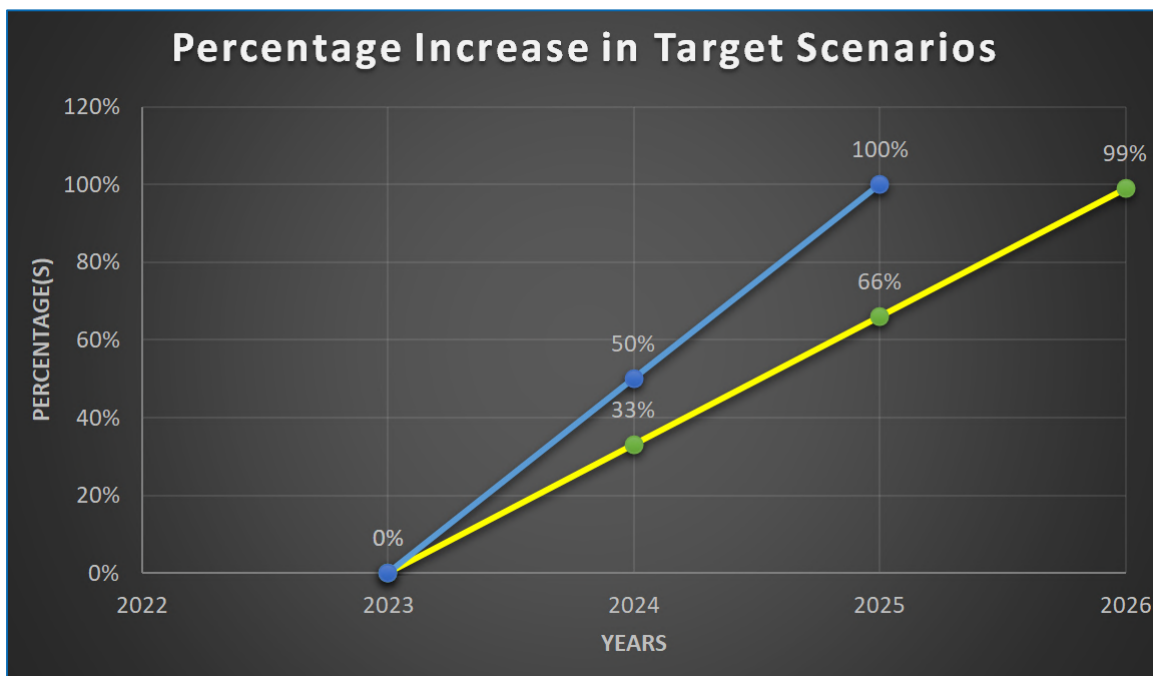
This is a High Ambitious Target Scenario which is depicted on the blue line in figure 1 below.

Diagram 1: Scenario Progression for Plan 1

High Ambitious Target Scenario	Reasonable Ambitious Target Scenario	Business-As-usual Scenario
50% increase in metered connection within 2 years, leading to about 2,870,500 meter-connected customers annually till 2025.	33% increase in metered connection within 3 years leading to about 1,913,666 meter-connected customers annually till 2026.	Decline in the yearly percentage of metered customers leading to a slow increase in the percentage (57.07%) of metered customers.

Source: Electricity Lawyer

Figure 1: Closing the metering gap in Nigeria based on the RATS and HATS Scenarios



Source: **Electricity Lawyer**

➤ **Legal & Regulatory Consideration(s)**

According to the NMMP framework, the Central Bank of Nigeria offers financial assistance to local meter manufacturers and distribution companies (Discos) to assist with the production and purchase of meters for end-use customers. This has consequently led to a cost reflective and/or service-based approach on electricity tariff rates among metered customers (customers only pay for the electricity used) as opposed to estimated billing. If this form of framework is further proliferated to alleviate the financial demand that will be a challenge to meter manufacturers and Discos, in trying to close the existing metering gap, (like the CBN does under the NMMP), there will be an increase in the rate at which the metering gap will be closed.

The National Mass Metering Regulation and NERC Meter Asset Provider Regulation 2021, already make room for closing the metering gap by providing a portion of the financial requirements for Discos to undertake meter connections with an assurance of revenue enhancement. The Regulation is a hybrid framework that combines the National Mass Metering Policy and the Meter Asset Providers (**MAP**) Regulation, 2018. (**NMMP**). The goal is to eliminate estimated billing in the NESI, promote private investment in the provision of meters/metering services in the NESI, close the metering gap through an expedited roll out of meters, and improve revenue certainties at the retail end of the NESI value chain.

The effective implementation of this Regulation will encourage the closing of the metering gap in both the high and reasonable ambitious target scenarios at the various projected timelines as represented in Figure 1 above, considering that it provides a financial cushion for Discos to charge cost reflective tariffs and for local meter manufacturers to have working capital on ground.

Legislative instruments like the NMMP are key drivers of putting an end to estimated billing and the enhancement of public and private investment in smart metering, as they may support with eliminating the financial barriers existing in the metering landscape in Nigeria. Hence, it is expected that there will be a proliferation of laws, policies and regulations governing the electricity sector like the recent Electricity Bill 2022 yet to be passed into law.

THE ELECTRICITY BILL (2022) CONSIDERATIONS

The Electricity Bill does not itemise vast provisions for estimated billing, smart metering, and other related issues.

➤ **Provision(s) of Legal and Regulatory Instruments on Projected Scenarios**

For the **projected/target scenarios**, the National Mass Metering Regulation and NERC Meter Asset Provider Regulation²⁰²¹ stipulate that the Central Bank of Nigeria will provide to the Discos and local meter manufacturers, the financial assistance they require which will in effect aid in the implementation of the abovementioned scenarios and allow for the distribution of the required number of meters to customers.

PLAN 2: DOMESTIC MANUFACTURING OF PREPAID METERS



PLAN 2: DOMESTIC MANUFACTURING OF PREPAID METERS

Encourage the manufacturing of prepaid meters by reducing import levies on manufacturing inputs and provide other forms of support for domestic manufacturers.

➤ **General Overview**

The new government seeks to lower import levies on materials used in meter manufacturing, offer other types of assistance, and provide targeted and effective tax incentives for regional businesses that produce meters to encourage competition among meter manufacturers and enable the closing of the meter gap by meeting market demand. As of January 2023, in preparation for the next stage of the government's metering initiative, the Federal Government has awarded new licenses to 20 new local meter producers, in addition to the five (5) companies recorded to have been certified in 2014, amounting to a total of 25 known local meter manufacturers. The combined capacity of available meter manufacturers in Nigeria was recorded as being able to produce over six (6) million units of meters on the assumption that all factors, including support mechanisms which the President-elect's plan seeks to provide are in place.

President Muhammadu Buhari by a decision taken, postponed for a year, the 35 percent adjustment tax imposed on fully built unit (**FBU**) electricity meters, to allow the importation of roughly three (3) million prepaid meters from China in 2020. This figure is significantly (50%) below the combined meter manufacturing capacity of all meter manufacturers in the country which is estimated at over six million. With such Presidential decisions, Nigeria runs the risk of losing more than \$600 million (six hundred million dollars) to China, which could be diverted to local meter manufacturing in Nigeria. The domestic meter producers claim that such Presidential decision undermines the efforts of the federal government to increase local content and is a deterrent to the growth of domestic capacity in the country's power industry downstream sub-sector.

Furthermore, financial and knowledge capacity barriers, obstruct the local manufacturing of prepaid meters. For instance, when importing raw materials that are not easily accessible domestically, there are significant tariff rates that must be paid;

the tax on the raw materials ranges from 5% to 40% plus additional port fees. There is a one-time payment of 10% tax on the finished meters plus additional port charges. Additionally, there is a dearth of empowerment to enhance local meter manufacturing in practical technical skills which also extends to energy meter installations and electrical building installations in the country, which leaves the government with no choice than to rely on foreign technical skills.

➤ **Current Status (Business as Usual Scenario)**

On a **Business-as-Usual Scenario**, all the above limitations highlighted reveal that there is a significant gap in the provision of support mechanisms for meter manufacturers and manufacturing in Nigeria which culminates in challenges for local meter manufacturing. Nevertheless, in terms of metering and building local capacity, the North East Development Commission (**NEDC**) in partnership with MOMAS Group empowered 150 Nigerian youths in the North Eastern part of the country, in its bid to bridge the nation's metering gap currently estimated at around 8 million. The training aimed to produce certified installers and technicians for electricity meter installations to meet the demand of Meter Asset Providers (**MAP**) within the National Mass Metering Programme (**NMMP**), as approved by the Federal Government prior to the suspension of the NMMP as earlier indicated. *Nonetheless, multiplication of meter manufacturing locally on a business-as-usual scenario is slow and will continue to be riddled by all the above highlighted factors should the status quo of inadequate support mechanisms be maintained.*

➤ **Projected Scenarios (RAT and HAT Scenarios)**

Reasonable Ambitious Target Scenario (HATS)

On a **Reasonable Ambitious Target Scenario**, using the statistics of 25 manufacturers having the capacity to produce six (6) million units of meters as mentioned above and also working towards the Federal Government's target to close the metering gap in 18 months, if five (5) local meter manufacturers are equipped with the necessary finances and/ or tax incentives or waivers; along with the technical know-how available, to produce 200,000 units of meters annually, capacity will steadily increase to about two (2) million meters within two (2) years. This is an estimated 25% increase in local manufacturing of meters by 2025.

This RAT scenario is depicted on the orange line in Figure 2 below.

High Ambitious Target Scenario (HATS)

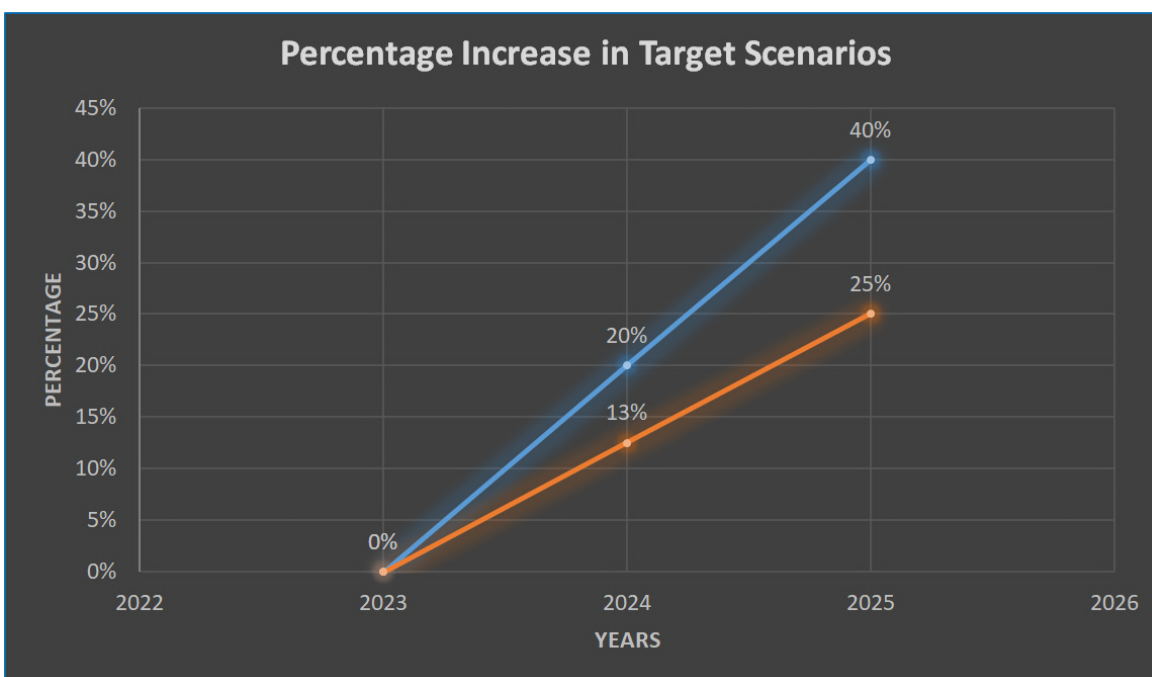
Under the **High Ambitious Target Scenario**, assuming capacity building mechanisms are intensified and persons who are trained in meter manufacturing are empowered to commence meter manufacturing in Nigeria with a mandate to train a minimum number of persons in meter manufacturing within a stipulated window of time, the country will experience a high increase in local meter manufacturing which has been a challenge as of date.

An initiative to create dedicated capital or fund for meter manufacturer(s) to acquire loans on a minimal interest basis, tax incentives and waivers, along with capacity building of local content are support mechanisms that could spur a high ambitious percentage of meter manufacturing in Nigeria by 2025.

Under this **High Ambitious Target Scenario**, considering that there is current statistics of 25 local manufacturers with the ability to produce over six (6) million meters annually as mentioned above, (estimating that each manufacturer will produce at least 400,000 – 450,00 meters annually), and a target to close the 8.1 million meter gap in 18 months, there will be a swift increase in meter manufacturing, if about five (5) local meter manufacturers are added to produce 800,000 meters each, (400,000 meters annually) within two (2) years; this will lead to about four (4) million additional meters in two (2) years. This is an estimated 40% increase of local manufacturing of meters by 2025.

This HAT scenario is depicted on the blue line in Figure 2 below.

Figure 2: Local Meter Manufacturing in Nigeria based on the RATS and HATS Scenarios



Source: Electricity Lawyer

➤ **Legal & Regulatory Consideration(s)**

As earlier opined, the National Mass Metering Regulation and NERC Meter Asset Provider Regulation 2021 already provide for local manufacturing of meters by increasing avenues for meter deployment, promoting local meter manufacturing and creating jobs in the local meter value chain. For instance, MAPs are permitted to import fully built meters subject to the requirement that a minimum of 30% of the contracted quantity of meters to be supplied by MAPs must be sourced locally in Nigeria.

Also, the NMMP framework provides for Local Meter Manufacturers/Assemblers (**LMMA**) who are eligible to provide metering services under the Manufacturer Category. These refer to local companies that will be engaged in the manufacturing or assemblage of meters in Nigeria. To be eligible, the LMMAs must show that the local manufacturing or assembling process is not less than the assemblage of 6 (six) meter components at factory level in Nigeria.

A revisit of the taxes levied on raw materials of meter manufacturing will go a long way in encouraging local manufacturers, and an increment in the percentage of locally made meters from the extant 30% local content stipulation to about 50% and beyond within the MAP and NMMP policy(ies), will help to boost patronage of local manufacturers, whilst taking advantage of the proposed tax incentives, waivers and financial boost from the government, rather than the continued reliance on importation of meters.

It is expected that future electricity laws will also promote such tax incentives and waivers for local manufacturers, within the framework of the proposed Electricity Bill.

THE ELECTRICITY BILL (2022) CONSIDERATIONS

Unfortunately, the Electricity Bill does not contain vast provisions relating to local manufacturing of electricity meters, tax incentives and capacity building of local content in metering.

➤ **Provision(s) of Legal and Regulatory Instruments on Projected Scenarios**

For the **projected/target scenarios**, there is no extant law that emphasises the increase in the capacity of local meter manufacturers, nevertheless, the National Mass Metering Regulation and NERC Meter Asset Provider, Regulation 2021 provide for financial contribution(s) to local manufacturers in the form of working capital.

**PLAN 3:
FOCUS ON SOLAR ENERGY**



PLAN 3: FOCUS ON SOLAR ENERGY

- *Continue to work with stakeholders to increase Nigeria's solar energy capacity.*
- *Create more opportunities for policy development and increase investments to enable more solar-based projects for households and businesses.*

➤ **General Overview**

The administration seeks to provide the enabling environment, institutional, legislative, and regulatory reforms required to attract foreign and domestic private sector investors, and support from donor agencies for renewable energy. More specifically, the solar energy plan will focus on all major parts of the power value chain to ensure that Nigeria takes advantage of solar deployment for increased electricity generation capacity across the country. Finally, the government seeks to encourage greater investment and research into the use of residential solar power solutions.

➤ **Current Status (Business as Usual Scenario)**

As of 2021, Nigeria had a total renewable energy capacity of 2.15 gigawatts. Between 2011 and 2021, the renewable energy capacity experienced a slight increase, from roughly 2 gigawatts to 2.15 gigawatts. **Electricity generated from solar power in Nigeria amounted to 40 gigawatt hours in 2020, keeping stable from the preceding year. Within the timeframe reviewed, the contribution of solar energy to electricity production in the country followed an upward trend.**

The rate of radiation of the sun's energy is about 3.8×10^{23} kW/s, and Nigeria receives about 4.85×10^{12} kW/h of this energy per day. This comes from about 4 - 8.5 (an average of 6) hours per day of sunlight, which is equivalent to the energy produced from about 1.082 million tons of oil per day. This figure corresponds to about 4000 times the current daily crude oil production in Nigeria and about 13,000 times the natural gas daily production, based on standard energy units". The nation can achieve enough in different sectors of the economy with this large, free, and sustainable clean energy.

➤ **Projected Scenarios (RAT and HAT Scenarios)**

Reasonable Ambitious Target Scenario (HATS)

Under a **Reasonable Ambitious Target Scenario**, Nigeria has established the 30:30:30 vision in her Sustainable Energy 4 All (SE4All) Agenda 2016 (an offshoot of the **National Renewable Energy and Energy Efficiency Policy 2015**), with the goal of generating 30 GW of electricity by 2030, and with renewable energy making up 30% of the energy mix. **Solar energy as an energy source has the capacity to produce the 30% renewable**

energy target of 30GW, thus resulting in an additional 9 GW of solar energy by 2030. The current capacity of solar energy in Nigeria is 33 MW, equivalent of 0.033 GW which is less than 1GW, thus depicting the gap based on policy ambitions.

To meet the target of 9GW of solar capacity by 2030, Nigeria will need to produce about 1.3 GW for seven (7) years. Thus, if Nigeria produces 1.3 GW annually for seven (7) years, there will be a solar capacity of 9.1 gigawatts by 2030, resulting in an estimated 14.1% increase annually and a total of 99.6 % increase in solar capacity by 2030.

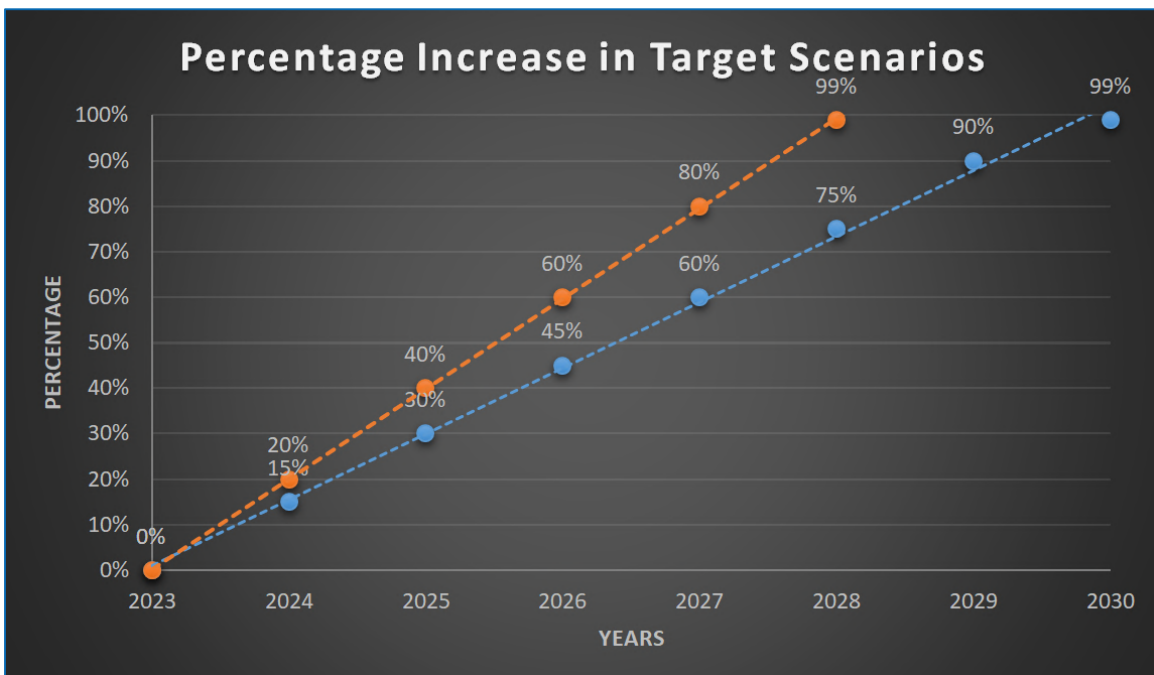
This is a reasonable ambitious capacity scenario depicted on the blue line in Figure 3 below.

High Ambitious Target Scenario (HATS)

In a **High Ambitious Target Scenario**, using the same statistics of achieving 9 GW by 2030 based on the 30% target, and higher tax incentives are introduced, if the country produces 2 GW per year, there will be a solar capacity of 10 GW by 2028. This will lead to an estimated 99.7% increase in solar capacity by 2028, and a 20% increase annually.

This is depicted on the orange line in Figure 3 below.

Figure 3: Solar Energy increase in Nigeria based on RAT and HAT Scenarios



Source: Electricity Lawyer

➤ **Legal & Regulatory Considerations and Provision(s) of Legal and Regulatory Instruments on Projected Scenarios**

The Federal Ministry of Power published a guideline in 2006 called the **Renewable Energy Policy Guidelines (REPG)** that outlines policy goals for the advancement and application of renewable energy. Additionally, it lays forth a plan for the efficient management of the Renewable Electricity Trust Fund. In order to promote the involvement of more stakeholders, the REPG also offers incentives for the use of renewable energy and suggests a five-year tax exemption as an incentive for investment in renewable energy.

The Nigerian Electricity Regulatory Commission (**NERC**) **Mini-Grid Regulation (2016)**, and **National Renewable Energy and Energy Efficiency Policy (NREEEP), 2015** are among the two policies that emphasize the integration of renewable energy in the electricity mix with tax incentives and exemption(s).

Other policies and instruments providing incentives include:

- **Nigerian Electricity Regulatory Commission (NERC) Mini-Grid Regulation 2018:** the Central Bank of Nigeria recently introduced a solar intervention fund that offers soft loans (5 per cent interest) to developers engaged in renewable projects who may obtain credit facilities up to 500 million naira.
- **National Renewable Energy and Energy Efficiency Policy (NREEEP), 2015:** The NREEEP offers incentives focused on renewable energy, some of which include:
 - I. Two-year customs duty exemptions on the importation of equipment and materials used in renewable energy projects and
 - ii. Free Custom Duties for two (2) years on the importation of equipment and materials used in renewables and energy efficiency projects
 - iii. Allowance for project developers to obtain soft loans and special low-interest loans from the Renewable Electricity Fund for renewable energy supply and energy efficiency projects.
 - iv. Advocates for the Government to ensure that an appropriate economic instrument is put in place to allow generators of renewables to obtain preferred pricing and rates.
 - v. Tax incentives to manufacturers of renewable energy and energy efficient equipment and their accessories. Incentives include: (i) five-year tax holiday for manufacturers from date of commencement of manufacturing; (ii) five-year tax holiday on dividend incomes from investments on domestic renewable energy source.

- **The Renewable Energy Policy Guidelines 2006 (REPG):** is a document published by the Federal Ministry of Power that outlines policy objectives for the development and use of renewable energy. The REPG is very similar to the REMP, with the main difference being that the REPG prioritizes renewable energy generation and distribution. It also outlines a strategy for managing the Renewable Electricity Trust Fund in a cost-effective manner. Furthermore, the REPG provides incentives for the use of renewable energy and recommends a five-year tax holiday as an incentive for renewable energy investors in a bid to garner more stakeholders buy-in.

Nevertheless, there are policies that do not provide for any tax incentives or waiver for renewable energy but remain relevant for promoting renewable energy utilisation, some of which include but are not limited to:

- **The Renewable Energy Master Plan 2005 (REMP):** encourages the use of renewable energy and attempts to provide a strategy for implementation. It conceptualizes Nigeria's renewable energy goals and attempts to address key factors for their achievement. According to the REMP, Nigeria's minimum electricity demand will be greater than 315MW by 2030. The goal is for renewable energy to account for more than 20% of total energy supply.
- **National Renewable Energy Efficiency Policy 2013:** The Federal Ministry of Power developed the National Renewable Energy Efficiency Policy 2013, as a policy to promote sustainable power generation and to consolidate the provisions of existing energy laws. It aims to improve energy efficiency while also removing administrative and social barriers to long-term energy use. It is a policy to promote sustainable power generation and to consolidate the provisions of existing energy laws. It aims to improve energy efficiency while also removing administrative and social barriers to long-term energy use.
- **National Energy Efficiency Action Plans 2015–2030:** The Inter-Ministerial Committee on Renewable Energy and Energy Efficiency adopted, and the National Council on Power approved the National Energy Efficiency Action Plans 2015–2030 (**NEEAP**). Even though the template was adopted from the ECOWAS Centre for Renewable Energy and Efficiency, the NEEAP provides a strategic outlook on the situation in Nigeria, including plans for the implementation of renewable energy goals. A special emphasis is placed on effective energy, emission reduction, efficient lighting, monitoring, distribution, and enforcement, and verification of material, home, building, and industry standards.

Nevertheless, from a futuristic perspective, although the Electricity Bill has not been passed into law, it makes provision for tax incentives and other opportunities to aid the promotion and integration of renewable energy into Nigeria's electricity mix.

➤ **The Electricity Bill**

Through the deployment of renewable energy off-grid and mini-grid solutions, the Bill aims to improve access to electricity in rural, unserved, underserved, peri-urban, and urban areas. It also aims to promote local technological capacity for renewable energy sources through a framework for local content in the Nigerian electricity supply industry. The bill provides for feed in tariffs, with NERC vested with the responsibility to decide on the rates, after considering various aspects, including the technology used for renewable energy generation, the location of the generation facility, the costs associated with construction, commissioning, operation, and maintenance, reasonable rate of return, etc.

Feed-in tariffs will be renewed every two (2) years and will last for a duration of 10 to 15 years. The Commission will factor the price difference between the cost of purchasing electricity generated from renewable energy sources and the cost of purchasing power from other sources when determining the tariff rates. The Commission is also in charge of implementing feed-in tariffs for all small hydro projects, all biomass cogeneration power plants, and all solar and wind-based facilities, regardless of size, with terms of up to 20 years to ensure that there are buyers under common Power Purchase Agreements and provide return on investments.

The Bill provides that the Minister of Power may work with the Ministry of the Environment to take advantage of opportunities provided by the Clean Development Mechanism and other mechanisms, including but not limited to the trading of carbon credits and renewable energy certificates, to advance the research and development of renewable energy sources. A well-functioning market, a successful trading system or platform, the necessary solid infrastructure, institutional expertise and capacity, etc., are just a few examples of the systems and processes that must be in place for such mechanisms to flourish and produce the desired results.

THE ELECTRICITY BILL (2022) CONSIDERATIONS

The adoption of the policies outlined in the Electricity Bill (if passed into law) will fundamentally alter Nigeria's renewable energy market, some of which include:

- A. Renewable Generation Obligation:** electricity generation license holders are required to meet any renewable generation requirements that NERC may impose. As a result, electricity generating firms will be required to produce power using renewable energy sources, buy power produced using renewable energy, or purchase any equipment that represents the development of renewable energy. Essentially, the goal is to establish a market for renewable energy and encourage financial investment in the field.
- B. Renewable Purchase Obligations:** distribution or supply license holders will be required to buy a certain percentage of their energy needs from renewable sources or invest in equipment that simulates the production of renewable energy. A licensee may also be obliged to pay NERC a premium or purchase a predetermined proportion of its total electricity demand from renewable sources. To encourage the consumption of energy produced from renewable energy sources and consequently support the expansion of the renewable energy market in Nigeria, renewable purchasing obligations are being placed on distribution licensees, supply licensees, and bulk consumers.
- C. Feed In Tariffs:** As a means of promoting investment in renewable energy power generation, the Electricity Bill requires NERC to establish and provide for feed-in tariff rates for electricity generated from renewable energy sources. The tariff rate will be guaranteed for 10 to 15 years after which it will be reviewed every two years. The price difference between the cost of purchasing electricity produced by renewable energy sources and the cost of purchasing electricity from conventional sources is to be considered by NERC when calculating the tariffs.
- D. Local Content Support:** The Electricity Bill mandates NERC to review the current National Content Development Regulations for the power sector to address local content requirements for local skills acquisition, local production and assembly of solar PV components, deep cycle batteries, electro-mechanical components of SHP technology, wind power, boilers, and turbines for cogeneration of less than 30MW, etc. This is in line with the need to ensure indigenous development in all sectors of the Nigerian economy. Also, all organizations operating in the renewable energy sector (including licensees, contractors, and subcontractors) are required to make sure that local content is a part of their operational renewable energy activities.

PLAN 4: INCREASE RURAL ELECTRIFICATION



PLAN 4: INCREASE RURAL ELECTRIFICATION

To improve rural electrification by streamlining and relaxing regulations to enable the private sector, as well as local and state government actors to electrify rural Nigeria safely and securely

➤ General Overview

Rural electrification refers to the process of bringing electrical power to rural and remote areas. It has been recorded that half of the Sub-Saharan African population without electrification is particularly concentrated in five African countries including Nigeria. Amongst the population without access to electricity today, there is a wide dichotomy between the electrification rate in rural and urban areas. The Nigerian Rural Electrification Agency (**REA**) is the Implementing Agency of the Federal Government of Nigeria created in 2006 by virtue of S. 88 of the Electric Power Sector Reform Act (**EPSRA**) 2005 and is tasked with electrification of rural and unserved communities in Nigeria by facilitating the provision of affordable power supply for residential, commercial, industrial, and social activities in the rural and peri-urban areas of the country.

Plan 4 of the Bola Ahmed Tinubu's campaign manifesto outlines the improvement of rural electrification as a key agenda.

➤ Current Status (Business-As-Usual Scenario)

As of 2022, Nigeria's rural electrification rate was 39%. This creates a rural electrification access gap of 61%. According to World Bank data, about 23% of the rural population in Nigeria had access to electricity as of 2019. Considering that rural electrification rate reached 39% in 2022 from 23% in 2019, a 16% increase in rural electrification rate was recorded for the period of 2020 – 2022. This 16% projects a 5.3% increase in rural electrification per year for the last three (3) years. **Assuming the rural electrification rate of 5.3% per year for the previous three (3) years is maintained for the period of 2023 – 2030 as displayed in Series 1 of Figure 4 below (blue), Nigeria can be projected to achieve a rural electrification rate of 81.4% by 2030 on a Business-as-Usual Scenario.**

➤ **Projected Scenarios (RAT and HAT Scenarios)**

Reasonable Ambitious Target Scenario (RATS)

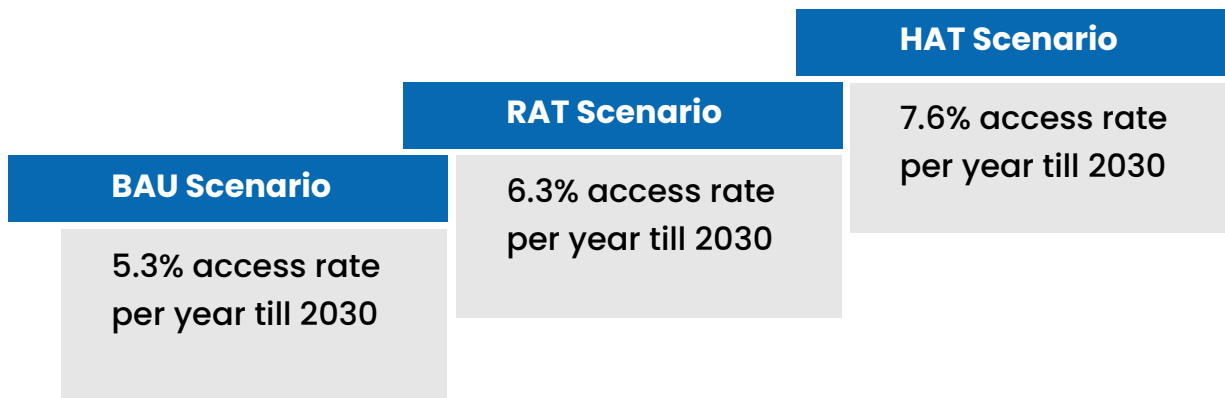
The rural electrification goal of the Federal Government of Nigeria captured in the National Electric Power Policy (**NEPP**) of 2001 and the Rural Electrification Policy of 2005 respectively is to increase access to electricity to 75% and 90% by 2020 and 2030 respectively and at least 10% of renewable energy in the energy mix by 2025, as contained in the National Electric Power Policy (**NEPP**) of 2001 and the Rural Electrification Policy of 2005 respectively.

According to quantitative data, Nigeria had a rural electrification rate of 39% as of 2022. By the Federal government's NEPP projected rural electrification rate of 75% by 2020, the current rural electrification rate of 39% reveals that Nigeria is behind its rural electrification target by about 36%. **To attain the projected rural electrification rate of 90% by 2030, a 6.3% rural electrification rate must be achieved per year for the period of 2023 – 2030.** A 6.3% rural electrification rate projected over the period of 2023–2030 as illustrated in **Series 2 of Figure 4 (orange)** below amounts to a rural electrification rate of 51% which when summed with the current 39% rural electrification rate amounts to the federal government's projected 90% rural electricity access rate by 2030. **This electrification rate based on the referenced scenario achieves a rural electrification rate of 1% above the BAU projection per year over the next seven (7) years.**

High Ambitious Target Scenario (HATS)

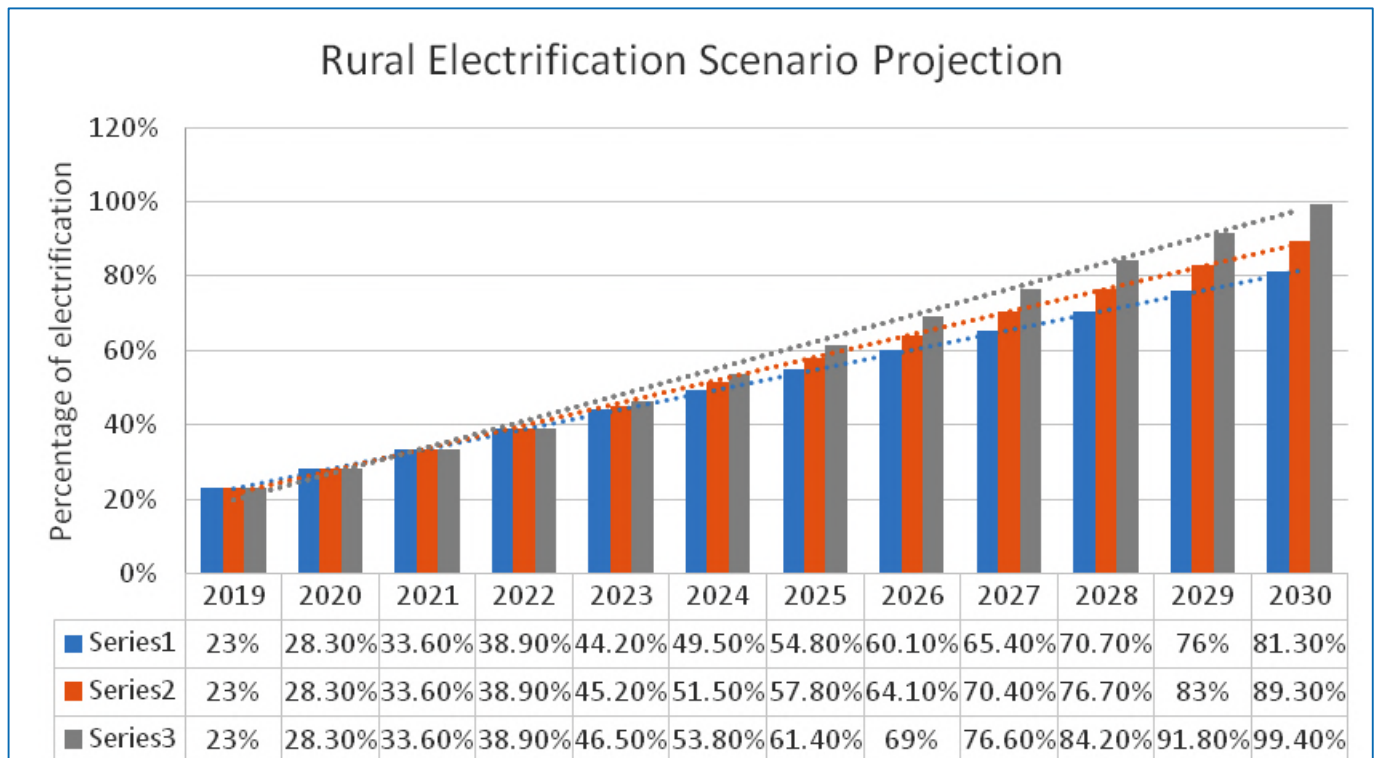
Under the HAT Scenario, a 100% rural electrification rate is projected by 2030. This creates a 61% rural electrification access gap to be closed between 2023 and 2030. To achieve a 100% rural electrification access rate under this scenario, a yearly rate of 7.6% rural electrification must be achieved per year from 2023 to 2030. **If Nigeria electrifies 7.6% of the rural community per year for the period of 2023 – 2030, a rural electrification rate of 100% electricity access rate will be achieved by 2030. This scenario projects the maximum electrification rate by 2030 in comparison with the BAU and RAT scenarios.**

Diagram 2: Scenario Projection for Plan 4- Schematic representation of Rural Electrification



Source: Electricity Lawyer

Figure 4: Rural Electrification Scenario Progression between 2023-2030 under the BAU, RAT and HAT Scenarios



Series 1 (Blue) = BAU Scenario, Series 2 (Orange) = RAT Scenario, Series 3 (Grey) = HAT Scenario

Source: Electricity Lawyer

The EL report projects rural electrification using three scenarios:

1. **BAU Scenario** is a projection that is based on the rural electrification rate over the preceding three (3) years. The BAU Scenario projects an electrification rate for the next eight (8) years based on the reported rural electrification rate for the preceding years using quantitative data. The Y-axis represents the percentage of electrification rate over the years. The years are represented in the X-axis beginning from 2019 to 2030.
2. **The RAT Scenario** is based on the Federal Government's NEPP projected rural electrification rate of 75% by 2020 and 90% by 2030.
3. **The HAT Scenario** is based on the projection of 100% rural electrification rate by 2030.

➤ **Legal and Regulatory Considerations and Provision(s) of Legal and Regulatory Instruments on Projected Scenarios**

- **Streamlining and relaxing regulations to electrify rural Nigeria**

Research reveals that 38% of the Nigerian population has no access to the national grid. The estimate in figure is 80million Nigerians (rural & non-rural areas). A wide proportion of this figure is apportioned to the rural communities. The cost of extending the national grid to rural areas makes it impractical for the Federal Government to undertake grid extension at a pace that allows for the achievement of forecasted rural electrification targets. Research conducted in 2015 revealed that Borno State is the costliest grid-based state to electrify in Nigeria with an approximate cost of US\$2.9 billion, while the least expensive grid-based state to electrify is Edo state at US\$73 million and an average cost of US\$1 billion dollars would be required to electrify each state in Nigeria. The disparity in costs for grid-based electrification for different regions is attributed to distance in the locations from existing grid infrastructure, topography, and population size of different regions. This places mini-grid as the best alternative to grid connection to improve rural electrification within the projected timeline.

The **Nigeria Electricity Regulatory Commission (NERC) Mini-Grid Regulation 2016** regulates the deployment of mini-grid solutions within Nigeria. The regulation defines a mini grid as an electrical supply system with its own power generation capacity, supplying more than one customer and which can operate in isolation or be connected to a Distribution Licensee's network generating between 0kW to 1MW of capacity. **To achieve a relaxed regulation, the Tinubu administration may need to consider**

increasing the maximum mini-grid generation capacity well beyond the 1MW threshold. For example, the maximum limit for solar PV in South Africa is 100MW while there are deliberations on the need to remove the cap completely.

The **Electric Power Sector Reform Act (EPSRA) 2005** provides for the Rural Electrification Agency (REA) responsible for spear heading rural electrification and the rural electrification fund which has benefited from multiple grants from government and non-government international organisations including the World Bank and the African Development Bank over the years and has in turn advanced the rate of rural electrification in the preceding years. In 2020, REA published its achievement for the immediately preceding 20months. The achievements include 99,450 connections impacting 457,470 people. **The REA as an agency established by the Act, is an existing vehicle for the realisation of the planned scenarios.** The electrification of rural communities is spearheaded by the REA. **The NERC Mini-Grid Regulation also provides for the development of mini-grids which is one of the mechanisms through which the electrification rates in the defined scenarios can be achieved.**

An **Electricity Bill for an Act, 2022** is currently under consideration by the National Assembly. The Bill is set to replace the primary legislation governing the electricity sector, the Electric Power Sector Reform Act, 2005. It is therefore important to consider the provisions of the Electricity Bill regarding rural electrification within Plan 4.

THE ELECTRICITY BILL (2022) CONSIDERATIONS

Part 15 of the Bill proposes a name change from the Rural Electrification Agency (**REA**) to the Rural Electrification and Renewable Energy Agency (**REREA**), and contains detailed provisions regarding REREA's objectives and functions, structure, and the expansion of the Rural Electrification Fund to include the Renewable Energy Fund.

These proposed changes acknowledge the REA's role in rural electrification and, by extension, the promotion of renewable energy through its projects.

In addition, the Electricity Bill, 2022 underway makes provision for state level electricity regulation which allows for state-sponsored electricity sector incentives and increased investment into decentralised electricity systems. In this light, states can create its state electricity regulatory authorities/bodies to regulate electricity business within its jurisdiction (to the extent that it does not interfere with the federal electricity regulatory body's authority). This is an additional provision of the law that makes room for the achievement of all targeted scenarios.

Streamlining local and state government actors to electrify rural Nigeria

Given that state governments are closer to rural communities where mini-grids will operate, it may be more practical for mini-grid developers to liaise with state electricity board(s), or such organisations created for this purpose, in the setting up of mini-grid systems. State regulation will also open avenues for different innovations and mini-grid models that may best serve the interests of the diverse communities existing in each state. Furthermore, it would be easier for states or local governments to facilitate negotiations between communities, villages, and mini-grid investors to structure small scale power generation and distribution arrangements that would be beneficial to all parties

PLAN 5: **GAS-TO-POWER**



Policy to enable gas resources to be harnessed on a priority one basis to be used to generate power and support power projects that can be delivered quickly to optimize power grid reliability, grid interconnectedness, and grid wheeling.

➤ **General Overview**

The term gas to power describes the process of converting natural gas, typically ethane and methane or other petroleum gasses, into electricity. Natural gas accounts for about 22.8% of global energy consumption, of which approximately 8.7% is supplied as Liquefied Natural Gas (**LNG**). In light of the global carbon emission reduction agenda, gas is commonly recognised as a transition fuel. Nigeria's Energy Transition Plan, 2022 largely itemises gas as the transition fuel for Nigeria's power sector before the era of a complete transition to renewable sources of energy for power generation by 2060 as committed to at COP26, by H.E. President Muhammadu Buhari. Nigeria has Africa's largest gas reserve which should be sufficient to power her electricity sector. However, Nigeria's power sector continues to suffer low gas supply. Nevertheless, gas continues to dominate the electricity generation mix accounting for 81.53% of the electricity generated during the second quarter of 2020. This implies that approximately 8.15kWh of every 10kWh of electric energy generated in Nigeria in the second quarter of 2020 came from gas.

77% of electricity generation was derived from gas in 2020. There are currently 28 grid connected electricity generation companies (Gencos) in Nigeria. Three of these companies are powered by hydropower: these include Shiroro, Kainji and Jebba while others are gas-fired plants. It was reported that within the first seven days of March 2021, Nigeria's power sector lost about N6.8 billion to challenges related to insufficient gas supply to electricity generation companies (Gencos), amongst other constraints.

Illiquidity is a major challenge of the Nigerian Electricity Supply Industry (**NESI**). The sector is not financially viable due to several issues within the electricity supply chain. Firstly, Discos are unable to account for and offset the total cost of electricity supplied by

the Gencos. This results in the inability of Gencos to recover the true cost of power generated and offset bills for gas supplied for the purpose of electricity generation. This creates a reluctance on the part of gas producers to sell gas to power generation companies.

Furthermore, report reveals that Nigeria's daily gas production stood at 1.2 billion standard cubic feet (scuf) with 41 per cent of the daily production exported while 48 per cent went to the domestic market, and 11 per cent was being flared. However, gas producers have over the years been cautious of investing in gas infrastructure in the country due to low gas prices and lack of assurance or payment guarantee from the Gencos.

Nigeria's Energy Transition Plan envisages a gas-led transition to full energy access and net zero emissions. The plan envisages a transition from fossil fuel to full gas utilisation across Nigeria's energy consuming sectors by 2030. Nigeria in 2022 also re-introduced its Nigeria Gas Commercialisation program, inviting applicants to submit gas gathering commercialisation initiatives.

There are 24 known gas-powered electricity generation plants in Nigeria with a combined generation capacity of 12,204MW. **The scenario projections will be based on the combined electricity generation capacity of the listed power plants.** The power plants and their respective generation capacity is listed below.

	Power Plant	Generation Capacity
1	Azura Power Station	450MW
2	Ibom Power Plant	191MW
3	Transcorp Ughelli Power Station	900MW
4	Sapele Power Station	450MW
5	Sapele Power Station	1020 MW
6	Omosho I Power Station	336MW
7	Omosho II Power Station	450MW
8	Omoku Power Station	150MW

	Power Plant	Generation Capacity
9	Omoku II Power Station	225MW
10	Olorunsogo Power Station	336MW
11	Olorunsogo II Power Station	675MW
12	Okpai Power Station	480MW
13	Ihovbor Power Station	450MW
14	Ibom Power Station	190MW
15	Geregu I Power Station	414MW
16	Geregu II Power Station	434MW
17	Egbim Thermal Power Station	1320MW
18	Egbema Power Station	338MW
19	Calabar Power Station	561MW
20	Alaoji Power Station	1074MW
21	Afam VI Power Station	624MW
22	Afam IV-V Power Station	726MW
23	Aba Power Station	140MW
24	AES Barge	270MW

Nigeria's Power Baseline Report of 2015 by the Advisory Power Team of the Office of the Vice President in Conjunction with Power Africa provides the average operational capacity, average available capacity, and installed capacity for Nigeria's gas generation power plants as of 2015 as 3879MW, 7141MW and 12522 MW respectively. The current installed and available capacity as published on NERC's website are 10,396MW and 6,056MW respectively, while the Transmission Company of Nigeria recorded a range of 3,466MW - 4,198.2MW transmission in January 2023, representing the available operational capacity.

➤ **Current Status (Business as usual Scenario)**

Using the average operational capacity of 3879MW per day on a BAU Scenario Nigeria recorded 887.6mmscfd gas to power utilisation in 2015 (which is within the capacity range of 3,466MW–4,198.2MW recorded by the Transmission Company of Nigeria in January 2023). This figure is reasonably close to the current recorded gas to power availability recorded at 820.2 mmscfd which justifies the usage of the 2015 data as a **business-as-usual scenario**.

This is the BAU scenario represented in the first bar in Figure 5 below.

➤ **Projected Scenarios**

Reasonable Ambitious Target Scenario (RATS)

On a **RAT Scenario** projection, if Nigeria achieves the supply of gas to power based on the total average available power plant capacity of 7141MW per day on a priority one basis, Nigeria can project 1634mmscfd gas to power supply by 2030.

This RAT scenario is illustrated in the second bar in Figure 5 below.

High Ambitious Target Scenario (HATS)

On a **HAT Scenario** projection, if Nigeria achieves the supply of gas to power based on the total installed power plants generation capacity of 12,522MW per day on a priority one basis, Nigeria can project 2865.5mmscfd gas to power supply by 2030.

This HAT scenario is illustrated in the third bar in Figure 5 below.

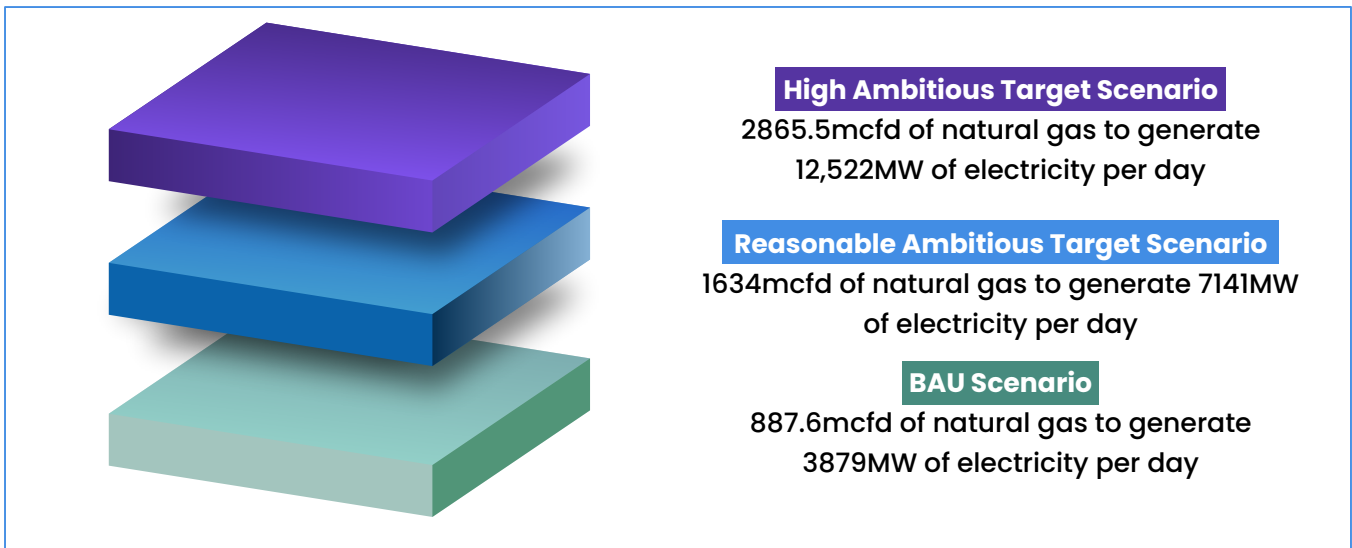
Comparing the Scenarios with the projections in Nigeria's Energy Transition Plan (2022)

Nigeria's Energy Transition Plan (**NETP**), published in 2022 by H.E President Muhammadu Buhari records a total natural gas consumption of 2.9tcf in 2019 with 243bcf (8.1%) of the natural gas utilised for power generation (gas to power). The NETP projects a 25% increase of the 2.9tcf gas consumption recorded in 2019 by 2030. An increment of 25% on 2.9tcf amounts to a total natural gas consumption of 3.6tcf per year by 2030. The NETP further records a 504bcf projection for gas to power by 2030 which is a 14% share of the total projected gas consumption for 2030. This projects a 5.9% increase of gas to power between 2019 and 2030.

In comparison with the **BAU, RAT and HAT scenarios** projected above based on the average operational capacity, average available capacity, and installed capacity of Nigeria's gas generation power plants as of 2015, the NETP projects gas to power consumption of 504bcf/yr by 2030, which is a 5.9% increase from its recorded 2019

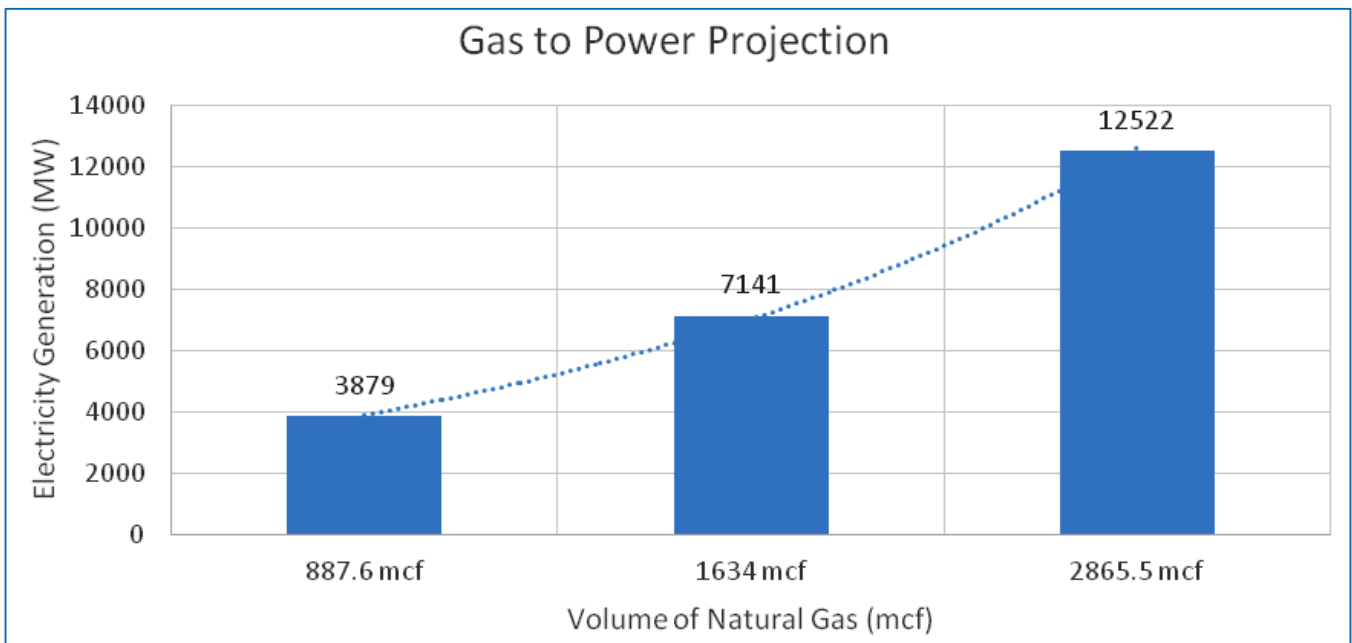
consumption. In the projected **RAT scenario** gas to power consumption is projected to increase to 596.41bcf/yr by 2030. The RATS projection is slightly above the NETP's projection by a marginal difference of 94bcf/year. Therefore, it can be regarded as falling within the NETP's 2030 projection. The **HAT scenario** being an optimistic projection rightly overshoots the projected 504bcf/yr by 2030, with a projected consumption of 1045.9 bcf/yr by 2030. This is an optimistic projection, as it projects gas to power consumption of 541.9bscf/yr above the NETP's projection and 449.49bcf/yr above the RATS projection.

Diagram 3: Scenario Projection for Plan 5



Source: Electricity Lawyer

Figure 5: Gas-to-Power Scenario Progression between 2023-2030 under the BAU, RAT and BAT Scenarios



Source: Electricity Lawyer

1. **The BAU Scenario** projection is based on the average operational capacity generation of 3879MW per day.
2. **The RAT Scenario** projection is based on the average available generation capacity of 7141MW per day. The X-axis represents MW value of the projected scenarios, and the Y axis represents the volume of natural gas (represented in cubic foot) that is required to generate each projected capacity.
3. **The HAT Scenario** projection is based on the total installed generation capacity of 12522MW per day.

➤ **Legal and Regulatory Considerations and Provision(s) of Legal and Regulatory Instruments on Projected Scenarios**

To realise this plan, key gas infrastructure will need to be developed. Pipelines for gas transport will need to be laid, there is need for investments into gas gathering, in addition to the development of other services across the value chain. The Federal government cannot achieve such feat with sole reliance on public funds. There is need for public-private partnerships to be steered within the Gas-to-Power value chain. Potential investors will want to take full advantage of gas fiscal incentives such as the 2021 **Petroleum Industry Act (PIA)** 10-year gas tax holiday provision. A policy implication is that there will be an increased need to develop investment protection mechanisms to guarantee a minimum standard of treatment to investors. Particularly, the **Nigerian Investment Promotion Commission (NIPC) Act, 1995** should be considered for review/amendment to guarantee internationally recognised investment protection standards to foreign investors (beyond its current guarantees regarding expropriation and unconditional transferability of funds) such as most favoured nation, protection against discriminatory treatment, fair and equitable treatment and national treatment provisions and free transfer of investment and returns, etc.

The petroleum industry governance framework makes provision for incentives that can attract the level of investment that is needed to actualise the proposed **RAT and HAT scenarios**. The Petroleum Industry Act, 2021 provides for a gas fiscal incentive such as the 10-year gas tax holiday provision under Petroleum Industry Act. Also, companies involved in domestic midstream petroleum operations, downstream gas operations, and large-scale gas utilization industries are eligible to take advantage of the incentives offered by Section 39 of the **Companies Income Tax Act (CITA), 2004** and investors in gas pipeline will be given an additional five years of tax-free time after the

tax-free period specified in section 39 of the Companies Income Tax Act expires.

Furthermore, section 5.2.6 of the **National Gas Policy (NGP), 2017** provides for domestic Gas Supply Obligations requiring all gas producers to make gas available for the domestic market. The issuance and renewal of upstream licenses will be subject to strict compliance by the applicant with its domestic gas supply obligation. The policy's imperative is for gas development for priority supply to promote power generation.

THE ELECTRICITY BILL (2022) CONSIDERATIONS

The Electricity Bill, 2022 is silent on provisions relating to natural gas and other petroleum gasses for electricity generation.

**PLAN 6:
UPDATE THE POWER SECTOR
GOVERNANCE REFORM**



PLAN 6: UPDATE THE POWER SECTOR GOVERNANCE REFORM

- *To review and update the Electric Power Sector Reform Act of 2005 and reform the regulatory and governance structure of the country's power sector.*
- *To expand Nigeria's power base to include coal, solar, hydropower, and other sustainable energy technologies.*

➤ **General Overview**

The Nigeria power sector is primarily governed by the Electric Power Sector Reform Act (**EPSRA**) 2005. The EPSRA was enacted to herald the privatisation of the sector and address the numerous challenges affecting the power sector including to provide for the formation of companies to take over the functions, assets, liabilities and staff of the defunct National Electric Power Authority (**NEPA**), to develop competitive electricity markets, to establish the Nigeria Electricity Regulatory Commission; to provide for title licensing and regulation of the generation, transmission, distribution and supply of electricity, to enforce such matters as performance standards, consumer rights and obligations, to provide for the determination of tariffs and to provide for related matters. The EPSRA also created the Nigerian Electricity Regulatory Commission (**NERC**) as the institution responsible for creating, promoting, and preserving efficient industry and market structures, and to ensure the optimal utilisation of resources for the provision of electricity services, etc. NERC in exercise of its authority has created several regulations that regulate the Nigeria Electricity Supply Industry. Additionally, the Federal Ministry of Power is mandated to formulate and implement policies of the Federal Government of Nigeria with respect to generation, distribution, and transmission of power nation-wide.

In March of 2022, the Senate voted in favour of a new Bill for an Act to replace the current Electricity Law in Nigeria. However, the bill is yet to receive the approval of the House of Representatives. The President-elect in his campaign manifesto has now set out an agenda to push for a review and update of the EPSRA 2005, to reform the regulatory and governance structure of the country's power sector, expand Nigeria's power base to include clean coal, solar, hydropower, and other sustainable energy technologies and ensure that government processes and procedures improve efficiency and accountability for project management, design, procurement, construction, and remittances.

➤ **Current Status (Business as Usual Scenario)**

The Electric Power Sector Reform Act (EPSRA), 2005 currently governs the NESI value chain activities. Nevertheless, the motion has been set to repeal the EPSRA 2005 by the 9th National Assembly. The Electricity Bill, 2022 seeks to provide a comprehensive legal and institutional framework for the power sector in Nigeria in the areas of electricity generation, transmission, system operation, distribution, supply, trading, enforcement of consumer rights and obligations.

On the second lap of the President-elect's Plan 6: **to expand Nigeria's power base to include coal, solar, hydropower, and other sustainable energy technologies**, the **National Energy Policy 2013** places emphasis on the effective use of sustainable energy resources with a particular focus on solar energy and advocates for the aggressive integration of solar energy in Nigeria's power supply. **Nigeria's Renewable Energy Master Plan, 2005** also recommends the utilisation of renewable energy and seeks to provide an implementation strategy.

Furthermore, the **Renewable Energy Policy Guidelines, 2006** of the Federal Ministry of Power details policy objectives for the development and utilisation of renewable energy. The **National Renewable Energy Efficiency Policy, 2013** was conceived by the Federal Ministry of Power as a policy to foster sustainable power generation and consolidate existing energy laws. It seeks to improve energy efficiency and to overcome the administrative and social barriers hindering the sustainable use of energy. The **National Energy Efficiency Action Plans, 2015-2030** provide a strategic outlook for Nigeria, with plans for the implementation of renewable energy goals.

➤ **Projected Scenarios**

Governance Framework Projection (GFP)

Projections in the table below regarding the governance framework for the Nigeria Electricity Supply Industry (**NESI**) are based on selected parameters linked to key provisions in the Electricity Bill in comparison to the status quo scenario, i.e., the Electric Power Sector Reform Act, (**EPSRA**) 2005.

Parameters	Status quo under the current governance framework	Projection under the Electricity Bill, 2022	
1	<p>State Participation in Electricity Value Chain activities in areas covered by the National Grid and Review of National Electricity Policies and Plans</p>	<p>In the status quo scenario, the electricity market will continue to be dominated private entities licensed by the Nigerian Electricity Regulatory Commission (NERC) with little to no state participation. However, the recent assent by the President (at the time of this report), regarding the constitutional amendment to the previous provision in the constitution barring states from participating in electricity value chain activities in areas covered by the national grid will change this narrative especially if combined with the projected scenario under this heading.</p>	<p>In a scenario where the Electricity Bill is passed into law, the electricity market under the new governance framework will see the establishment of state electricity power stations and state electricity boards or other authorities to manage electric power stations followed by a wider participation or involvement of states in electricity regulatory activities, especially considering the recent constitutional amendment to this effect.</p>
2	<p>Revamped Institutional Framework for the Nigerian Electricity Supply Industry</p>	<p>In the status quo scenario, the institutional framework of the electricity sector consists of the Minister of Power; the National Assembly; NERC; Nigerian Bulk Electricity Trading Co. (NBET) Rural Electrification Agency, Energy Commission of Nigeria; the Nigerian Electricity Management Services Agency; Nigeria Electricity Liability Co; the Presidential Task Force on Power; National Power Training Institute of Nigeria (NAPTIN); Gases aggregation Company of Nigeria Ltd (GACN); Nigeria Electricity System Operator.</p>	<p>In the projected scenario, institutional stakeholders in the Nigeria Electricity Supply Industry (NESI) would expand to include new agencies and existing agencies with increased functions including the Minister of Power with a novel responsibility of promoting gender mainstreaming in the design and implementation of electricity projects and programmes; the National Assembly who is vested with oversight responsibility over the NESI; the Nigerian Electricity Regulatory Commission who would also be responsible for ensuring the phase-wise development of a competitive electricity market across the market stages and promoting gender mainstreaming</p>

	Parameters	Status quo under the current governance framework	Projection under the Electricity Bill, 2022
			<p>amongst other functions; the Hydroelectric Power Producing Areas Development Commission charged with the responsibility of managing ecological menace to the operation of dams for hydroelectricity generation; the Rural Electrification and Renewable Energy Agency with the responsibility of promoting renewable energy development in the energy sector; and the Nigerian Electricity Management Services Agency.</p>
3	<p>Market Stages – Phased development of the Electricity Market</p>	<p>Under the status quo, the electricity market continues to be at the transitional market stage which is characterised by contract-based arrangements for electricity trading.</p>	<p>The projected scenario should witness the progression of the transitional electricity market with the introduction of wholesale competition.</p>
4	<p>Expanded Licensing Framework</p>	<p>Under the status quo, private sector participation in the electricity market continues to be limited.</p>	<p>In the projected scenario, the activities along the electricity value chain which permits the participation of the private sector is extended to include electricity supply, independent distribution network operators and authority is granted to NERC to issue independent electricity transmission network licenses, multiple licenses to IPPs for generation of electricity from renewable and non-renewable sources with express exclusion or prohibition of exclusivity.</p>

	Parameters	Status quo under the current governance framework	Projection under the Electricity Bill, 2022
5	Renewable Energy	Under the status quo, the primary electricity legislation does not expressly provide incentives for the development of renewable energy resources in Nigeria.	In the projected scenario, the Electricity Bill's provision of tax incentives to promote and facilitate the generation and consumption of energy from renewable energy sources should witness the increased development and deployment of renewable energy in Nigeria's energy mix.
6	Private Sector Investment in the Transmission Network	Under the status quo, the transmission network continues to be controlled by the federal government through the transmission company of Nigeria and continues to play the dual role of the transmission network and system operator.	In the projected governance framework scenario under the electricity bill, there will be promotion of private sector participants in the business of electricity transmission as independent transmission network operators for the expansion of the existing network alongside successor transmission licensees or independently, as it relates to the independent electricity transmission network.
7	Independent System Operator	Under the status quo, the responsibility of system operation continues to be undertaken by the transmission company of Nigeria, with the dual function of transmission operator and system operator.	In the projected scenario, the electricity bill would pioneer the Incorporation of a corporate entity to serve as an Independent System Operator (ISO), tasked with carrying out market and system operation functions while the transmission company of Nigeria transfers its market and system operation functions to the ISO and becomes licensed solely as the Transmission Service Provider.

Parameters	Status quo under the current governance framework	Projection under the Electricity Bill, 2022	
8	<p>Industry Bundle: Tariffs, Subsidies, Distribution Franchising, and Electricity Theft</p>	<p>Under the status quo, sale of electricity between licensees and customers is based solely on NERC's approved tariff methodology which encompasses the various classes of customers.</p>	<p>Under the projected scenario, NERC is empowered to approve willing-buyer, willing-seller arrangements that allow licensees to enter bilateral contracts to offer premium services to a class or classes of customers at different tariffs, other than the approved tariff methodology.</p>
9	<p>Resolving Disputes in the Power Sector</p>	<p>In the status quo scenario, disputed questions of law continue to be referred to the High Court as it relates to orders or decisions of NERC.</p>	<p>Under the projected scenario, there will be an established Electricity Appeals Tribunal to be set up on zonal basis by the Minister, with membership consisting of judicial and technical members and the tribunal is able to hear and determine any question of law or dispute relating to any decision or determination of the Commission regarding its operation and application of the Bill.</p>

➤ Future Policy Projections

The second lap of the President-elect's Plan 6 identifies the **expansion of Nigeria's power base to include coal, solar, hydropower, and other sustainable energy technologies**. The utilisation of coal as a clean energy source usually involves capturing carbon emissions from burning coal and storing in underground pockets of porous rock through a system known as carbon capture and storage (**CCS**).

It has been identified that there are multiple points at which CCS technology could intervene in coal utilisation. At the pre-combustion stage, an air separation unit introduces a stream of pure oxygen which is introduced into a coal gasifier, the oxygen introduced into the gasifier reacts with fuel to create a syngas made up of hydrogen, carbon monoxide, water, and CO₂. The CCS technology sends the syngas to a shift reactor, where it encounters steam. That steam transforms the carbon monoxide that is present into hydrogen and more CO₂. The CO₂ is subsequently captured from the gas stream, compressed, and dehydrated. That leaves it ready for transport and storage (i.e., sending the CO₂ in a pipeline several kilometres below the earth and into rock, the idea being that it is stored underground pockets of porous rock rather than released into the atmosphere to contribute to climate change).

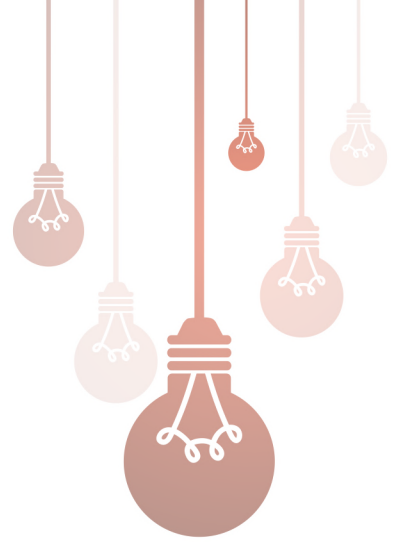
While carbon capture and storage (**CCS**) technically does work, it is expensive to build new infrastructure and retrofit old plants. Furthermore, there are currently no policies supporting CCS in Nigeria. To actualise the utilisation of clean coal in Nigeria, the President-elect's (Tinubu's) Administration would need to create a regulatory framework or policy for CCS. It is hoped that as the sector progresses via the successful adoption of the CCS technology in Nigeria, carbon utilisation can be optimised by allowing for the conversion of captured carbon into another form of energy for use beyond carbon capture and storage, i.e., CCUS (carbon capture, utilisation, and storage).

In considering a CCS policy, due consideration will need to be given to the amount and type of GHG emissions, the amount and type of CO₂ sequestration opportunities, plans for and impacts on economic development, legislative processes, and ongoing and projected commitment to GHG emissions reductions from fossil fuels.

In recent times, it has been submitted that a CCS ready policy approach could be considered to allow for adequate planning and plant design to ensure integration of CCS into already existing power plants. This policy approach could be adopted for the CCS development stage in Nigeria. The CCS ready approach involves the adoption of upfront CCS ready planning and plant design, and some incremental pre-investment

in the development of new power plants, to reduce potential compliance costs and risks involved in either having to retrofit capture technologies and connection to transport and storage systems in the future or; possible closure of power plants, if CO₂ mitigation options are technically infeasible or too expensive or even complete exemption from future CCS requirements with resulting carbon lock-in, without fully committing to CCS before it has been widely commercially proven.

Part of giving due consideration to this policy option involves investigating the economics of CCS as a GHG mitigation measure, and how a CCS ready policy would affect the adoption of CCS and the overall cost of GHG mitigation. The investigation into the economics could be conducted from the perspective of a developer considering how a plant should be built and operated and from the perspective of the jurisdiction as a whole, taking into account all social costs and benefits—including externalities.



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