TCN: THE JOURNEY SO FAR UNDER

ENGR. DR. SULE AHMED ABDULAZIZ
- LED MANAGEMENT

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UNDER

ENGR. (DR.) SULE AHMED ABDULAZIZ

LED MANAGEMENT


TRANSMISSION COMPANY OF NIGERIA
TCN
VISION
To be one of the leading electricity transmission companies in the world
CORE VALUES
·Integrity
·Transparency
·Sustainability
·Professionalism
·Customer Focus
·Teamwork
·Safety
MISSION
To transmit electricity in a most efficient and effective manner

EXECUTIVE SUMMARY

Under the leadership of Engineer Abdulaziz, the MD/CEO, the Transmission Company of Nigeria (TCN) has achieved significant improvements in project delivery and embarked on an aggressive digital transformation journey through a strategic plan known as the Nigeria Electricity Grid Maintenance, Expansion, and Rehabilitation Program (NEGMERP). NEGMERP has facilitated the execution of multiple capital and reinforcement projects across transmission regions, reinforcing the grid for optimal electricity evacuation and transmission.

Notably, TCN has successfully completed several substations, initiated the reconductoring of aged and limited capacity 132kV lines, replaced aged transformers with new ones, upgraded capacities of transformers. Also, multiple system generation peaks were achieved, with an all-time peak of 5802 MW recorded.

To enhance efficiency and effectiveness, TCN has embraced digital transformation through the utilization of internal solutions and vendor-procured applications. This transformation encompasses the upgrade of the TCN web-portal, NSONG, to achieve transparency and facilitate information exchange critical to the market operations. Additionally, the management team led by Engineer Abdulaziz signed a contract for a new Supervisory Control and Data Acquisition System/Energy Management System (SCADA/EMS) and Communication Systems upgrade, replacing the outdated NEPA era system.

To address the crucial need for grid visibility, TCN engineers developed an in-house solution leveraging the "Internet of Things" (IoT) to obtain near real-time data from generators and substations. This solution has significantly improved grid visibility, with all generators and a substantial number of substations now visible to the Grid Controllers at NCC. While waiting for the full implementation of the advanced SCADA/EMS network; TCN recognized the value of small-scale solutions that yield impactful results.

The TCN's Information and Communication Technology (ICT) Department has played a vital role in automating and digitizing processes aligned with the organization's corporate goals. The department has undertaken various digitization projects, including the creation of a conducive workplace to foster a productive and compassionate work culture.

TCN now recognizes the significance of a conducive workplace in motivating employees to perform at their best. The current management has undertaken initiatives to ensure that the work environment supports productivity and cultivates a holistic approach to work. Renovation projects have been implemented to

improve office complexes, and modern facilities have been constructed in regions such as Kano, Ihovbor (Benin), Owerri, and Uyo. These efforts demonstrate the management's understanding that a well-designed and comfortable workspace positively impacts employee output.

In addition to physical improvements, TCN places emphasis on maintaining equipment and infrastructure in a timely manner. Through proactive maintenance practices and the procurement of necessary spare parts, TCN ensures the reliability and efficiency of its operations. This commitment to regular maintenance helps prevent disruptions, enhances system performance, and reinforces TCN's reputation as a dependable transmission system provider.

Recognizing the importance of skilled and knowledgeable staff, TCN invests in continuous training and development programs for its employees. By equipping staff with the necessary expertise and keeping them updated on industry advancements, TCN ensures that its workforce remains competent and capable of effectively fulfilling their job functions. This commitment to ongoing learning contributes to a highly skilled engineering workforce that can efficiently address operational challenges and drive innovation within the organization.

Furthermore, TCN understands the significance of fostering harmonious relationships with other stakeholders in the electricity sector. Collaboration and cooperation with governmental agencies, power generation companies, distribution companies, and regulatory bodies are essential for seamless grid operations and the achievement of shared objectives. By promoting open communication channels and actively engaging with stakeholders, TCN effectively coordinate efforts, resolve issues, and align strategies to ensure the reliable transmission of bulk electricity across the country.

Through the collective efforts of the leadership, TCN has demonstrated a commitment to project delivery, digital transformation, and the creation of a positive work environment. These accomplishments position TCN for continued growth and enhanced performance in the transmission of bulk power across Nigeria. Equally TCN's commitment to creating a conducive engineering working environment and fostering harmonious relationships with stakeholders serves as a foundation for sustained growth and success. By prioritizing the well-being of its employees, investing in their professional development, and nurturing collaborative partnerships, TCN aims to strengthen its position as a leading transmission system operator in Nigeria.

OVERVIEW OF TCN

The Transmission Company of Nigeria (TCN), is the sole bulk transporter of electricity in the nation's power sector. Established by the Electric Power Sector Reform Act of 2005, TCN is the nexus in the Nigerian Electricity Supply Industry (NESI), charged with the task of ensuring bulk transmission of electricity to distribution load centers, System and Market Operations.

In a bid to effectively discharge this critical role, TCN Management under the leadership of the Managing Director/CEO Engr. Dr. Sule Abdulaziz, has put in place a strategic, well-articulated and systematic programme, tagged the Nigerian Electricity Grid Maintenance, Expansion and Rehabilitation Programme (NEGMERP), with short and long term objectives. The diligent implementation of this programme has fast-tracked the achievement of milestones in grid efficiency, maintenance, rehabilitation, equipment procurement and expansion.

TCN currently has the capacity to wheel 8,100MW bulk electricity on 330kV and 132kV voltage levels from the power generating plants through high tension cables and transformers to distribution load centres nationwide. The last three years of the company under the Engr. Dr. Sule Ahmed Abdulaziz led management

have witnessed outstanding successes in all aspect of transmission projects execution and operations with significant milestone achievements. Engr, Dr, Abdulaziz oversees and supervises the entire TCN, including transmission projects initiation, construction, network operations and maintenance, system operations, market administration and human resources management.

As the Chief Accounting Officer working with four Executive Directors, under two business units, the Transmission Service Provider (TSP) and the Independent System Operator (ISO), TCN is set to be transformed into a world class transmission company serving both the national and international customers.

TCN MANAGEMENT TEAM, UNDER
ENGR. DR. SULE A. ABDULAZIZ LED ADMINISTRATION

Engr. Dr. Sule A. Abdulaziz – MD/CEO, TCN

Prior to his appointment as the substantive MD/CEO, Engr. Dr. Abdulaziz held the position in acting capacity. He was previously the Regional Transmission Manager of Shiroro and Abuja Regions of TCN where he superintended over various operational and managerial functions such as wheeling of power to Distribution Companies (DisCos); coordination and supervision of equipment maintenance and repairs, transmission network reliability, security and expansion; inventory and stock management, as well as fiscal responsibility and accountability of the regional offices.

His profile as an astute Project Engineer spans over 20 years with cognate experience in project initiation, planning design, coordination, administration and fund management. As a seasoned Project Engineer, he has led the initiation and development of various strategic projects in the Nigerian grid network, including: Construction of 2x30/40MVA, 132/33kV Substation at Talata Mafara; Construction of 2x60MVA, 132/33kV Substations at Keffi, Daura and Kukwaba, Kurfi, Malumfashi, Dutsin-Ma, Kankara, Daura,

Gagarawa, Lalante and Igangan; Construction of 1x150MVA 330/132kV Substation at Maiduguri and construction of 2x150MVA, 330/132/33kV Substation at Katsina.

Engr. Dr. Abdulaziz is a COREN certified Electrical Engineer, a Fellow of both the Nigerian Society of Engineers (NSE), and the Nigerian Institute of Power Engineers (NIPE). He is also a chartered member of the Nigeria Institute of Management (NIM) and the Financial Reporting Council (FRC). He holds a Master of Science in Electronic/Automation Engineering from the Technical University in Sofia, Bulgaria.

TCN MANAGEMENT TEAM, UNDER ENGR. DR. SULE A. ABDULAZIZ LED ADMINISTRATION.

Engr. Victor Adewumi (Executive Director - TSP)

Engr. Victor Adewumi is the Executive Director, Transmission Service Provider (TSP).

He was appointed in September 2017. Prior to his elevation to the present position, he was the General Manager (Maintenance & Field Services), TCN Headquarters, Abuja.

Engr. Adewumi holds a Higher National Diploma (HND) in Engineering from Ado Ekiti Polytechnic. He is a member of the Council of Registered Engineers of Nigeria (COREN), Fellow, Institute of Corporate Administration of Nigeria (ICAD), Member, Nigerian Society of Engineers (NSE) and Member, Nigerian Institute of Management (NIM).

Engr. Maman Lawal (Executive Director - ISO)

Engr. Maman Jimoh Lawal, is the Executive Director, Independent System Operator (ISO).

He was appointed in September 2017. Before his appointment, he was the General Manager, System Operations (SO).

He Holds a Master of Science Degree (MSc) in Information Technology from National Open University of Nigeria (NOUN), and B Sc. Electrical Engineering from the University of Ilorin, Kwara State. Engr. Lawal is a corporate member of the Nigerian Society of Engineers (NSE), a Registered Electrical Engineer with the Council for the Regulation of Engineering in Nigeria (COREN).

TCN MANAGEMENT TEAM, UNDER ENGR. DR. SULE A. ABDULAZIZ LED ADMINISTRATION.

Barr. Justin Ishaya – Dodo (Executive Director HR&CS)

Barr. Justin Ishaya Dodo is the Executive Director (Human Resource & Corporate Services.

Before his new role as Executive Director (Human Resources & Corporate Services), he was the General Manger (Legal) ISO until his redeployment to the Human Resources Sub-sector as General Manager (Human Resources & Corporate Services in August, 2018.

Mr. Justin Ishaya Dodo holds a Bachelor's Degree in Public Administration from Ahmadu Bello University, Zaria, a Bachelor of Laws Degree (LLB, 1989) from the University of Lagos, Akoka, Lagos and was called to the Nigerian Bar in 1990. He is a member of the Nigerian Bar Association.

Mr. Isah Dutse (Executive Director F&A)

Mr. Ahmed Isah - Dutse is the Executive Director, (Finance & Account). Prior to his appointment in September 2017, he served as the General Manager in the Treasury, Finance & Accounts Division of Transmission Service Provider (TSP) and Independent System Operation (ISO).

Mr. Ahmed Isah - Dutse holds an MBA – Finance from Abubakar Tafawa Balewa University, Bauchi, and Higher National Diploma (HND) in Accountancy, from Kaduna Polytechnic (Kadpoly). He is a Fellow of Certified National Accountant (FCNA), Chartered Institute of Taxation of Nigeria (FCTI) and member, Nigerian Institute of Management (NIM).

Circuit Breakers

Notable Achievements Under the current Management led by Engr. Dr. Sule Abdulaziz

Project Delivery

Project delivery has improved significantly, as the MD/CEO has deployed his over 20 years' experience as an accomplished Project Manager to realize this. The achievements in this area are attributable to various strategic projects and programs embarked upon by the Company under his leadership to ensure grid expansion, stability, and reliability in efficient transmission of bulk power in the country. Through the strategic plan code-named Nigeria Electricity Grid Maintenance, Expansion and Rehabilitation Program (NEGMERP), TCN has executed several capital and reinforcement projects across the transmission regions in the country.

Some of the initiatives are highlighted below:

Quick Low Hanging Fruits

TCN has fast-tracked the delivery of the following outstanding projects:

Project Title	Location (State)	Completion Date	IMPACT
Completed the construction of brand new tower at Katampe, and also restrung the Katampe Central Area lines 1& 2	Abuja	January, 2023	a. Improve welfare and socio-economic activities of the State b. Improve power supply to affected areas
Energized a 150MVA, 330/132/33kV power transformer at Ayede Transmission Substation	Osogbo	November,2022	a. Additional 450MW is added to the grid b. Improve welfare and socio-economic activities of the State c. Improve power supply to affected areas
Energized brand new 2X60MVA, 132/33kV Gas Insulated Substation (GIS) at Dawaki	Abuja	November,2022	a. Additional 120MW is added to the grid b. Improve welfare and socio-economic activities of the State c. Improve power supply to affected areas
Energized brand new 60MVA, 132/33kV transformer at Itire132/33kV Transmission Substation in Lagos State	Lagos	October, 2022	a. Additional 48MW is added to the grid b. Improve welfare and socio-economic activities of the State c. Improve power supply to affected areas

1. Completed Projects

The following projects have been completed.

Project Title	Location (state)	Completion Date	Impact
Construction of 2x60MVA, 132/33kV Substation at Gagarawa	Jigawa	October, 2020	a. Additional 96MW is added to the Grid b. Improve the welfare and socio-economic activities of the State c. Improve the power supply of the affected area
Construction of Ikorodu-Odogunyan-Shagamu 132kV double circuit transmission line	Lagos/Ogun	May, 2021	a. Increase wheeling capacity to about 760MW. b. Improve the voltage level of the affected locations
Reinforcement of Ikeja West TS with 1x300MVA, 330/132/33kV Power transformer and its associated switchgears	Lagos/Ogun	March, 2021	a. Additional 240MW is added to the Grid b. Improve the welfare and socio-economic activities of the State
Reinforcement of Okene TS with 1x40MVA, 132/33kV Power transformer and its associated switchgears	Kogi	April, 2021	a. Additional 32MW is added to the Grid b. Improve the welfare and socio-economic activities of the State c. Improve the power supply of the affected area
Reinforcement of Ogba TS with 1x100MVA, 132/33kV Power transformer and its associated switchgears	Lagos	November, 2020	a. Additional 80MW is added to the Grid b. Improve the welfare and socio-economic activities of the State c. Improve the power supply of the affected area
Reinforcement of Iseyin TS with 1x30MVA, 132/33kV Power transformer and its associated switchgears	Oyo	April, 2021	a. Additional 24 MW is added to the Grid b. Improve the welfare and socio-economic activities of the State. c. Improve the power supply of the affected area

Construction of 2x30/40MVA Substation at Yelwa-Yauri and 100KM of 33KV Line Kebbi State	Kebbi	June, 2021	a. Additional 24 MW is added to the Grid b. Improve the welfare and socio - economic activities of the State. c. Improve the power supply of the affected area.
Reinforcement of Kubwa TS with replacement 1x60MVA, 132/33kV Power transformer and its associated switchgears	FCT	March, 2021	a. Additional 48 MW is added to the Grid b. Improve the welfare and socio - economic activities of the State. c. Improve the power supply of the affected area.
Finished Reconductoring 140km Birni -Kebbi -Sokoto line 330/132kV	Sokoto	May 2021	a. Additional 150MW added to the grid. b. Replaced ACSR to ACCC conductor c. Reduced line overloading and improved bulk power supply to affected areas.
Reinforcement of Rumosi TS with 1x60MVA, 132/33kV Power transformer and its associated switchgears	Rivers	August 2020	a. Additional 48 MW is added to the Grid b. Improve the welfare and socio - economic activities of the State. c. Improve the power supply of the affected area.
Reinforcement of Yandev TS with 1x60MVA, 132/33kV Power transformer and its associated switchgears	Benue	March, 2021	a. Additional 48 MW is added to the Grid b. Improve the welfare and socio - economic activities of the State. c. Improve the power supply of the affected area.
Reinforcement of Kumbotso TS with 1x60MVA, 132/33kV Power transformer and its associated switchgears	Kano	April, 2021	a. Additional 48 MW is added to the Grid b. Improve the welfare and socio - economic activities of the State. c. Improve the power supply of the affected area.
Upgrade Kaduna -Jos transmission line route with new multi-Circuit towers	Kaduna/Jos	December 2021	a. Increase the total capacity from 500MW to1500MW. b. Mando 330/132kV Substation can now receive supply through two independent sources, that is either through Shiroro-Kaduna line 1 and 2 or through Jos–Kaduna 330kV line 1 and 2 this will definitely provide system stability and reliability. c. This will boost power supply and socio-economic activities in Kaduna, Jos and neighboring areas.

TCN Maintenance Crew at work

Upgrade of Egbin 330/132/33kV Substation with 60MVA 132/33kV power transformer	Lagos	March 2022	a. Additional 48MW was added to the grid. b. improved welfare and socio -economic activities of the state c. improved power supply to affected areas.
Repairs and energizes the Katampe-Central Area 132kV underground transmission cable line – 1	Abuja	November 2021	a. bulk transmission line redundancy b. improved power supply to affected areas.
Installed & energised a brand new 60MVA power transformer in Gombe 132/33 kV Sub-Station,	Gombe	January 2022	a. capacity of the substation has been upgraded from 125MVA to 150MVA. b. Improved welfare and socio-economic activities of the State c. improved power supply to affected areas.
Installed and commissioned a new 33kV feeder in its Bauchi 132/33kV Substation	Bauchi	April 2022	a. improve supply with an additional 3.5MW to Jos Distribution Company b. provides bulk power supply to the new World Bank water project
Installation of 1 X 30 MVA 132/33kV Mobile Substation at Bichi	Kano	April 2022	Additional 24 MW was added to the grid. b. improved welfare and socio - economic activities of the state c. improved power supply to affected areas.
Installed a new 150MVA 330/132/33kV Inter -bus Transformer (IBTR) at Delta IV Transmission Substation, Ughelli, Delta	Delta	October 2022	This installation allows the bi-directional flow of power from the 330KV bus and 132 kV bus of Ughelli Power Plant, resulting in an addition of 120 MW capacity available to the Discos from Ughelli Power Plant.
Reinforcement of Itire TS with 1x60 MVA, 132/33kV Power transformer and its associated switchgears	Lagos	October 2022	a. Additional 48 MW was added to the grid. b. improved welfare and socio-economic activities of the state c. improved power supply to affected areas.
Installation of Ayede TS with 1x150MVA, 330/132/33kV Power transformer and its associated switchgears	Oyo	November 2022	a. Additional 120MW was added to the grid. b. improved welfare and socio -economic activities of the state c. improved power supply to affected areas.
Completion of Brand New Dawaki 2 X 60 MVA 132/33kV Substations	Abuja	November 2022	a. Additional 120MW was added to the grid. b. improved welfare and socio-economic activities of the state c. improved power supply to affected areas.

Minister of Power, Engr. Abubakar Aliyu FNSE, MD/CEO TCN Engr. Dr Sule Abdulaziz,
on a working visit to AFD project sites to access progress made in executing the projects

3. Projects Funded by Multilateral Agencies

Transmission projects are capital intensive and require dependable and reliable sources of funding for their timely completion. TCN therefore relies on funds from Multilateral Agencies through loan support backed by the Federal Government of Nigeria to finance some of its projects. These projects are executed by specialized units of the Company called Project Management Units(PMUs).

TCN currently has four PMUs, each one for a set of projects funded by each of the financing partners. These are:

A. World Bank PMU (USD486million Nigeria Electricity Transmission Project)
B. Agence FranÇaise de Development (AFD) PMU (USD170million Abuja Transmission Project) and Northern Corridor Project - $200million
C. African Development Bank (AfDB) PMU – (USD 210million Nigeria Transmission Expansion Project)
D. Japan International Corporation Agency (JICA) PMU (USD 235million Lagos-Ogun Power Transmission Project)

Under the leadership of Engineer Abdulaziz, the World Bank-PMU and AFD-PMU have made significant progress in their project delivery milestones.

AFDB PROJECT STATUS

TRANSMISSION LINES

PROJECT	STATUS	REMARKS	EXPECTED OUTPUT
LOT 1 - Construction of new 330kV Mando (Kaduna) – Rimin Zakara (Kano) 204km double circuit QUAD conductor transmission lines, including 1.5km Turn in-out at New Zaria 330/132/33kV, 10km Turn in-out at Kaduna Millenium City 330/132/33kV & 2.5km Turn in-out at Rigasa 132/33kV Substations	The Contract was signed on 22nd August, 2022. The Performance Guarantee, Advance Payment Guarantee (APG) and other supporting documents for effectiveness of the Contract has been submitted as required. Advance payment for the onshore portion of the Contract has been paid.	The Contract is yet to be Effective as Letter of Credit is yet to be opened for the offshore portion of the Contract.	1500MW Wheeling Capacity to be added to the grid. High Efficient Gap GZTACSR conducted to be used in the project.
LOT 2 - Reconstruction of existing 330kV Delta -Benin 125km single circuit Twin conductor transmission line to a double-circuit QUAD conductor, with additional 1 x 330kV Line bay extension each at the existing Delta and Benin Main substations	The Bidding Document was issued in November, 2020 while the Bid Evaluation Report which was sent to the AfDB is being expected for a No Objection. Lot 2 is to be retendered. In addition, a draft bidding document has been forwarded to the Bank for a No objection.	The Contract is to be retendered	1500MW Wheeling Capacity to be added to the grid. High Efficient Gap GZTACSR Conducted to be used in the project.
LOT 3 - Reconstruction of existing 330kV Onitsha - Alaoji 138km single circuit conductor transmission line to a double-circuit QUAD conductor, with additional 1 x 330kV Line bay extension each at the existing Alaoji and Onitsha substations	The Contract was signed on 27th June, 2022. The Performance Guarantee, Advance Payment Guarantee (APG) and other supporting documents for effectiveness of the Contract has been submitted as required. Advance payment for the onshore portion of the Contract has been paid	The Contract is yet to be Effective as Letter of Credit is yet to be opened for the offshore portion of the Contract	1500MW Wheeling Capacity to be added to the grid. High Efficient Gap GZTACSR Conducted to be used in the project

TRANSMISSION SUBSTATIONS

LOT 1 (i) - Construction of 2x150MVA, 330/132/33kV & 2x60MVA, 132/33kV complete Substation at new Zaria, with 4x330kV, x132kV line bays and 6x33kV feeder bays LOT 1 (ii) - Construction of 2x60MVA, 132/33kV complete substation Turn in - out on the existing Kaduna - Zaria 132kV double circuit transmission line at Jaji, with 2x132kV line bays and 6x33kV feeder bays	The Contract was signed on 9th June, 2022. The Performance Guarantee, Advance Payment Guarantee (APG) and other supporting documents for effectiveness of the C ontract has been submitted as required. Advance payment for the onshore portion of the Contract has been paid	The Contract is yet to be Effective as Letter of Credit is yet to be opened for the offshore portion of the Contract	240MVA Substation Capacity will be added to the grid on completion of the project
LOT 2 (i) - Construction of 2x150MVA, 330/132kV & 2x60MVA, 132/33kV complete substation on the existing Kaduna-Jos single circuit transmission line at Millennium city Kaduna, with 2x330kV, 4x132kV line bays and 6x33kV feeder bays LOT 2 (ii) - Construction of 2x60MVA, 132/33kV complete substation including 4 x 132kV line bays and 6 x 33kV feeder bays at Rigasa	The Contract was signed on 9th June, 2022. The Performance Guarantee, Advance Payment Guarantee (APG) and other supporting documents for effectiveness of the Contract has been submitted as required. Advance payment for the onshore portion of the Contract has been paid.	The Contract is yet to be Effective as Letter of Credit is yet to be opened for the offshore portion of the Contract.	240MVA Substation Capacity will be added to the grid on completion of the project

ENGINEERING SUPERVISION

Contract Supervision of 330kV Double Circuit QUAD Conductor Transmission Lines, 330/132/33kV & 132/33kV Transmission Substations Projects	The Contract was signed on 19 th October, 2022. The Advance Payment Guarantee (APG) and other supporting documents for effectiveness of the Contract has been submitted as required. Also, Advance payment for the onshore portion of the Contract has been paid	The Contract is yet to be Effective.	

ENGAGEMENT OF EXTERNAL AUDITOR FOR NTEP-1

Engagement of External Auditor for NTEP-1	The Request for Expression of Interest was issued to approved list of Auditing firms in Nigeria by the AfDB on 25th October 2022. Request for Proposals (RfP) was issued to shortlisted firms on 27th January 2023. Technical Proposals were opened on 13th February 2023 and evaluation has concluded and sent to the Bank for No objection.	Technical Evaluation has been concluded and sent to the Bank for a No objection	

AFD PROJECT

PROJECT DESCRIPTION	PROJECT PURPOSE	PROJECT LOCATION	PROJECT STATUS in %	COMMENCE-MENT DATE	COMPLET-ION DATE	SOURCE OF FUNDING
LOT 1:- 143KM Lafia – New Apo (Pigba) 330kV DC Transmission Line	Provide 3rd 330kV corridor into Abuja	Nassarawa/ Abuja	63.91%	15th July 2019	14th Nov 2022	AFD
LOT 2:- (A)11km New Apo (Pigba) -Old Apo , (B)42km New Apo (Pigba)-Kuje , and (C)28km Kuje -West Main (Lugbe) 132kV DC Transmission Lines	Load growth	Abuja	62.80%	15th July 2019	15th Dec 2022	AFD
LOT-3 Construction of 2X150MVA 330/132/33kV S/S at New Apo with Line Bay Extensions at Lafia S/S and Old Apo S/S.	Load growth	Abuja	81.80%	1st July 2019	30th Sept 2022	AFD
LOT-4 Construction Of 2x150MVA, 330kV Hybrid S/S at West Main (Lugbe) With 2x330kV Line Bays Including 3x60MVA,132/33kV & 4x132kV Line Bay GIS & 33kV Metal Clad	Load growth	Abuja	69.70%	19th Aug 2019	15th Nov 2022	AFD
LOT-5 Construction of Complete New 3x60MVA 132/33kV Kuje S/S with 4 x 132kV Line Bays and 2 x 60MVA, 132/33kV S/S with 2x132kV Line Bays at Wumba/Lokogoma plus 5km 132kV Underground XLPE Cable from New Apo Substation to Wumba/ Lokogoma Substation	Load growth	Abuja	94.20%	15th July 2019	15th Dec 2022	AFD
LOT-6 Construction of 2X60MVA,132/33kV GIS Substation at Gwarimpa including Laying of 1km 132kV Underground XPLE	Load growth	Abuja	100%	15th July 2019	15th Nov 2022	AFD

JICA PROJECTS STATUS

PROJECT DESCRIPTION	PROJECT PURPOSE	PROJECT LOCATION	PROJECT STATUS in %	SOURCE OF FUNDING
Lot 1a - Construction of about 102.95 km of new 330kV double circuit line	i) Construction of 48.8km of new 330kV double circuit (DC) line from Likosi 330/132/33kV substation to Ejigbo 330/132/33kV substation ii) Construction of 5.1km of 2x 330kV double circuit line (multi circuits) from new MFM 330/132/33kV substation to the existing Omotoso /Ikeja West double circuit line	Ogun State	0.00%	JICA
Lot 1b - Construction of about 104.59 km of new 132kV double circuit lines	i) Construction of about 35.5km of new 132kV double circuit line from new Ejigbo 330/132/33kV substation to New Abeokuta (Kobape) 132/33kV Substation ii) Construction of 7.78km of new 132kV double circuit line from Likosi 330/132/33kV Substation to the proposed Redeem 132/33kV substation iii) Construction of 2.41km of new 2x 132kV double circuit (multi circuits) line from the proposed Likosi 330/132/33kV Substation to Ikorodu /Shagamu 132kV double circuit line.	Ogun State	0.00%	JICA
Lot 2a - Construction of 2No. 150MVA, 330/132/33kV AIS substation at Likosi equipped with 10 x 330kV line bays, 2No. 100MVA 132/33kV transformers including 6 x 132kV and 6 x 33kV line bays and Termination works with the existing 330kV Transmission lines	New 330/132/33kV Substation for power transmission around Sagamu and Simawa area of Ogun State	Ogun State	0.00%	JICA

Lot 2b – Construction of complete new 2No.x 60MVA, 132/33kV substation at Abule Oba (Redeem)including 6 x 33kV line bays	New 132/33kV Substation to cover the Redeem and Shimawa area	Ogun State	0.00%	JICA
Lot 3a – Construction of complete new 2No. 150MVA, 330/132/33kV AIS substation at Ejigbo to be equipped with 12 X 330kV line bays, and 2No. 60MVA, 132/33kV transformers including 2 x 132kV and 6 x 33kV line bays and i. Construction of 2 x 330kV line bays extension at Olorunsogo switchyard ii. Construction of 2 x 132kV line bays extension at New Abeokuta 132/33 kV Substation	New 330/132/33kV Substation for power evacuation from Olorunsogo Power to cover the Ewekoro, Airigbajo and Ofada area of Ogun State	Ogun State	0.00%	JICA
Lot 3b – Construction of complete new 2No. 150MVA, 330/132/33kV AIS substation at Makogi (MFM) to be equipped with 4 X 330kV line bays, and 2No. 60MVA, 132/33kV transformers including 6 x 33kV line bays	New 330/132/33kV Substation to cover the Mowe, Ofada and MFM area in Ogun state	Ogun State	0.00%	JICA
Lot 4a – Construction of complete new 2No. 150MVA, 330/132/33kV AIS substation at Ajegunle (New Agbara) to be equipped with 6 X 330kV line bays, and 2No.60MVA, 132/33kV transformers including 4 x132kV and 6 x 33kV line bays and Construction of 2 x 132kV line bays extension at the existing Agbara 132/33KV substation	New 330/132/33kV Substation to cover the Agbara Industrial Area, Otta and its environs in Ogun state	Ogun State	0.00%	JICA
4b – Construction of complete new 2No. x 60MVA, 132/33kV substation at Badagary including 2 x 132kV and 6 x 33kV line bays	New 132/33kV Substation to cover the Badagry and its environs	Lagos State	0.00%	JICA

WORLD BANK

Project Title	Project Location	Status	% Disbursement
Rehabilitation and Reinforcement 330/132kV Transmission Substations (NTP - TR1A Lot 1)	Dakata, Dan Agundi, Kumbotso in Kano State ; Shiroro and Kainji in Niger State ; Central Area in FCT Abuja ; and Birnin Kebbi	Engineering/Design = 85% Procurement = 30% Construction = 15% Pre - commissioning = 0% Overall Percentage = 27%	22%
Rehabilitation and Reinforcement 330/132kV Transmission Substations (TR1A Lot 2)	Ijora, Lekki, Alagbon, Alausa, Akoka, Amuowu Odoffin, Itire, Otta TS, Maryland and Egbin Substation in Lagos State	Engineering/Design = 90% Procurement = 30% Construction = 15% Pre - commissioning = 0% Overall Percentage = 28%	22%
Rehabilitation and Reinforcement 330/132kV Transmission Substations (TR2 Lot 1)	Alaoji , Umuahia Aba, in Abia State ; Port Harcourt Main, Port Harcourt Town ; Itu, Akwa Ibom State ; New Haven in Enugu State ; GCM TS Onitsha Otukpo, Apir, Makurdi in Benue State	Engineering/Design = 30% Procurement = 65% Construction = 10% Installation = 0% Pre - commissioning = 0% Overall Percentage = 39%	30%
Rehabilitation and Reinforcement 330/132kV Transmission Substations (TR2 Lot 2)	Delta IV and Effurun in Delta State ; Irrua and Benin in Edo State ; Ganmo, Ilorin in Kwara State ; Osogbo in Osun State ; Ondo, Ondo State	Engineering/Design = 90% Procurement = 70% Construction = 10% Pre - commissioning = 0% Overall Percentage = 45%	60%
Rehabilitation and Reinforcement 330/132kV Transmission Substations (NTP - TR3 Lot 1)	Damaturu , Mayo Belwa Bauchi and New Bauchi , Damboa , Yola , and Maiduguri	Engineering/Design = 80% Procurement = 60% Construction = 20% Pre - commissioning = 0% Overall Percentage = 44%	32%

Rehabilitation and Reinforcement 330/132kV Transmission Substations (TR3 Lot 2)	Gombe, Gombe State Jos, Plateau State Jalingo, Taraba State	Engineering/Design = 70% Procurement = 40% Construction = 20% Pre - commissioning = 0% Overall Percentage = 34%	34%
TR 10: Completion of Billiri 2x60 MVA 132/33kv substation	Billiri, Gombe State	Engineering/Design = 100% Procurement = 90% Construction = 80% Pre - commissioning = 0% Overall Percentage = 87%	85%
Supply and Installation of Substation Essential Power Equipment - NGP-T6 Lot 2: Addendum No 3	Shagamu, Ogun State Kabba, Kogi State New Kano, Kano State 9th Mile, Enugu State	New Kano: 92% Kabba: 90% Sagamu: 98% 9th Mile: 92% Overall Percentage = 87%	70%
Rehabilitation of SCADA (NTP – TR6C)	All Transmission Substation	Contract was signed on 25th August 2022 Site Handover will commence on the 20th of September 2022 Payment of 20% Advance is on - going	0%
Digitization (NTP-TR12)	Selected 26 Transmission Substation	FAT on all equipment is completed Shipment of equipment is ongoing Overall Progress–20%	23%
Refurbishment and Extension of Two Existing Control Centres	Ikeja West Regional Control Centre Benin Regional Control Centre	Ikeja West – 57% Benin–57%	43%

Project	Project Description	% Completion	% Disbursed	Status
Supply of Substation Essential Power Equipment to Ojo Stores, Lagos (NTP-TR4 – Lot 1)	Supply of Power Transformer, Earthing Transformers and Earthing Reactors to TCN Ojo Stores	80%	90%	Manufacturing of 3 Nos 100 MVA Power Transformer is Ongoing
Supply of Substati on Essential Power Equipment to Ojo Stores, Lagos (NTP - TR4 – Lot 2)	Supply of Circuit Breakers, Current Transformers, Disconnector Switches, Voltage Transformers to TCN Ojo Stores	100%	100%	Completed
Supply of Battery Charger and other testing equipment to TCN Ojo Stores NTP-TR8	Supply of Battery chargers, testing equipment, safety materials, battery bank, to the TCN Ojo stores	75%	75%	Delivery of Battery Bank and Numerical Relay to TCN Ojo Stores is expected by 15th October 2022
Supply of regeneration machines, Hiab, tower cranes NTP –TR7	Its includes the supply of regeneration machines, hiab, low bed truck, tower cranes, aerial machines to the TCN Ojo stores	65%	55%	9no Hiab, 20no Mobile Scissors, 1no Low Bed and Truck head was shipped on the 17th of July 2022 and expected to arrive at the Apapa Port by end of September 2022
Supply of GAP Conductors Lokoja-Okeagbe 132kV Double Circuit	Supply of GAP Conductors and Tower Accessories	35%	43%	OPGW, GSW, GAP conductor, insulators, hardware, and fittings have arrived at the Port and awaiting clearance. FAT for Towers is completed

Some Completed and Ongoing Transformer and lines Projects in TCN Regional offices

15 (Fifteen) brand new power transformers from Lagos port, Apapa to TCN Central Store in Ojo, Lagos State, for onward delivery to TCN project sites

8 (Eight) brand new power transformers from Lagos port, Apapa to TCN Central Store in Ojo, Lagos State, for onward delivery to TCN project sites

ABUJA REGION

2X60MVA, 132/33kV Gas Insulated Substation (GIS) at Gwarinpa, Abuja

Construction of brand new tower at Katampe, Abuja.

BENIN REGION

150MVA 330/132/33kV interbus transformer (IBTR) at Delta IV Transmission Substation, installed and energized

100MVA transformer in Benin Transmission Substation.

BAUCHI REGION

60MVA power transformer in Gombe 132/33kV Substation, installed & energised

Energized 132kV Shiroro-Tegina-Kotangora Transmission line

KANO REGION

100MVA power transformer at 330/132/33kV Kumbotso Transmission Substation, Kano State.

100MVA power transformer at Dan Agundi 132/33kV Transmission Substation

2x60MVA power transformers at 132/33kV Kankia Transmission Substation, Kastina State.

100MVA, 132/33kV power transformer at 132/33kV Dakata Substation, Kano, placed on plinth

OSOGBO REGION

150MVA, 330/132kV power transformer energized at Ayede Transmission substation

75MX 330kV Shunt Reactor at 330/132/33kV Osogbo Transmission Substation

300/375MVA 330/132/33kV power transformer at Osogbo Transmission Substation

Ongoing reconductoring/upgrading of TCN Ayede-Eleyele 132kV Double Circuit transmission lines project in Ibadan.

LAGOS REGION

60MVA 132/33kV power transformer at Isolo 132/33kV Transmission Substation, installed and energised

Transformer switch gears and accessories at Egbin 330/132kV Transmission Substation

2x100/125MVA power transformers and accessories at Alagbon 330/132/33kV Transmission Substation.

Truck containing one number 100MVA transformer and accessories at 132/33kV Ijora Transmission Substation, Lagos.

Transformer accessories and switchgears in Lekki 330/132/33kV Transmission Substation

Transformer accessories in Ota 132/33kV Transmission Substation

KADUNA REGION

330kV Circuit Breaker installed at Mando 330/132kV Transmission Substation

30MVA 132/33kV Mobile Transmission Substation, Bichi

PROJECTS AWARDED IN 2023

Name of Project	Location (State)	Year of Award	Planned Date of completion	Impact
Design, Supply and Installation of 2x60MVA, 132/33kV Transmission Substation at Misau with 2x132kV Line Bays Extension at Gwaram	Bauchi	2023	24Months	a. Additional 98MW is added to the grid b. On completion of the project, socio-economic activities in the affected areas will be positively impacted
Design, Supply and Installation of 2x60MVA, 132kV Substation at Mashi, with Turn-in and Turn-out from Katsina-Daura 132kV Double Circuit line	Katsina	2023	24Months	a. Additional 98MW is added to the grid b. On completion of the project, socio-economic activities in the affected areas will be positively impacted
Design, Supply and Installation of 2x60MVA, 132/33kV Substation at North Bank, with 2x132kV Line Bays Extension at Apir and 20km Apir - North Bank 132kV Double Circuit Transmission Line	Benue	2023	24Months	a. Additional 98MW is added to the grid b. On completion of the project, socio-economic activities in the affected areas will be positively impacted
Design, Supply and Installation of 1x60MVA, Mobile Transformer in each Ebonyi State University and Ebonyi State Airport with 4.5km 132kV Double Circuit Turn-in and Turn-out on the ongoing Abakiliki-Amasari Transmission line	Ebonyi	2023	24Months	a. Additional 48MW is added to the grid b. On completion of the project, socio-economic activities in the affected areas will be positively impacted

Design, Supply and Installation of 2x60MVA, 132/33kV Transmission Substation at Babura with 4x132kV Line Bays Extension at Danbatta, Kano State and Associate 61km Babura - Danbatta 132kV DC Transmission Line	Jigawa	2023	24Months	a. Additional 98MW is added to the grid b. On completion of the project, socio-economic activities in the affected areas will be positively impacted
Design, Supply and Installation of 1x60MVA, 132/33kV Substation at Oro, Kwara State with 5km Turn-in and Turn-out Offa-Omuaran 132kV DC Transmission Line	Kwara	2023	24Months	a. Additional 48MW is added to the grid b. On completion of the project, socio-economic activities in the affected areas will be positively impacted
Design, Supply and Installation of 222km Birnin-Kudu-Gwaram-Misau-Ningi-Azare 132kV SC Transmission Line	Jigwa and Bauchi	2023	24Months	On completion of the project, socio-economic activities in the affected areas will be positively impacted
Design, Supply and Installation of 2x60MVA 132/33kV Substation at Zing	Taraba	2023	24Months	a. Additional 98MW is added to the grid b. On completion of the project, socio-economic activities in the affected areas will be positively impacted
Design, Supply and Installation of 2x60MVA 132/33kV Substation at Geidam	Yobe	2023	24Months	a. Additional 98MW is added to the grid b. On completion of the project, socio-economic activities in the affected areas will be positively impacted

Construction of 30km 132kV Double Circuit Transmission Line from Rimin-Zakara to Kanye	Kano	2023	18Months	a. Improved voltage level in the affected area b. On completion of the project, socio-economic activities in the affected areas will be positively impacted
Design, Supply and Installation of 2x60MVA, 132/33kV Substation at Birnin-Kudu with 4x132kV Line Bays and 2x132kV Line Bays Extension	Jigawa	2023	24Months	a. Additional 98MW is added to the grid b. On completion of the project, socio-economic activities in the affected areas will be positively impacted
Design, Supply and Installation of 2x60MVA, 132/33kV Substation at Kazaure with 4x132kV Line Bays Extension	Jigawa	2023	24Months	a. Additional 98MW is added to the grid b. On completion of the project, socio-economic activities in the affected areas will be positively impacted
Design, Supply and Installation of 2x60MVA, 132kV Substation at Nguru with 2x132kV Line Bays Extension at Damaturu	Yobe	2023	24Months	a. Additional 98MW is added to the grid b. On completion of the project, socio-economic activities in the affected areas will be positively impacted

4. Nigerian Presidential Power Initiative (PPI)

TCN is a key stakeholder of the Nigerian Presidential Power Initiative (PPI) as undertaken by FGN Power Company (FGNPC). The initiative aims to resolve existing challenges in the nations power sector and expand the capacity of the transmission and distribution networks. The PPI project also aims to upgrade the electricity network, to achieve an operational capacity of 25,000 megawatts (MW) from the current average of around 4,500 MW, through series of projects spanning three phases.

The Engr. Dr. Abdulaziz led management has provided continual support to the PPI through the dedication of TCN engineers in supporting the initiation, design and delivery of TCN related part of PPI. As a result, TCN engineers have successfully assisted the FGNPC in the procurement, delivery and installation of some replacements at critical substations in the grid. Focusing on satisfying DisCos needs, TCN has recently agreed to embark on some projects to resolve TCN/DisCos constraints. The projects are called the Service Level Agreement (SLA) projects, because they represent TCN's commitment to better serve the DisCos. There are more than 50 DisCos/TCN interface projects in this project cohort. The projects are funded by Central Bank of Nigeria (CBN) through loans provided to the DisCos. The loans are to be recovered through deductions from TCN Internally Generated Revenue Invoices.

5. Line Reconductoring

Several 132kV lines are aged and severely limited in capacity, TCN therefore initiated the reconductoring of some of these lines, including the reconductoring of 16No, transmission lines, and 17 others under the Service Level Agreement (SLA) projects across the country to further reinforce the grid for optimal evacuation and transmission of bulk electricity. These include, the Ogba-Alausa 132kV Transmission line, Ikeja West Alimosho 132kV Transmission Line, Kumbotso-Hadeja 132kV SC, Kumbotso-Kankia 132kV SC, Birnin Kebbi -Sokoto 132kV Transmission Line, Ahaoda Garrain Yenagoa 132kV Transmission Line and Alaoji-Owerri 132kV Transmission line DC Line 1, among others.

6. Launch of Grievance Redress Mechanism (GRM) Strategy Booklet

The GRM Booklet aims to resolve TCN/ landowner's issues and enable the quick resolution of challenges stalling the completion of TCN's projects nationwide.

7.Digital Transformation Process in TCN

Under the current leadership, TCN has embarked on aggressive digital transformation using internal home-grown solutions and vendor procured applications. This is to enhance the efficiency and effectiveness of firm-

wide operations by embracing new platforms and tools, upgrading existing systems, and automating routine tasks. Key areas that are worth noting include:

The Upgraded NSONG Platform

Prior to assumption of office by Engr. Dr. Abdulaziz, the management of grid control was done mostly via manual logs and exchange of emails. As part of the digital transformation strategy, the TCN web-portal NSONG was upgraded to achieve transparency. The NSONG which was previously used for skeletal exchange of information was reinvigorated to enhance transparency as a key ingredient to the market which runs on TCN infrastructure (as TSP) and coordinated also by TCN(SO).

Similarly, NSONG has in-built Generator Dispatch Tool (GDT) and Distribution Dispatch Tool (DDT) for the Generators, Distribution Companies and National Control Center (NCC) Grid Controllers to enhance seamless and transparent interaction. Through NSONG, operational and guidance instructions are dispatched to GENCOs & DISCOs, ensuring transparent and seamless communication within the Electricity Grid. All activities and interactions between stakeholders are logged in to help facilitate analysis, planning, as well as dispute resolution.

The Generation Dispatch Tool (GDT) of the NSONG is used:

a. By generators to submit their day-ahead nominations stating what they want to generate in the 24-hour period of the next day.

These nominations are used by the NCC Grid Controllers to allocate load in a transparent manner to the Distribution Companies, who equally submit their load demand in the NSONG through the Distribution Dispatch Tool.

b. Gathering quarter-hour/ hourly generation profile (MW & MVar) of the individual Generating units in all GenCos.

c. Dispatching Load Profile instructions to GenCos (free governor /increase / decrease generation) to ensure stability of the Grid.

The Immediate Gains of the GDT are:

- Timely dissemination of quarter-hour generation data by GenCos to NCC
- Monitoring of the units on free-governor or frequency response
- Elimination of errors that occur while using phone calls to obtain generation data thereby largely eliminating disputes that often arise from verbal transmission of data
- Easy storage & retrieval of generation data (MW & Mvar)
- Closer monitoring of generation performance
- Viewing generation history & export of records
- Greatly assist in meritorious dispatch of generating units in the grid

Similarly, the Distribution Dispatch Tool (DDT), is currently being used to give load-allocation to the

DisCos and it has the following immediate gains
- Monitoring of Distribution Load profile
- Matching of DISCO load profile to Generation availability and vice versa

NSONG was built and is being maintained by the TCN ICT Department. The advantage of this for TCN, is the ability to meet the needs of the electricity sector in a timely manner. Prior to the tenure of the present management, the prevalent attitude was to overlook in-house capacity and home-grown solutions with the TCN ICT Department while waiting for the establishment of a new Supervisory Control and Data Acquisition System/Energy Management System (SCADA/EMS) to implement these tasks.

It is well known that an industrial grade SCADA/EMS is the best to implement the coordination and recording of electricity flow and market data on the grid. However, the MD/CEO decided that TCN needed to meet its mandate while the procurement of SCADA was being vigorously pursued. This illustrates an almost revolutionary digital transformation, from a manual process to one that is semi-automated, accountable, and transparent.

Supervisory Control and Data Acquisition System/Energy Management System (SCADA/EMS)

After a protracted delay in commencing a new SCADA/EMS project to replace the dilapidated NEPA era SCADA/EMS system, the Management team led by Engr. Abdulaziz signed a contract for the new SCADA/EMS and Communication Systems upgrade in August 2022. The new system is being implemented by NR Electric Co. Ltd. Prior to that, the TCN Management had initiated the process of building two state of the art Control Centers in Osogbo and Gwagwalada to house the new SCADA/EMS infrastructure.

Increase Grid Visibility

For effective grid management and control, it is important that the Grid Controllers at NCC view every part of the grid to accurately gauge situations on the grid and take immediate remedial measures to guarantee grid reliability. Prior to the present leadership, only 6 out of 27 generators were visible to NCC. Determined to move forward on grid visibility, TCN jettisoned the previous approach of waiting for the completion of the SCADA/EMS scheme for visibility level to increase. While they acknowledged that it was more ideal to have an established SCADA system, they also recognized that little things could be done to make great impact while waiting for the full implementation of the big SCADA. They tasked TCN Engineers to come up with a stop-gap solution to address visibility issues.

The Engineers came up with an in-house design that leverages on "Internet of Things" to get data in near real time from all the generators and some substations. Currently, all the generators on the grid are visible on the grid, with a substantial amount of the substations visible to NCC. This in-house solution to the perennial visibility problem has shown that while waiting for the big idea to mature, TCN can leverage on small solutions that

germinate fast and make big impacts. This stop-gap solution will be operational for grid management pending the deployment of a state-of-the-art SCADA/EMS network which has already been awarded and sponsored by the World Bank.

Digitization of Old Transmission Substations

TCN has embarked on digitization of old transmission substations in its network. The digitization project is aimed at improving the automation system of old transmission substations and their connectivity with the proposed TCN SCADA System, without which the old substations would not have been able to take advantage of the new SCADA system.

Automated Meter Reading (AMR) and Meter Data Management System (MDMS)

Deployment of Automated Meter Reading (AMR) and Meter Data Management System (MDMS) for remote meter reading and data acquisition and accurate energy data for settlement preparation to achieve:

- Unrestricted access to user department 24/7 and ensure data integrity, system availability and security.
- Detect tamper events and outage occurrences.
- Calculate transformer loading from interval data and ability to read capacity from generator's meters.
- Stream and store meter data at user defined interval and monitor participants energy load in real time and publish.
- Reliable and effective communication channel with all types of meters.
- Scalable and flexible system integration with other systems (Settlement Software, SCADA etc.) for reports generation.

ICT Transformational Processes

The Information and Communication Technology (ICT) Department is a support service division in Transmission Company of Nigeria, saddled with automating and digitizing the processes of TCN in line with the corporate goals of the organization in a quick and effective manner. The TCN Management has leveraged on the mandate of the ICT Department to undertake several digitization projects including:

a. Procurement of Enterprise Resource Planning (ERP) Solution which is at an advanced stage. The consultancy services arrangement is fully running while the main contract funded partly by AFDB is at signing stage. The ERP project will integrate all running and proposed digital assets and applications of TCN as well as automation of other manual processes of the company.

b. Award of contract for deployment of Mini Data Center in eight regional offices - Oshogbo, Benin, Enugu, Port Harcourt, Bauchi, Kaduna, Kano, and Abuja Region which is in progress. These projects will form the sub-domain of TCN corporate infrastructural forest with nucleus at TCN CHQ.

c. Award of contract for deployment of Disaster

Recovery Centers in two Regional Offices – Lagos and Shiroro Regions which is similarly in progress.
The Disaster Recovery Center will be the remote mirror of the network hub at the Corporate Headquarters, with capacity to assume and function as main hub whenever there is a failure for any reason at the Corporate Headquarters.

d. Award of contract for Deployment of Local Area Networks (LAN) in all Regional Offices, with deployment in progress. The Local Area Network will be used to avail network resources to every office and users in the regional headquarters

e. TCN Management is in the process of Deploying Closed Circuit Televisions (CCTV) in all control rooms and switch yards of TCN. The consultancy services for the project is in progress in all regions. The CCTV will ensure comprehensive and centralized surveillance of TCN critical infrastructures.

f. Similarly, TCN Management has commenced deployment of Video Conferencing equipment in all regional Headquarters of TCN and CHQ. This project has been deployed at CHQ, Bauchi, Enugu, Oshogbo, Lagos and Kaduna regions, while contract has been awarded for deployments at Port Harcourt, Shiroro, Benin, Kano and Abuja Regions. The Video teleconferencing equipment will ease the conduct of all Management and regional meetings virtually to save time and cost.

g. TCN Management is in the process of awarding contact for the provision of dedicated internet services in all regional and sub-regional offices of TCN nationwide. Award of this contract has been approved by TSP tender board following no objection approval by BPP. Provision of internet services will provide platform for integration of all Island networks in TCN into an all-inclusive Wide Area Network(WAN).

8. Capacity Building

In realization of the importance of human capacity building in the successful implementation of these projects, TCN Management has not only incorporated technical trainings in the respective projects but also organized the under-listed trainings for ICT staff.

i. Advanced Technical Training for ICT staff on Palo Alto design and deployment by CLEMAD Nig. Limited in January 2022.
ii. Capacity building in cloud computing by Intel Box Nigeria Ltd in February 2022.
iii. Capacity building in Cyber Security and online collaboration by Lexington Nig. Limited in February 2022.
iv. Technical Training on FM800 Data Center management by Huawei Technologies in April 2022.
v. Crisis Management and Leadership held by Capacity Development Training for Africa (CDTFA) in Dubai, United Arab Emirates in May 2022.
vi. Executive Leadership Management training by worldwide solutions in London UK -July 2022

9. Creation of Conducive Work

Environment

Creation of a conducive workplace as a vital tool for driving personnel to work hard together is one of the key commitments of the present Management. Management is committed towards creating a prolific and compassionate holistic work culture through swiftness in policy making and implementation.

In order to achieve this objective therefore, several office complexes have been renovated, modern ones have also been built in Kano Region, while that of Benin Region in Ihovbor, and Owerri and Uyo Work Centers are ongoing. This is because, there is the understanding that a conducive environment impacts output.

Recently upgraded Kano regional office

TCN engineers installing a brand new Circuit Breaker delivered to the

Mando 330/132/33kV Substation, under the Kaduna Regional Office of TCN

10. RESPONSIVE AND EXPEDIENT

- MAINTENANCE

Replenishing the Store

Today, TCN's Central Store has been fully stocked against what prevailed in the past. The lack of spare parts in-store was responsible for slow responses to apparatuses outages and long equipment downtimes. To address this, TCN procured a large number of spare apparatuses and store materials that will enable quick and efficient maintenance which will consequently reduce downtime and increase performance. A lot of the procured spare parts are already at the Ojo Store, Lagos, some have been deployed to substations nationwide while more have arrived the Nigerian ports.

The spare stock which is the highest of such in the company's history, includes 22 power (60MVA, 100MVA and 150MVA) transformers, 30 forklifts, reconditioning facilities, isolators haulage trucks, transmission switchyard spare parts, 45No. earthing transformers, Suspension Clamps, Vibration Dampers, electric scaffold mobile scissors, Armor Rods, Circuit Breakers, Current transformer, Voltage transformers, 100 tons Crane truck heads etc. This massive stock of Equipment procured under the Engr. Abdulaziz led management is to ensure significant reduction in downtime due to continuous availability of spares for planned and unplanned maintenance activities in the grid.

Trace Clearing

TCN Management team undertook massive vegetation management and trace clearing of land under transmission lines which was not done for a long time in the past. This has led to significant reduction in transmission lines outages caused by grass, trees, crops and other vegetations. These actions have contributed greatly to the reduction of lines downtime and have equally contributed to grid stability.

Service Reflective Tariff Mechanism and Improved Revenue

TCN, is cooperating with the regulator, the Nigerian Electricity Regulatory Commission (NERC) in implementing the Service Reflective Tariff Order and the associated mechanism operated by the System Operator and Market Operator. This cooperation has moved the industry from an opaque tariff era to one that is transparent and based on service delivered as measured by the System Operator and Market Operator Divisions of TCN.

Under the current leadership of TCN, NERC allowed a slight increase in tariff for TCN to cover its investments and operations cost. This has led to increased revenue and more funds being made available to execute projects for the immediate benefits of the DisCos.

11. HUMAN RESOURCES AND

- INDUSTRIAL RELATIONS

Labour Issues

TCN has two in-house labour unions, National Union of Electricity Employees (NUEE) and Senior Staff Association of Electricity and Allied Companies (SSAEAC). Both were for a long time at logger-heads. However, within one month of assuming office, the MD/CEO and his team deployed leadership skills and managerial experience to resolve the issues behind the conflict, leading to unprecedented industrial harmony in the workplace. His policy of inclusion and non-interference in dealing with labour related issues, have engendered increased level of mutual trust by the two unions, thus breaking the vicious unproductive past characterised by in-fighting among labour unions. Under his leadership, the Management team has adhered to the terms of collective agreement thus bringing to the barest minimum, the incidence of work disruption.

Human Capital Development

The perennial challenge of poor staff training in key technical and operational areas in the organization were brought into focus and tackled. This is to bridge the yawning skill gaps in the workforce. The Human Resources Department had to quickly embark on strategic capacity building programs including:

1. The continuous training of Grid Controllers and System Operators on extant rules and regulations of the Nigerian Electricity Supply Industry (NESI).
2. Advanced Data Gathering and Manipulation for Systems and Market Data Processes.
3. Training of all General Managers on Leadership and Management Skillsets.
4. Procurement Skillsets Training.
5. Training of Field Engineers:
    a. Protection, Control and Metering Engineers
    b. Electrical Maintenance Department
    c. Lines (Hot & Cold Maintenance)

12. IMPROVED RELATIONSHIP WITH

- OTHER STAKEHOLDERS

The current administration of TCN has equally put an end to the constant blame game in the media between TCN and the DisCos over issues that could otherwise have been resolved amicably. He took a different approach in dealing with operational disputes, choosing rather to treat DisCos not only as critical stakeholders, but most importantly, as TCN customers. Various TCN - DisCos engagements were initiated, some of which were conducted under the guidance of the regulator, Nigeria Electricity Regulatory Commission (NERC) to ensure that a more conducive atmosphere for business was created.

These engagements have made TCN to pay more attention to interface challenges of the DisCos and resolving them expeditiously. Consequently, TCN now has improved and better relationships with the DisCos and GenCos, and has also signed Service Level Agreements with DisCos to guarantee the commitment to service improvement.

The obligations of the parties under Service Level Agreements will bring about the resuscitation and completion of abandoned projects or facilities which will enhance supply of power to DisCos load centres and also address interface issues.

Ag. MD/CEO TCN, Engr Dr. Sule Abdulaziz signing SLA agrrement with MD Yola Disco

Air Insulated Substation

TCN TARGETED AREAS OF IMPROVEMENT

1. Financial Sustainability/Business Growth

Financial growth is very important to sustaining the activities of TCN. Towards this end, TCN will explore the following areas for financial growth and increase in revenue.

A. Expand the network to areas of high profitability.
B. Actively seek new viable Eligible Customers on the transmission network.
C. Explore the improvement of TCN's revenue through the optimization of unutilized and underutilized Fibre Optics/OPGW facilities, especially the un-utilized and under-utilized ones.
D. Deliberate reduction of transmission losses to decrease transmission loss factor financial penalties.
E. Develop and implement cost-saving initiatives to reduce expenses and improve the overall financial performance of the company.
F. Explore new business opportunities and partnerships to diversify the company's revenue streams and improve its financial stability.
G. Continuous support of the development of WAPP Regional Electricity Market.
H. Explore new business opportunities and partnerships to diversify the company's revenue streams and improve its financial stability.
I. Develop and implement a clear and concise growth strategy to guide the company's expansion efforts.
J. Foster a culture of innovation and creativity within the company to help drive new business opportunities and growth.

By implementing the above, TCN will increase its revenue, satisfy the Discos, GenCos, International Customers and Eligible Customers and above all, promote sustainable business growth.

2. System reliability and capacity improvement

It is important that TCN improves the system reliability and further expand its capacity.
To improve system reliability and capacity, TCN will take the following steps:

- Continue reinforcement of the existing transmission infrastructure to reduce transmission losses and improve the overall efficiency of the grid.
- Continue to upgrade the existing substations and transmission lines to increase their capacity and further improve reliability.
- Continue with the provision for spares, work tools, equipment and work vehicles.
- Rehabilitation and upgrading of the grid through transmission lines and substation projects across the country will be prioritized and sustained.
- TCN will actively seek to gazette and register with the state governments all its substation lands and transmission lines Right of Way for existing, ongoing and future projects. TCN will also seek collaboration with state development control to jointly patrol Right of Way to evict encroachers in a timely manner.
- Adoption of new technologies and methodologies for grid management.
- Procurement of Spinning Reserve.
- Development and enforcement of the transmission planning criteria.
- Full automation of all substations will be completed.
- Active steps will be taken to eliminate grid collapse and ensure grid frequency stays within active limits.

2b. Continuous Expansion for Growth, Reliability and Renewable Integration

The Transmission Company of Nigeria (TCN) grid is the backbone of Nigeria's electricity supply system, responsible for the transmission of electricity from power generation stations to distribution companies and ultimately to consumers. As shown in the preceding parts of the report, over the years, TCN has embarked on various expansion programs to increase the capacity of the grid to meet the growing demand for electricity in the country. However, despite these efforts, there is still a need for continuous expansion of the grid. The reasons are explained below.

Firstly, the population of Nigeria is growing at a rapid rate, and with it, the demand for electricity is also increasing. As more people gain access to electricity, the demand for power is likely to rise significantly. In addition, the Nigerian government has been making efforts to diversify the economy and increase industrialization, which will further increase the demand for electricity. If the grid is not expanded to accommodate this growth, it will lead to overloading of the existing infrastructure, resulting in power outages and blackouts.

Secondly, Nigeria's economy is also growing, and with it, the demand for electricity is increasing. As more businesses are established, they require electricity to power their operations. The industrial sector is also expanding, and this sector requires a reliable and stable power supply to operate efficiently. If the grid is not expanded to meet the growing demand for electricity, it will hinder economic growth and development.

Also TCN grid needs to be expanded is to improve the reliability and stability of the power supply. Nigeria has a history of frequent power outages and blackouts due to an aging and inadequate grid infrastructure. By expanding the grid, the TCN can increase the number of

transmission lines and substations, which will help to reduce the risk of power outages and improve the stability of the power supply.

Additionally, as Nigeria moves towards a more sustainable future, there is a need to incorporate more renewable energy sources into the electricity supply mix. Nigeria has significant potential for renewable energy, particularly solar and wind power. By expanding the grid and improving its reliability, the TCN can facilitate the integration of renewable energy into the grid and help to reduce the country's dependence on fossil fuels. This will require significant investment in the grid infrastructure to ensure that it can accommodate the intermittent nature of renewable energy sources.

To address these challenges, TCN has several potential future projects in the pipeline to expand the grid. These projects include the construction of new transmission lines and substations, the rehabilitation of existing infrastructure, and the deployment of advanced technologies to improve the efficiency and reliability of the grid.

The projects in Table 1 are projects identified by studies to increase capacity and reliability of supply to specific locations if there is increase in demand in the locations or there is a need for more reliability.

Table 1: Potential Future Capacity and Reliability Projects

S/N	Transmission Line	Distance (km)	Remarks
1	Alagbon – Ijora 132kV	4	SC already exists. Make it DC
2	Omoku – Rumosi 132kV	12	SC already exists. Make it DC
3	Ibom IPP – Ikot Abasi 132kV	30	SC already exists. Make it DC
4	Yenegoa – Gbarain 132kV	5	SC already exists. Make it DC
5	Osogbo – Iwo 132kV	80	SC already exists. Make it DC
6	Biu – Dadinkowa 132kV	82	SC already exists. Make it DC
8	Delta – Effurun 132kV	36	SC already exists. Make it DC
9	Yenegoa – Ahoada 132kV	46	SC already exists. Make it DC
11	Mando – Kudenda 132kV	20	SC already exists. Make it DC
12	PH Main – Rumuosi 132kV	10	SC already exists. Make it DC
13	Eket – Ibom IPP 132kV	45	SC already exists. Make it DC
14	Akoka – Alagbon 132kV	12	SC already exists. Make it DC
16	Zaria – Funtua 132kV	20	SC already exists. Make it DC
17	Akangba – Isolo 132kV	4.5	SC already exists. Make it DC
18	Kaduna Town – Mando 132kV	20	SC already exists. Make it DC
19	Onne – Trans Amadi 132kV	10	SC already exists. Make it DC
20	Birnin Kebbi – Dosso 132kV	128	SC already exists. Make it DC
21	Damaturu – Maiduguri 330kV DC	260	SC already exists. Make it DC
22	Gombe – Damaturu 330kV DC	180	SC already exists. Make it DC
23	Gombe – Yola 330kV DC	240	SC already exists. Make it DC
24	Yola – Jalingo 330kV DC	160	SC already exists. Make it DC
25	Jos – Gombe 330kV DC	270	SC already exists. Make it DC

If there is significant growth in demand the lines shown in Table 2 will be embarked to evacuate power to load center.

Table 2: Potential lines for evacuation of power to address increase in demand at specific locations.

S/N	Transmission Line	Distance (km)
1	Ikot Ekpene – Benin	300
2	Ikot Ekpene – Makurdi	300
3	Benin - New Agbara	250
4	Benin – Osogbo	160
5	Benin – Ajaokuta	300
6	New Agbara - Osogbo	160
7	Osogbo – Gwagwalada	260
8	Makurdi – Gwagwalada	200
9	Ajaokuta – Gwagwalada	200
10	Gwagwalada - Funtua	250

In addition, reactors might be needed for voltage control at certain substations listed in Table 3. Appropriate sizes will be determined by simulation and past operational data.

Table 3: Substations with potential needs for Reactors and Capacitors

S/N	Substation	Voltage (kV)	Type
1	Ikot Ekpene	330	Reactor
2	Benin	330	Reactor
3	Makurdi	330	Reactor
4	Osogbo	330	Reactor
5	New Agbara	330	Reactor
6	Ajaokuta	330	Reactor
7	Gwagwalada	330	Reactor
8	Funtua	330	Reactor
9	Maiduguri	330	Capacitor
10	Omuaran	132	Reactor
11	Ondo	132	Reactor
12	Yelwa Yauri	132	Reactor
13	Irrua	132	Reactor

These projects and the ongoing ones are critical to improving the reliability of the TCN grid and the improvement of the electricity supply in Nigeria. With the implementation of these projects, TCN can meet the growing demand for electricity, support economic growth and development, and move towards a more sustainable future.

In conclusion, the expansion of the TCN grid is crucial to meet the growing demand for electricity in Nigeria, improve the reliability and stability of the power supply, and promote the development of renewable energy sources. Despite the progress made so far, there is still much work to be done, and the TCN must continue to invest in new transmission lines, substations, and other infrastructure to meet the country's evolving energy needs.

3. Digital Transformation

As a policy, TCN shall embark on aggressive digital transformation process to enhance its operations and improve the reliability and efficiency of the grid. Digital transformation of work management systems will also be pursued to streamline operations, improve work processes, and increase overall efficiency. TCN will develop and implement a comprehensive digital transformation strategy to guide its efforts in this area.

Smart Grid Technology:
TCN will implement smart grid technology to collect real-time data on the performance of the transmission grid, monitor energy demand and supply, and improve the overall management of the grid.

Implement a Digital Work Order Management and Communication System:
TCN will use digital tools to create, track, and manage work orders in real-time, this will improve the accuracy and speed of the work order process. TCN will also leverage on the use of mobile devices to access data or provide data on the field as need be. Digital collaboration tools embedded on the mobile devices and online will be used to facilitate communication and collaboration among its teams, both in the field and in the office, improving teamwork and productivity.

Deploy Asset Management Software:
TCN will deploy and use asset management software to monitor and manage its assets, ensuring that they are maintained correctly, reducing the risk of equipment failure.

By leveraging digital transformation in its work management systems, TCN will improve its operational efficiency, reduce downtime, and ultimately deliver better service to its customers.

4. Human Capital Optimization

TCN will engage in holistic Human Capital Optimization using a comprehensive approach to managing and developing the organization's workforce to enhance productivity, efficiency, and effectiveness. Some of the following steps will be taken:

Develop a Human Capital Strategy:
TCN will develop a human capital strategy that aligns with the organization's mission, vision, and goals. The strategy will identify the skills, knowledge, and competencies required to achieve the organization's objectives and outline the necessary steps to recruit, develop, and retain talented individuals.

Employee Recruitment and Selection:
Recruitment and selection of the right people are essential to achieving human capital optimization. TCN has developed a comprehensive recruitment process that considers the required skills, knowledge, and experience for each role. The recruitment process will ensure diversity and inclusivity as mandated by Federal Character Commission.

Training and Development:
TCN will continue to invest in the training and development of its employees to ensure they have the skills and knowledge necessary to perform their roles effectively. This includes both technical and soft skills training, such as leadership, communication, and teamwork. Development opportunities will be provided to employees to encourage them grow within the organization.

Performance Management:
A comprehensive performance management system will be established to evaluate employee performance, provide feedback, and identify areas for improvement. This process will be transparent and aligned with the organization's goals and objectives. Regular performance appraisals will be conducted to evaluate performance and determine individual development plans.

Employee Engagement:
Employee engagement is essential for the success of any organization. TCN will create a positive work environment that promotes employee engagement, teamwork and satisfaction. This includes offering competitive salaries and benefits, recognizing and rewarding employees for their achievements, and providing opportunities for career advancement.

Succession Planning:
Succession planning is essential for the long-term success of TCN. TCN will identify high-potential employees and create development plans to ensure that they are ready to assume leadership positions in the future.

Technology and Innovation:
TCN will embrace technology and innovation to optimize human capital. This includes using technology to automate processes and increase efficiency, adopting innovative work practices, and providing employees with the necessary technology tools to perform their roles effectively.

Conclusion:
Optimizing human capital in TCN involves a comprehensive approach to managing and developing the organization's workforce. By developing a human capital strategy, recruiting and selecting the right people, investing in training and development, establishing a performance management system, promoting employee engagement, creating succession plans, and embracing technology and innovation, TCN will enhance productivity, efficiency, and effectiveness.

5. Branding, Image making and Public Relations

TCN is working on ensuring a strong brand and maintaining positive relations with the publics, with clear brand messages and identity that resonates with stakeholders. This requires a more positive relationship with key stakeholders, including government agencies, generation and distribution companies, as well as the end-users of electricity, including the media.

Increase public awareness of TCN's achievements and contributions to the development of Nigeria's power sector will be achieved by developing and implementing a more effective communication strategy that would engage stakeholders and the public. Some of the Strategies are:

Brand Development:
Develop a new, clear brand message and identity that resonates with stakeholders. This will involve a review of TCN's existing brand, including its logo, tagline, and visual identity. TCN will also conduct market research to identify key stakeholders' perceptions of the TCN brand and use these insights to inform its branding strategy.

Stakeholder Engagement:
Build positive relationships with key stakeholders by engaging in regular dialogue, responding to their concerns and expectations, and delivering high-quality services, as well as establish a dedicated stakeholder engagement team to ensure effective communication and collaboration with stakeholders.

Reputation Management:
Focus on enhancing the company's reputation as a reliable and trustworthy provider of electricity transmission services. This will involve implementing measures to improve service reliability, investing in modernizing infrastructure, and adopting best practices in service delivery.

Public Awareness:
There is need to further increase public awareness on its achievements and contributions to the development of the nation's power sector by disseminating information through various channels, including the social media, and TCN website. TCN will also engage in community development activities to demonstrate its commitment to the well-being of the communities it serves.

Communication Strategies:
TCN will develop and implement effective communication strategies to engage stakeholders and the public. This will involve a review of existing communication channels, including its website, social media accounts, and customer service processes. TCN will also develop a content strategy to ensure consistent communication that is relevant, and engaging.

Key Tactics:

- Develop a brand book to ensure consistent use of the TCN brand across all communication channels.
- Engage in regular dialogue with stakeholders through meetings, consultations, and optimize feedback mechanisms.
- Establish regular reporting mechanisms to provide regular updates to the public and other stakeholders on the performance of the company and the status of the grid.
- Develop and implement a clear brand strategy that aligns with the company's mission and values.
- Build a strong brand image through consistent messaging and visual identity.
- Develop a crisis communication plan to address potential reputation risks.
- Use case studies and success stories to showcase TCN's achievements and contributions to the development of Nigeria's power sector.
- Establish a customer service hotline and online portal to improve customer engagement and satisfaction.
- Develop a social media strategy to increase engagement with stakeholders and the public.
- Invest in media relations to ensure positive coverage of TCN's activities in the media.
- Conduct regular employee training and communication to ensure a consistent and aligned message across the organization.
- Use digital and traditional media to promote the company and its achievements.
- Adopt uniform signage in all TCN offices nationwide

Conclusion

The preceding outlines the key strategies and tactics that will be applied to improve TCN's brand and public relations. A clear brand message will help build a more positive relationship with stakeholders, enhance TCN's reputation, and increase public awareness.

6. Strategic Business Partnership

Cultivating a culture of strategic business partnership is essential for the Transmission Company of Nigeria (TCN) to achieve its goals and objectives. TCN will take a new dimension and actively seek strategic partnership with the Discos, Gencos, International Customers and Eligible Customers. TCN will take the following steps to foster a culture of strategic business partnership:

Identify potential partners:
TCN will identify potential partners within the Discos, Gencos, Eligible Customers and International Customers, technology providers, and research institutions that contribute to TCN's mission and objectives.

Develop a partnership strategy:
TCN will develop a strategic partnership plan that outlines the goals, benefits, and expectations of the partnership. This will help to ensure that both parties are aligned in their objectives and working towards the same goal.

TCN will regularly review its partnership programs to assess their effectiveness and identify areas for improvement. This will help to ensure that the partnership programs are delivering the desired results and are aligned with TCN's strategic objectives.

Communication and Collaboration:
TCN will also foster a culture of open communication and collaboration between its staff and partners. This will help to build trust and establish a strong working relationship between the parties.

Shared Resources:
TCN will explore opportunities to share resources with its partners, such as technology, equipment, and human resources. This will help to reduce costs and improve efficiency.

Joint Transmission and Distribution Projects
TCN will consider partnering with Discos on projects that can deliver mutual benefits such as building new transmission substations and new lines; TCN might consider helping the Discos in seeking finance to build the complementary distribution substations and lines associated with the TCN projects.

TCN will also partner with other stakeholders in the sector on other areas including research and development projects, capacity-building initiatives, and infrastructure projects.

Exchange Programs
TCN will seek exchange programs with other utilities and grid operators in other countries to enable it adopt best practices in those utilities.

Conclusion
Cultivating a culture of strategic business partnership requires commitment to building strong relationships with stakeholders, clear communication, collaboration, a willingness to share resources and work towards shared goals. By adopting these strategies, TCN will establish a network of partnerships that can support its mission and drive success.

7. Research and Innovation

The management understands that research and innovation play a crucial role in improving the performance, efficiency, and effectiveness of TCN, enabling the company to deliver a more reliable and stable supply of bulk electricity to distribution load centers nationwide. In this regard, TCN will leverage on Research and Innovation to improve critical areas of the company by building a culture of innovation and continuous improvement within the company. Some of the areas to be explored are:

Technology Adoption

New technologies that can improve the efficiency of the national grid, reduce transmission losses and downtime, and enhance the overall quality of power transmission will be adopted. In this regard, the management has created a new Research and Innovation department in the Independent System Operators (ISO) division to complement the efforts of the Research and Development department in the Transmission Service Provider (TSP) division.

Project Design

More investment will be made in research, to optimize the placement of transmission lines and improve the design of substation equipment, which can help improve system efficiency, reduce downtime and improve the quality of electricity delivered to customers. TCN will also invest in research to study the performance of new technologies like High Temperature Low Sag (HTLS) conductors in the system, before they are adopted.

Grid Control

TCN will leverage innovation to improve its grid control and management processes. TCN will explore the use of artificial intelligence and machine learning to monitor its transmission network in real-time, identify potential issues before they occur, and quickly respond to any disruptions. Additionally, TCN will adopt digital solutions for asset management, such as using sensors and data analytics to optimize the maintenance of its transmission equipment.

Renewable Energy Integration

With the increase in demand for renewable energy sources and its benefit to the environment, TCN will invest in research and innovation to develop new solutions that can integrate renewable energy into the national grid in a more effective and efficient manner. With the global push towards sustainable energy, innovative solutions will be explored such as integrating renewable energy sources into its transmission network, using energy storage systems to manage fluctuations in power supply, and exploring the potential of smart grids.

Grid stability and reliability:

TCN will use its Research and Innovation department to develop new approaches and technologies that can enhance the stability and reliability of the national grid, reducing the occurrence of blackouts, voltage fluctuations, and other transmission issues.

Data-driven decision-making:

By leveraging data analytics, machine learning, and artificial intelligence, TCN will use research and innovation to make more informed and data-driven decisions on how to improve the national grid's performance. It will also use data analytics to identify inefficiencies and opportunities for improvement in the it's operations.

Capacity building:
More investment will be made in research and innovation to develop new training programs and resources for staff, improving their technical skills and knowledge and enhancing the company's overall capacity to operate and maintain the national grid. TCN will encourage its employees to participate in research and innovation activities and to share their ideas and insights.

Collaboration with Research Institutions
TCN will collaborate with Universities, research institutions and other stakeholders to develop solutions to power transmission problems and to stay current on industry trends and developments.

Conclusion
Leveraging research and innovation will help TCN to improve the reliability, efficiency, and sustainability of its transmission network, as well as optimize its management processes. By investing in research and innovation, TCN will position itself as a leader in the power sector, improve the quality of electricity supplied to customers, and contribute to the economic development of Nigeria.

With our **diligent execution** of the Nigerian electricity grid maintenance, expansion and rehabilitation programme, **the power transmission system has become more stable.**

TRANSMISSION COMPANY OF NIGERIA
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