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NEWSLETTER

TRANSMISSION COMPANY OF NIGERIA (TCN)

- VP commissions 2X60MVA Transmission Substation at Agu Awka
- FG to provide electricity to over 1.5 million households by 2022
- TCN Head Tasks Staff on Synergy to Sustain Power Transmission Milestones

VICE PRESIDENT COMMISSIONS 2x 60MVA AGU AWKA TRANSMISSION SUBSTATION

….Says Anambra is the fastest-growing manufacturing hub in Nigeria

By Grace Sambe-Jauro

Vice President, Federal Republic of Nigeria, Prof. Yemi Osinbajo

The Vice President of the Federal Republic of Nigeria, Prof. Yemi Osibanjo, has said that the living environment and the ease of doing business in Anambra State made the state one of the fastest-growing manufacturing hubs in the country, housing key manufacturing industries like Innoson Motors and Chicason group among others.

Vice President Osinbajo, who made this known while commissioning the new 2 x 60 MVA 132/33kV Sub-Station in Agu Awka, Anambra State, on 24th August 2021, noted that rapid economic growth in the state and the attendant increase in the demand for electricity, necessitated the installation of a 40MVA, 132/33kV Mobile Transformer Substation by the Transmission Company of Nigeria (TCN) in Awka to augment the available bulk supply to Enugu DisCo load centers in that axis.

The new Agu Awka 2x60MVA 132/33kV Substation executed by the Niger Delta Power Holding (NDPHC), he said, has increased transmission capability in Awka by 96MW, complimenting available bulk transmission capacity.

He said that the additional transmission capacity would help drive industrial growth and boost commercial activities that would positively impact employment and socio-economic upliftment of residents in the state.

The Executive Governor of Anambra State, Willie Obiano, expressed delight at the completion and energizing of the substation, noting that the substation would also supply power to the newly built International Cargo Airport as well as remove the burden of purchasing diesel for business from industrialists within the state, thereby reducing the cost of production.

He further noted that the project would complement other completed State Government power intervention projects such as the extension of the 33kV line connecting six local government areas with about 82 local communities. He revealed that the State Government is already partnering with TCN to construct six additional transmission substations which will help extend electricity supply to many more communities within the state and its environs.

Earlier in his remarks, the Managing Director of Niger Delta Power Holding Company Ltd, Mr. Chinedu Ugbo said that the high demand for power supply in Awka and indeed Anambra State was the reason behind the new substation project.

He commended Nigerian engineers for executing the project from inception.
According to him, the project was successfully executed from inception to energizing and commissioning exclusively by Nigerians. The engineering procurement and construction contractor and the project consultant team of engineers are wholly Nigerian power engineering companies he emphasized.

Mr. Ugbo explained that the new Awka Substation is connected to 33kV feeders enabling a robust power evacuation through Enugu Electricity Distribution Company (EEDC) to areas in Anambra State, thereby providing relief to overloaded load centers and transformers.

TCN Head Tasks Staff on Synergy to Sustain Power Transmission Milestones

By Ndidi Mbah

Ag. MD/CEO TCN, Engr. Dr. Sule Abdulaziz

The Acting Managing Director and Chief Executive Officer of the Transmission Company of Nigeria (TCN), Engr. Dr. Sule A. Abdulaziz has tasked Management staff with developing more synergy towards sustaining the company milestones and moving it to a higher level of efficiency.

Engr. Abdulaziz gave the charge while addressing Executive Directors, General Managers, and Regional Heads of TCN, at the opening session of the TCN Management retreat held at the Ibom Icon Hotel and Golf Resort, Uyo, Akwa Ibom State.

Speaking on the theme, "Managing Change in a Renewed Organization", Engr. Abdulaziz said the retreat was aimed at achieving the strategic objective of giving TCN a new direction to enable it to occupy its pride of place within the context of the electricity market in the Nigerian Electricity Supply Industry (NESI) and the West African sub-region.

He said, "You will agree with me that so much change has occurred both in our organization and the marketplace that requires us to redouble our efforts to ensure that we move TCN to the next level in operational efficiency." Engr. Abdulaziz emphasized that this is even more so at this particular time when the President Buhari-led administration is committed to reversing the deficit in power supply in the country.

He commended the Management staff for their contributions towards achieving the modest milestones TCN has recorded so far. In his words, "together, we have expanded TCN's capacity and also brought a measure of stability and discipline to the grid. We have substantially upgraded our facilities and can evacuate more bulk electricity to distribution load centers nationwide". Engr. Abdulaziz, however, cautioned that the team must not rest on its oars as there is much more to be done for the strategic repositioning of TCN. He encouraged every participant to continue to work hard as emerging challenges will constantly test staff capacity to innovate.

Shortly before declaring the retreat open, he remarked that the program afforded the participants a platform to synergize and improve teamwork. According to him, "high on my expectations is also the building of a team that will not only appreciate the benefits of teamwork but also embrace high Management performance through facilitation, communication, and collaborative relationships."

Governors Visit

While welcoming TCN staff to Uyo for the retreat, His Excellency Emmanuel Udom, the Akwa Ibom State Governor, said that the retreat was an avenue for TCN to synergize and restrategize, to enable it to do more for the nation and Akwa Ibom specifically. He stressed the need for teamwork to support the Ag. Managing Director/CEO to ensure the actualization of TCN goals.

According to him, "food is to the body, what power is to the economy". Without power, there would be no industrialization. He posited that the power sector can make much difference to the nation and that Akwa Ibom State was looking forward to more collaboration with TCN to help it achieve its goal of providing electricity for its inhabitants in line with its "Power for All" initiative by the end of December 2021. He said that presently, the nation's power sector ought to be distributing between 35,000MW to 50,000MW and challenged TCN to drive the needed change that will increase the sector output.

The Governor noted that Akwa Ibom State alone sits on approximately 36.1% of the nation's gas reserves and that gas flared in the state can generate over 35000MW of electricity. He opined that great effort is required to utilize these resources for power generation to shore up supply.

TCN, in conjunction with power sector players, should be challenged to find a solution to the nation's power sector issues. Solving the power sector challenges he said, would translate to solving about 50% of the nation's challenges. This is because developmental projects are linked to power availability.

Responding, the Ag. MD/CEO said that TCN was gradually expanding the transmission network nationwide. In Akwa Ibom specifically, he said that TCN has several ongoing projects such as; the Double Circuit (DC) 123kV transmission line from ALSCON to Ibom Power with a switching station to link the GIS at ALSCON with BAY extensions at Ibom Power; Construction of ORON 2x60MVA 132/33kV Substation and also reconductoring the ABA - ITU 132kV transmission line as well as the 132kV Eket - Oron DC transmission line.

FG TO PROVIDE ELECTRICITY TO OVER 1.5 MILLION HOUSEHOLDS BY 2022

By Kazah Bili Akau

Head, Investment and Sector Development Department of the Ministry of Power, Mr. James Pilakyaa

The Federal Government has disclosed plans to provide adequate electricity supply to over 1.5 million households, through the exploitation of the country's energy mix potential of Solar, Wind, Biomass, Gas as well as small and large Hydroelectric power generating plants, by the year 2022.

The former Minister of Power, Engr. Sale Mamman, who disclosed this while delivering a paper titled "National or Regional Grid, Best Way Forward for Nigeria" during the International Power Engineering Exhibition and Conference (IPECON), held at the Nile University of Nigeria on 2nd August 2021, in Abuja, said that though the Nigerian energy mix targets are desirable, the prospect of success remains bleak due to financial constraints, pricing policy and lack of policy coordination.

The former Minister who was represented by the Head, Investment and Sector Development Department of the Ministry of Power, Mr. James Pilakyaa, said that to improve electricity supply in Nigeria and also address barriers to the achievement of the energy mix target, it would be necessary to address the multifaceted issues of payment risk, power sector investment financing, as well as improve the pricing and tariff structure, gas pricing and market regulation.

He commended the efforts of IPECON on the choice of the Nile University to host the annual conference and exhibition and also encouraged student engineers to endeavor to always be part of such conferences as it is an opportunity for knowledge transfer.

In his goodwill message, the Acting Managing Director/Chief Executive Officer of the Transmission Company of Nigeria (TCN), Engr. Dr. Sule Ahmed Abdulaziz, who was represented by the General Manager, Research and Development, TCN, Engr. Tom Inogonum, assured that TCN would always support IPECON and share ideas as it relates to electric power delivery as well as encourage, and welcome constructive criticisms and analysis of faults in the TCN network.

He recommended that other universities should borrow a leaf from the collaboration between Nile University and IPECON in jointly organizing the conference, and advised that exchange programs should be undertaken between industries/companies and skilled academia in universities.

The President of the Nigerian Institute of Power Engineers (NIPE), Engr. Israel Abraham, earlier in his welcome address explained that the conference was designed to be a proactive, proficient, and solution-focused peer-review session where issues are broken down and the details of projected issues brought to the fore to constitute a knowledge base for further discourse and research.

He further appealed to participants to freely contribute to the success of the conference as past IPECON outcomes has given birth to landmark interventions, new polies and orientations, especially in the Nigerian Electric Supply Industry (NESI).

Cross section of participants

TCN URGES NSE TO SUSTAIN HIGH STANDARDS IN THE ENGINEERING PROFESSION

By Eric Ephraim Ene

The Management of TCN has urged members of the Nigerian Society of Engineers (NSE) to sustain high standards in the engineering profession to maintain its transformative role in society.

The Ag. Managing Director and Chief Executive Officer of TCN, Engr. Dr. Sule Abdulaziz, gave the charge while hosting some leaders of the Nigerian Society of Engineers (NSE), Maitama Branch, led by its Chairman Engr. Dipo Mabogaji, during a courtesy visit to the TCN Management on Tuesday, 10th August 2021, in Abuja.

While receiving the team in his office, the Executive Director, Transmission Service Provider (TSP), Engr. Victor Adewumi, who represented Engr. Sule Abdulaziz decried the situation where the engineering profession does not appear to be competing adequately with other professions in terms of growth and expansion. He opined that this trend could be linked to older members of the profession not encouraging their children and wards to pursue engineering courses in tertiary institutions and also lack of mentorship of younger engineers.

He said that there is a need for all engineers to uphold the high standards the engineering profession is known for, so it can continue to occupy its place among leading professionals. Commending the Maitama Branch of NSE for embarking on several community-based projects, Engr. Adewumi pledged TCN's continued support to initiatives that will challenge members of NSE to excel in the practice of engineering.

In his remarks, the General Manager, (Engineering Services), Engr. Geoffrey Nwokoye reiterated the need for engineers and NSE members to imbibe infrastructure maintenance culture. On his part, the General Manager (Transmission Service), Engr. Jimmy Adetola, harped on the need for NSE and COREN to live up to expectations by coming up with initiatives that would advance and protect the engineering profession.

Earlier in his remarks, the Chairman of NSE, Maitama Branch, Engr. Dipo Omabugaje said that the courtesy call on TCN was part of preparations towards the forthcoming Annual General Meeting (AGM) and to appreciate TCN fits support in the past three years.

He enumerated some of their achievements since 2015 to include the construction of a borehole in the Gwagwalada community, distribution of textbooks worth 2million naira, and many medical outreaches.

Speaking also at the occasion, the Vice Chairman of the NSE Maitama Branch, Engr. Henry Okoye, harped on the need for more capacity-building programs for engineers, to sustain the ethics of the profession.

Group photograph

TCN ADVOCATES MORE FUNDS FOR TRANSMISSION INFRASTRUCTURE IN NIGERIA

By Eric Ephraim Ene


Middle, GM, (Programme Coordination),Engr Joseph Ciroma

With heightening concerns by experts on infrastructure deficit in the country and the need to develop, sustain and maintain existing ones, the Management of Transmission Company of Nigeria (TCN) has made a strong case for adequate funding from government budgetary allocation to complete all the ongoing transmission projects in the country and enhance bulk power delivery to cope with the growing demand.

The Managing Director and Chief Executive Officer of TCN, Engr. Dr. Sule Abdulaziz made this position known while speaking as a discussant on "Government Role in the Development of Infrastructure in Nigeria" at the National Engineering Infrastructure Summit themed: "Towards a Sustainable Development, Maintenance and Management in Nigeria" on Thursday, 15th July 2021, in Abuja.

Engr. Abdulaziz, who was represented by the General Manager, Programme Coordination, TCN, Engr. Joseph Ciroma noted that due to inadequate funding from the Federal government budgetary allocation, timelines for completion of several capital projects have not been met. According to him, "One of the challenges we're having is the annual Federal Government budgetary allocation which never matches the proposed amount budgeted for the fiscal year. For example, for N70 or N100 billion budgeted for 20 projects in the previous years, we end up having a paltry N3.5 billion or N10 billion which cannot complete the projects" he said.

He explained that one of the reasons TCN obtained the loan from international donor' agencies for the execution of projects is because the loan will be available for the next five years. Transmission lines in Nigeria take about 5-6 years to complete".

He also said that the primary responsibility of TCN in Nigeria's electricity value chain is to evacuate generated power from over 29 power stations to distribution load centers for onward distribution to electricity consumers in the country.

He further explained that though TCN only transmits electricity generated, it also understands the importance of efficient service delivery and the need for robust transmission infrastructure in the country.
He said, "I don't have to emphasize the importance of power whether in business or the infrastructural development of any country, especially in Nigeria where we have just 45% access to electricity. We have over 8,500km 132 kV and 9,000km 330kV transmission lines. We have had several government interventions in the power sector in the past and there is a need to ensure adequate maintenance of existing projects.

Speaking also at the occasion, the Chairman of Momas Electricity Meters Manufacturing Company Ltd, Mr. Kola Balogun, identified lack of national goals from the leadership downwards, mismanagement of our diversity, and misalignment of policies as the bane of infrastructure development in Nigeria.

According to him, "Most of the issues truncating the development and sustainability of electricity infrastructure has to do with the management of our diversity because there is no definition of national goal that we all have to key into.

He equally advocated for inter-agency collaboration to address issues as they come, especially concerning the uniform production of Nigerian meters. "If we can sit down design one single face that anywhere you see it, you'll know that this is a Nigerian meter," he said.

The summit featured paper presentations from experts, government functionaries, and other professional bodies in the development, sustenance, and maintenance of the country's infrastructure.

MINISTER TALKS TOUGH ON FAKE METER INSTALLATIONS IN NIGERIA

By Mary Philips-Udom

Perm Sec. Ministry of Power, Mr. William Nwankwo Alo

The Minister of State for Power, Dr. Goddy Jeddy Agba, has cautioned participants in the Nigerian Electricity Supply Industry (NESI) that the federal government would no longer tolerate the installation of fake electricity meters by uncertified quacks in the country.

The Minister who was represented by the Permanent Secretary of the Ministry of Power, Mr. William Nwankwo Alo, gave the warning during the official commissioning of the new Nigerian Electricity Management Service Agency (NEMSA) National Meter Test Station for the South East Zone in Enugu on 5th August 2021.

The Minister pointed out that the power sector remained the engine room of economic growth and development in the country, the federal government is therefore determined to rid the power sector of all unprofessional players and provide a safe, reliable, and sustainable electricity supply to its customers.

Dr. Goddy noted that the meter test station should be judiciously used for testing and certifying meters to eliminate the high rate of uncertified and substandard meters in circulation. The test station, he said, will also create jobs for residents within the eastern axis.

The Managing Director of the Transmission Company of Nigeria (TCN), Engr. Dr. Ahmed Sule Abdulaziz, represented by the General Manager (Engineering), Engr. G. O. Nwokoye commended NEMSA's initiative for setting up the meter test station and advised that it embarks on an enlightenment/sensitization exercise so that there will be a proper understanding of what the test station is to achieve. This, he said, would help to drive utilization of the test station.

Group photograph

FOCUS ON

LAGOS REGION

By Tosin Olashinde

Lagos Regional Office

COVERAGE AREA

The Lagos Region of Transmission Company of Nigeria covers mainly Lagos State and some parts of Ogun State. Research statistics indicate that Lagos State alone has an estimated population of over 15 million people and about 30% of the energy generated in the country is being utilized in Lagos alone.

Lagos Region comprises five Sub-Regions namely; Ikeja-West, Akangba, Egbin, Aja, and Palalanto. The Region has two major sectors namely; Transmission Service Provider (TSP) and Independent System Operation (ISO). TSP, with its Regional office located in the Ijora-Olopa area of Lagos State, is headed by Engr. O.E.A . Ajiboye while ISO, headed by Engr. Joseph Johnson has its Regional Control Center at Ikeja- West. Lagos Region has a total staff strength of 355.

Lagos region has nine (9 No) 330/132kV and thirty (30 No) 132/33kV transmission Sub-Stations. The Sub-Stations have a total wheeling capacity of 8,369MVA made up of 3,960MVA on the 330/132kV level and 4,400 on the 132/33kV level. The Region interfaces with three(3) Distribution Companies namely, Ikeja Electric (IE), Eko Distribution (EKEDC), and Ibadan Distribution (IBEDC).

PROJECTS

The Region has several completed projects while many others are ongoing. Newly completed projects include 1X100MVA transformer installed at Ogba 132kV Transmission Substation (T/S), Ikeja-West/New Otta 132kV lines 1&2 from Ikeja West Sub-Station, newly installed 132kV Circuit Breaker (CB) on Agbara/Ojo 132kV line1 at Agbara T/S, 330kV faulty Circuit Breakers (CB 52-21 330kV) and (CB 52-17 330kV) at Egbin Switchyard recently replaced, the New Ikorodu/Sagamu 132kV line at Ikorodu 132kV T/S which was recently commissioned, and the installation of 1X30MVA 132/33kV transformer at Egbin 132kV T/S.

Others are the commissioning of new Oke- Eletu 33kV line, the newly installed Nari PCS 902 Distance Protection Relay along Ota-Ogba 132kV Line, replacement of shattered Yellow Phase Lightning Arrester at the secondary side on T2 30MVA 132/33kV Transformer at Papalanto T/S with new 33KV Arrester. Among the ongoing projects is the Rehabilitation/Reconductoring of Ikeja-West/Alimosho/Ogba 132KV lines 1 and 2, Ogba/Otta-Tee Off 132KV lines 1 and 2.

On-going projects being handled by the Region are numerous. However, ongoing projects being executed by the Project Monitoring Unit (PMU) arm of TCN in the Region include the following:

LOCATION	PROJECT
IJORA 132/33kV T/S	Upgrading of 1X30MVA power transformer with 1X100/125MVA 132/33kV. Reinforcement of the substation with additional 1x100/125MVA,132/33kV power transformer.
LEKKI T/S	Installation of 1X300/375MVA 330/132kV transformer and 2 X 60/75MVA 132/33kV Power Transformer with associated high voltage switchgear, and equipment.
ALAUSA 132/33kV T/S	Upgrading the existing 30MVA with 1 X 100/125MVA, 132/33kV power transformer and associated high voltage switchgear, and equipment. Upgrade and reconductoring the 132kV bus with 2X800 Sq. mm conductor, Supply, and installation of 33kV Transformer secondary bay for new 100/125MVA Transformer and additional 3 number 33kV outgoing feeder bays.
AKOKA 132/33kV T/S	Rehabilitation of Control Room Building structure and sinking surrounding land area. Supply and installation of GIS indoor equipment complete One-half circuit breaker configuration on both lines and transformer bays to replace the obsolete 132kV switchgear. Reinforcement with 1X60/75MVA 132/33kV Power transformer.
AMUWO 132/33kV T/S	Rehabilitation of Control Room Building structure and sinking surrounding land area. Installation of 2X60/75 MVA 132/33kV Power Transformer with the associated accessories. Installation of GIS indoor equipment complete one-half circuit breaker configuration on both lines and transformer bays to replace the obsolete 132kV switchgear.
OTTA 132/33kV T/S	Upgrading of existing 1X30MVA and 1X40 MVA transformers with 2X100/125MVA132/33kV capacity transformers, high voltage switchgear, and associated equipment.
ITIRE 132/33kV T/S	Rehabilitation of Control Room Building structure. installation of GIS indoor equipment complete One-half circuit breaker configuration (four diameters) on both Lines and Transformer bays to replace the obsolete 132kV Switchgears. Reinforcement with 1X60/75MVA 132/33kV Power Transformer.
ALAGBON T/S	Installation of 1X300 MVA 330/132kV power transformer with associated Switchgears and equipment. Supply and installation of 2X100/125MVA132/33kV Power Transformers with associated Switchgears and equipment. Substation Automation System (SAS) shall be integrated into the existing TCN SCADA system and the signal shall be monitored at NCC Osogbo.
MARYLAND T/S	Upgrading 2X30 MVA with 2X100/125 MVA 132/33kV Power Transformer (T1&T3). Supply and installation of high voltage switchgear and

EGBIN T/S	associated equipment. Replacement of obsolete 330kV and 132kV control and relay panels with a digital control system. Installation of 330kV and 132kV high voltage switchgear and associated equipment.

RIGHT OF WAY CHALLENGE

The Lagos Region is not spared the pervasive challenge of Right of Way encroachment that affects TCN operations nationwide. There are numerous cases of encroachment on transmission line routes throughout the Region, despite several measures to discourage the perpetrators. TCN, through the Regional office, has engaged community leaders and their subjects severally, on the dangers of erecting structures under high tension power lines have been emphasized.

IN-HOUSE CAPACITY

TCN engineers in Lagos Region have successfully executed several substation projects and transformer installations/ repairs in the Region. Some of these include a brand new 1X30MVA, 132/33 kV Transmission Sub-Station at Ilase, which is the first of its kind on an island in Nigeria. Installation of 2X100 MVA 132/33kV Power Transformer at Ejigbo T/S, installation of 1X60MVA 132/33kV Power Transformer at Apapa T/S, Installation of 1X30 MVA 132/33kV Power Transformer at Egbin 132/33kV T/S, among others.

This year alone, TCN Engineers have installed and commissioned Nari PCS 902 Distance Protection Relay along Ogba-Ota 132KV Line, replaced shattered Yellow Phase Lightning Arrester at the Secondary side of T2 30MVA, 132/33kV Transformer at Papalanto T/S, and replaced faulty 33kV Circuit Breaker on waterworks Feeder at Old Abeokuta.

Others include the replacement of differential relay on 60MVA 132/33kV T2 at New Abeokuta TS. Installation of Micom Differential Relay on 60MVA 132/33kV T4 at Otta T/S, commissioning of New Oke-Eletu 33kV Line. Replacement of 132kV Circuit Breaker on Alimosho Line 1 at Ikeja-West T/S and replacement of faulty Battery Bank at Olorunshogo Phase 2 among others.

NOVELTY FOOTBALL MATCH: NCC OSOGBO LOST 2-0 TO EGBIN POWER PLC

By Omideji Oluwakayode

As part of TCN's efforts towards maintaining mutual understanding among the electric power stakeholders in the country, the National Control Center (NCC), Osogbo recently organized a novelty football match between the NCC Oshogbo football team and Egbin Power football team at the City Stadium Oshogbo, Osun State.

According to the General Manager (NCC), Osogbo, Engr. Balarabe Abdullahi, "the benefits of the novelty football match include enhancing social relationships interpersonal affiliation and co-existence among TCN staff and with a staff of Egbin Power Plc,". He said such games are helpful, especially for some category of staff that sit for a very long time in their offices.

in his response, the Acting CEO, Egbin Power Plc, Engr. Olurotimi Famoroti, said that the essence of the match was to foster better relationships among critical partners within the electricity sector and create time for leisure, noting that as the saying goes, all work and no play truly makes Jack a dull boy. He said the National Control Center and stakeholders in the power sector have been working hard to ensure power delivery to Nigerians and that it is not out of place to take some time off to play and exercise.

On his part, NCC football team coach, Mr. Abdulrasheed Adeleke, appreciated the TCN Management for the unique opportunity to participate in the novelty match and promised that the NCC team would win the second leg of the novelty match. He commended the Egbin team, whom he said had always been a formidable football team since the era of the defunct PHCN up till now.

TCN's NCC Osogbo team lost by 2-0, to the Egbin team. For TCN, the football match was the first of its kind since the privatization of the Generation and Distribution companies in 2013.

The Transmission Service Provider (TSP) is in charge of the physical assets of the Transmission Company of Nigeria (TCN).
In this interview with the Executive Director, TSP, Engr. Victor Adewumi, TCN News sought to know what TSP has been doing in the last year, how TCN is coping with the pandemic as well as maintenance and safety issues.
Excerpts:


ED TSP, Engr. Victor Adewumi

Q: TCN wheeling capacity and coverage area.

A: We take transmission services to all the nooks and crannies of this country, so our coverage area covers the entire country and presently we are supplying Niger and Togo. In terms of our wheeling capacity, TCN can conveniently wheel 8,100 megawatts, but the verified transmission capacity by NERC is 7,000 megawatts.

Q: Projects executed in the last year.

A: Now we have a lot of ongoing projects being executed unlike before. We are presently executing simultaneously, over a hundred projects which would be commissioned as soon as they are completed.

In the last year we've commissioned 1x150MVA 330/132/33kV power transformer at Jos Transmission substation, 2x60MVA 132/33kV substation at Gagarawa, 1x60MVA 132/33kV power transformer at Yandev, 1x40MVA 132/33kV power transformer at Okene, upgraded 1x30MVA with 1x60MVA 132/33kV power transformer at Kumbotso transmission substation, energized the second 1x40MVA 132/33kV power transformer at Yauri Transmission substation, 2x75MVAR 330kV reactors to improve voltage profile at Apir and Jos Transmission substations respectively. We also completed the reconductoring of Birnin Kebbi – Sokoto and Otta - Ogba 132kV transmission lines with Gap conductors to increase their current carrying capacity from 70MW to 120MW. The complete reconstruction of the Ikorodu – Shagamu 132kV transmission line was also completed.

I can tell you that very soon we are going to commission 2x60MVA 132/33kV substation at Ogbomosho, it has been tested but we have a small challenge with the transmission line from Ganmo to Ogbomosho, which is not yet completed. So, we have all our projects ongoing now and as we are completing them, we'll be commissioning them to service.

Q: maintenance.

A: Before, our main focus used to be preventive and breakdown maintenance, and when we are carrying out preventive maintenance, most of the time we are more or less reactionary. We react to problems when they occur, so we have moved from preventive to preemptive, now we should be able to predict that this equipment is likely to fail and carry out maintenance on it before they occur at all. We don't just react to faults as they occur, we prevent them, we even foresee them by detecting the incipient fault and then take necessary action before they occur. That is what we are trying to do now.

Q: Line tracing, repairs, and vandalism.

A: I can tell you it has not been

easy especially with the insecurity in the country. You know most of our lines are in the bush, they are not where you can easily see and access them. Insecurity has made carrying out maintenance on these lines much more difficult, now when you mobilize people to patrol the lines, they will insist that you have to give them security. Not just a matter of providing police, they will insist on armed security men, and getting armed security men to patrol our lines is not very easy.

Presently we are still working hard to bring back supply to Maiduguri town after Boko Haram brought down some of our towers along the Damaturu-Maiduguri 330kV line by Boko Haram insurgents. We are also reconstructing vandalized 132kV towers on Benin – Delta line. We also have serious challenges in that axis but we are tackling them and putting measures on the ground to reduce and stop them completely. This year we have awarded the normal line trace maintenance in all the Regions in addition to the mechanized trace of some critical lines which are either completed or about to be completed.

Q: Safety of the workers.

A: For us at TCN, we have zero tolerance for issues of safety. We are talking of three hundred and thirty [330] volts, one hundred and thirty-two thousand [132] volts, those are the voltages we relate with. Nobody touches 330kV and 132kV and comes out alive. So we don't joke with safety at all! If you come in contact with 330kV, you might likely even vaporize because of the level of the voltage involved. Before we embark on any maintenance at all, we make sure that we sit all the workers down and rehearse safety procedures, we assign roles and responsibilities to everybody so that everybody knows what to do. We have safety supervisors and officers in all our work centers whose responsibility is

to make sure all safety precautions and procedures are duly followed. So we don't take the safety of our staff lightly.

Our LifeLine Department carries out its job on a live line. This is because you cannot knock off supply to major equipment else you throw a whole state or entire region into blackout, so nobody will tolerate that –because you want to carry out maintenance of over ten hours you ask a particular region of the country to be in blackout. To ensure the safety of the engineers, normally first raise the potential of those individuals that will do the job live from zero [0] to 330kV or from zero to 132kV, which means the person himself will be 330kV, but he is safe because when you don't have potential different between him and the voltage on the high-tension line, there won't be any current flowing. As long as no current flows, he's alive, he is safe, nothing is wrong with him. It's only when you have potential difference between him and the line, then you can have current flow, the person will be electrocuted.

So anytime you want to carry out maintenance on major lines, they do the job on that particular voltage level. That's why we call them Live Line, and in doing that, there are procedures we mandatorily follow and that is why I said, there is no tolerance at all for any mistake. Any error would kill the person concerned. So for us, as a matter of policy, we don't take the safety of our staff for granted, we adhere strictly to the safety codes as dictated by the type of maintenance they want to carry out.

Q: COVID-19 and project delivery.

A: Well, as I told you, we have a lot of projects that are ongoing now, some are nearing completion, as they are being completed, we're going to commission them to service. Unfortunately, I must say that COVID-19 more or less took us back more than two years, because at a point the contractors demobilized from site, some of them went back to their country, and some declared force majeure for us to remobilize them back to site.

It has not been easy even up till now there some equipment that we

need to travel to where the equipment is being manufactured to carry out factory acceptance test, COVID -19 affected that too, and that, in the long run, causes delay in project completion. Manufacturers don't manufacture power equipment and store them; you can't buy them off the shelve. You first give them your design and specifications for them to manufacture according to what you give them and when they are done you will have to go there to inspect and test what has been manufactured to ensure that it conforms to your standard.

> "For us at TCN, we have zero tolerance to issues of safety. We are talking of three hundred and thirty [330] volts, one hundred and thirty-two thousand [132] volts, those are the voltages we relate with. Nobody touches 330kV and 132kV and comes out alive. So we don't joke with safety at all! If you come in contact with 330kV, you might likely even vaporize because of the level of the voltage involved"

COVID-19 has been a very difficult period, what we are doing currently, is to carry out an online test, but being there physically is better, so covid 19 is a serious challenge but since it is a global issue, we are trying to live with to as we make effort to complete our projects.

TRANSPOSITION ON UGWUAJI-MAKURDI TRANSMISSION LINE

By Mary Philips-Udom

Middle, RTM Engu Region, Engr. E. Nwani, and his team during the official visit to the site of Ugwaji-Makurdi 330kVTransmission line transposition

Rising from the need to strengthen the grid network for optimum performance, engineers in the Enugu Region of TCN have completed transposition work on towers 45, 195, and 353 along Ugwuaji –Makurdi transmission lines. The lines transposition became necessary to correct voltage imbalance at the Apir Transmission Substation, Benue State.

The transposition work on the transmission lines that commenced from the Makurdi axis on the 25th of June, 2021, was completed at the Enugu axis on July 25, 2021. During the period, the New Haven-Otukpo 132kV line was transmitting bulk power to Benue State. This was followed by the OPGW splicing that was also completed July 27, 2021.

Transposition is the periodic swapping of the position of a transmission line at an interval of 150KM to reduce crosstalk/radio interference and improve transmission fluctuating voltages. It also helps equalize the impedance relative to the ground, thus avoiding one-sided loads in three-phase electric power systems.

PAPALANTO 132/33kV TRANSMISSION SUBSTATION

Papalanto 132/33kV Transmission Substation was commissioned in 1976 as a 45MVA substation with 3No 15MVA 132/33kV power transformers at 132/33kV voltage level. The sub-station had 2No 132kV lines; one from Ogba Sub-station (incoming), and the other feeds Abeokuta 132kV Station (outgoing). The sub-station is Located at Ewekoro in Ewekoro Local Government Area of Ogun State and takes supply from the Ogba/Papalanto 132kV single circuit (SC) diverted in 2002 to Ota/Papalanto 132kV single line.

With the creation of Ota 132/33kV Substation at Ota in 2002, the Ota/Papalanto line has remained the source of supply to Papalanto 132/33kV Transmission Substation to date.

Over the years, the Papalanto Substation has undergone several transformative changes. In 2001, a 15MVA 132/33kV power transformer was decommissioned and replaced with 30MVA 132/33kV power transformer. Also, in 2013, the substation was upgraded with a 30MVA 132/33kV transformer installed in-house by TCN engineers.

In 2018, the second 15MVA 132/33kV power transformer was also de-commissioned, and the substation was upgraded with a 60MVA 132/33kV power transformer, moving the capacity of the substation from 45MVA (36MW) to 120MVA (96MW)

The 3 No power transformers in the substation, including 2x30MVA and 1x 60MVA are all operating at 132/33kV voltage level.

In 2021, the Ota/Papalanto 132kV double circuit (DC) lines were commissioned, while the old Ota/Papalanto 132kV single circuit (SC) line was decommissioned. These have improved the load-carrying capacity of the circuit. Meanwhile, the new Ota/Papalanto double-circuit lines remain the source of supply to Papalanto, old and new Abeokuta 132/33kV transmission substations.

The Papalanto 132/33kV Substation supplies bulk electricity to Ewekoro, Ifo, Ijako, Papalanto, Ilaro and Lapekeleke environs. Presently, installation works on the new Papalanto/Abeokuta 132kV double circuit installation work is ongoing and on completion, will have a positive impact on the substations' supply reliability and flexibility.

Distributed Energy System in Nigeria:

Potentials, Technologies, Benefits and Challenges

By Bemboo Saka & Vedat Kiray

Cont'd from last edition

A. Hydroelectric Power

Nigeria has rivers and dams with great potential that can be utilized for hydroelectric power generation. The two major rivers in the country are the river Niger and river Benue, both in the North Central part of the country. There are however other rivers and dams that can be used for power generation both in large and small scale. There are about seven river basins established by the Nigerian government as reported in. These river basins have great potential for small to medium scale hydroelectric power generation and they include; Sokoto-Rima, Hadejia-Jama're, Chad, Niger, Upper Benue, Lower Benue, Cross-River. Presently, Nigeria has three existing hydroelectric power plants namely Kainji, Jebba and Shiroro with installed capacities of 760 MW, 607 MW and 600 MW respectively. The existing hydroelectric power plants with a total generation of 1967 MW constitute about 15.7% of the total installed capacity of the Nigerian power system. There are also power plants currently under construction like 700 MW Zungeru hydroelectric power plant and smaller hydro power plant. These smaller hydro power plants include: 40 MW Kashimbilla hydro power plant in Taraba State, 39 MW Dadin Kowa hydro power plant in Gombe and 30MW Gurara hydro power plant in Kaduna. The 3050 MW Mambilla hydroelectric project in Taraba State has been proposed for construction.

Therefore, hydroelectric power plants can be developed as distributed energy system and connected via the distribution system to supply power potential customers. These small scale power plants usually have water head between 1.5 m – 400 m and generate power in the range of 5 – 100 kW for micro hydroelectric power plants and between 500 kW - 10 MW for mini hydro-power plants. This DES technology is also of great advantage to the generation-absent northern part of the grid. Moreover, the low water head associated with distributed energy system means there will be water available all year round for power generation.

B. Gas Turbines

All the existing gas-fired power plants in Nigeria are located in the southern region where there is abundant gas deposit. Nigeria's gas reserve is the seventh largest in the world with an estimated 187 trillion cubic feet of natural gas with an estimated daily production of 3.5 billion cubic feet per day. Unfortunately, despite with this huge gas potential, only a little has been tapped with most of the gas flared due to geographical factors. The installed gross capacity of the existing gas-fired power plants is made up of 8685 MW while conventional steam power plants is made up of 1848 MW. This means the total capacity of installed gas power plants is 10,533 MW corresponding to about 84.3% of the total installed generation currently available in Nigeria. Though, the gas transmission and distribution system infrastructure has been developed for gas supply in the south of the country, it is highly affected by vandalism. Another reason responsible for the poor performance of these power plants is due to gas shortage, poor quality of gas supplied to some power stations, low gas supply pressure and limited size of the gas pipelines.

Despite this installed generation capacity and the huge gas potential in Nigeria, the peak generation ever attained is just over 5.3 GW. This low generation can partly be attributed to the fact that there is a lot of constrained generation due to gas that cannot be evacuated to load centers as a result of inadequate transmission lines. Thus, installing distributed energy systems to the distribution network at these locations can help evacuate some of these constrained generation to the grid thereby providing energy access to more population.

C. Diesel Generators

Most diesel generators and combustion engines are used for off-grid generation to provide power supply. The use of diesel generators is common due to lack of reliable electrical power supply especially in rural areas, high cost of building conventional power plants, high cost of expanding the transmission grid and right of way issues. In most of thecases, the loads in the rural areas are powered by small diesel generators running continuously.

With an estimated 35 billion barrels of crude oil, Nigeria has a lot of potential to develop diesel powered applications to support the

development of distributed generation and improve energy access to off-grid customers. In Nigeria, most of the diesel generators and combustion engines are used for off-grid generation purposes in residential, commercial and industrial applications. Also, hybrid solar PV– diesel generators have been combined and used in remote locations in Nigeria to provide energy access where there are no transmission and distribution lines. This hybrid system with diesel also reduces the cost that would have been used to procure batteries for the solar power. Furthermore, diesel- fuel can easily be transported to the site where it is installed thereby making the technology attractive for distributed energy applications. Therefore, diesel generators of over 500 kW have a great potential to contribute to DES organization in Nigeria.

D. Energy Storage System

Energy storage system is a significant component in the development of distributed energy system because it enhances reliability, efficiency and sustainability. When integrated with distributed energy system, it offers benefit such as increased penetration of renewable energy, improved energy efficiency, reduced fluctuations, decrease in network losses and ability to deliver reserve energy to the grid. The different types of energy storage systems include battery energy storage system (BESS), flywheels, superconducting magnetic energy storage (SMES), compressed air energy storage (CAES) and pumped storage for hydro power plants. Presently, there is no known on-grid application of energy storage system. This is can be attributed to the fact that there is no distributed energy system tied to the national grid. Therefore, going forward, Nigeria needs an energy storage system in order to have a healthy distributed energy system structure.

BENEFITS OF DISTRIBUTED ENERGY SYSTEM

Connecting distributed energy system can offer a lot of
benefits such as reduced network losses, transmission infrastructure deferral, increased use of renewable energy sources, lower emissions amongst many others. These benefits can be categorized into the technical, environmental and economical.

A. Technical Benefits

The technical benefits associated with integrating distributed energy system to the grid depends on the optimal placement and sizing of the units. This strategic placement and sizing of distributed energy units in the distribution network results in improved voltage profile, reliability, system loss reduction, relieved overloading on feeders, improved system stability, reliability, enhancement of power quality, provision of ancillary services, reduction of peak power requirement and flexibility.

B. Environmental Benefits

The environmental benefits offered by integrating distributed energy system to the distribution network provides a more efficient way of generating and distributing electricity with minimal greenhouse gas emissions. This is encouraged by the increased use of renewable energy resources. The environmental benefits associated with the connection of distributed energy system to the distribution grid include; reduction in greenhouse gas emissions, reduced health risk, reduction in use of land space and conservation of environmental resources.

C. Economical Benefits

Economic benefits that can be derived from the integration of distributed energy system to the distribution system include; reduction in capital investment for transmission and distribution assets, diversification and efficient use of cheaper fuel sources and provision of ancillary services to minimize cost associated with power outages.

CHALLENGES OF DISTRIBUTED ENERGY SYSTEM

There are some challenges that affect the use of distributed energy systems in the electrical distribution system. These challenges arise when distributed energy systems are not strategically connected to the electrical distribution system. The challenges can be as a result of technical, economical and regulatory/policy.

A. Technical Challenges

The technical challenges associated with integration of distributed energy system in the distribution network is largely due to two-way power flow. The traditional distribution networks are generally designed for one-way flow of power from the conventional grid to the loads connected to the distribution network. However, with the integration of distributed energy system, the distribution network has been transformed into a multi-source system allowing two-way power flow from the conventional grid to the load and vice-versa. Therefore, the technical challenges associated with connecting distributed energy system include: power quality issues, protection issues, voltage profile and regulation issues and power losses.

B. Economical Challenges

Presently, there are little or no incentives for distribution companies to connect distributed energy systems to their network and offer active management services. Therefore, new commercial measures needs to be established to encourage the

development of distributed energy system in distribution networks in order to extract corresponding benefits associated with the technology.

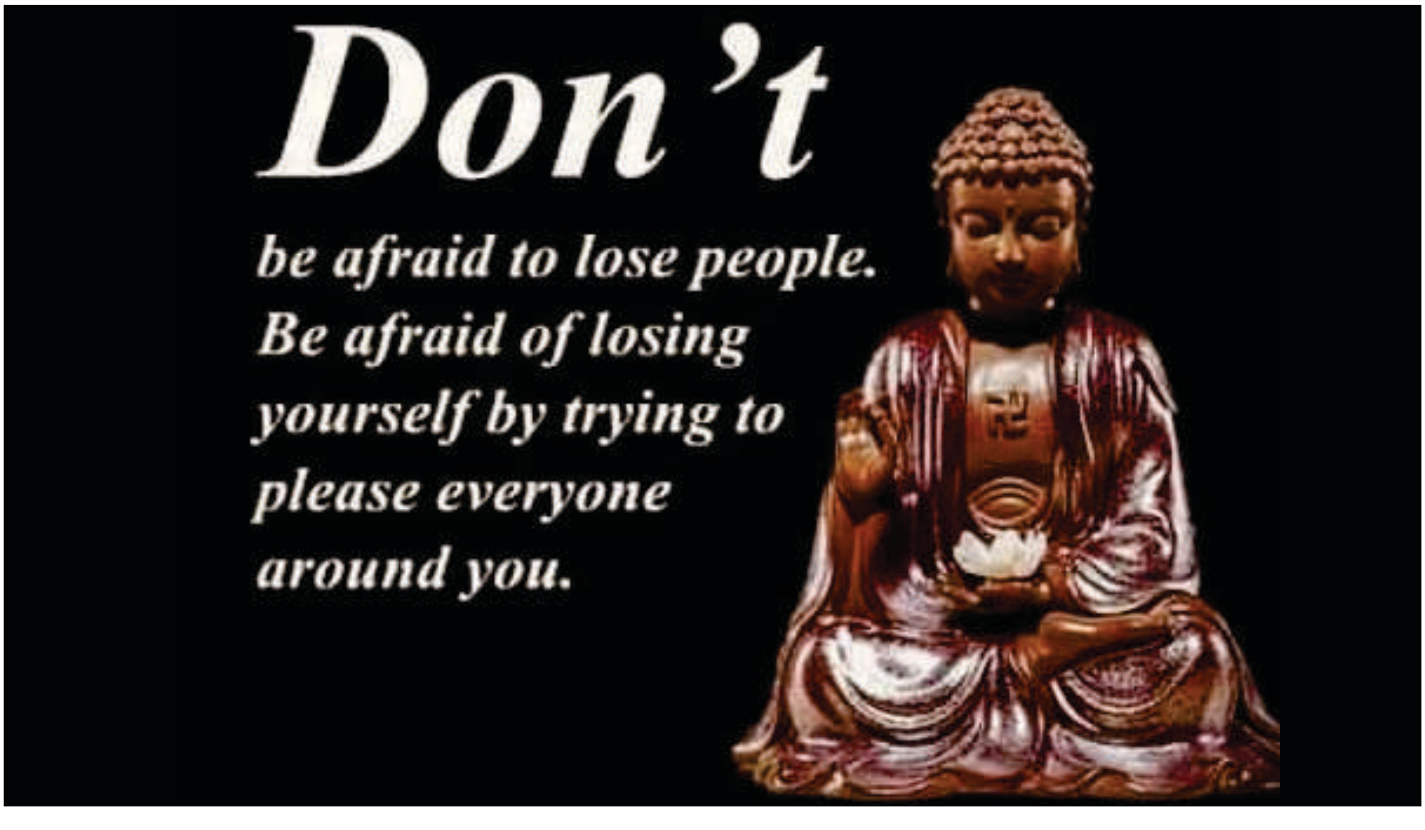
C. Regulatory / Policy Challenges

The regulatory policies in different areas influences the rate of developing and deploying distributed energy system. First, the present electric power industry structure favour the development of the centralized generation power plants making it challenging to encourage connection of distributed energy system to the power grid. Other regulatory challenges that affect the integration and development of distributed energy system include: high charges for ancillary servicesprocurement, limited access to regional electric power system development plan for private sectors, bureaucratic complications for licensing application, discriminatory use of system charge imposed on small generators and lack of tax exemption. Therefore, developing appropriate policies are important as it will support the integration of distributed generation system into the distribution networks.

CONCLUSION

Despite the huge renewable and non-renewable energy resources available in Nigeria, the country's power sector has faced a lot of challenges. One of the major challenges has been the development of the grid to meet the power requirements of the residential, commercial and industrial customers. Other difficulties faced by the power system include: huge network losses, right of way issues to build new transmission lines as well as shortage of gas for the conventional power plants to function maximally.

Therefore, connecting distributed energy systems to the distribution network has been identified as a way of overcoming these challenges. Integrating distributed energy system close to the load will lead to technical, environmental and economical benefits. These include improved voltage profile, reduced losses, provision of ancillary services for network stability, enhanced power quality, transmission expansion deferral, reduction in emissions and many others. These distributed energy systems can also pose technical, environmental and regulatory challenges. The technical challenges can arise if the distributed energy system is not optimally located and sized, thus leading to problems such as power quality issues, protection issues, voltage issues and losses. Thus, it is important to properly site and size distributed energy system in order to maximize the benefits of using this technology.



OCCUPATIONAL DISEASES

Electricity Industry is a high-risk accident-prone industry especially for those engineers who work in the field are exposed to electricity and its dangers. To reduce to minimum, disability or incidents that may cause and invariably endanger the effective operations of the company, appropriate safety measures must be instituted and strictly adhered to.

Some basic safety Precautions are;
- Faults men should avoid contact with naked or live cables.
- Use of safety belt when climbing pylons and poles.
- Use of safety booths.
- Uses of eye goggles for welders especially arch welding.
- Use of face mask for those who work exhaust outlets
- Precaution when walking on wet floors.
- Use of crash helmet when climbing.
- Use of hand gloves for those who work on sharp edges cables.
- Use of coverall especially when working in areas where chemicals are used.
- Use of specified tools for a specific job.
- Concentrate on your job. Do one thing at a time.
- Avoid unnecessary risks or unorthodox new methods; don't try new things until they have been certified okay.
- Don't litter work places or spill oil on the floor.
- Don't be at the wrong place at the wrong time, prevention is better than cure.
- Use of earmuff in noisy places like turbine floors.

Since accidents are a part of human existence and does occur in the industry, it is therefore essential that a well defined general remedy in first aid procedure is put in place and taught to key staff to ensure that victims of workplace accidents are given proper first aid help so as to minimize injuries and save lives.

Basic First Aid Procedure include the following;

a) Airway- Make sure you keep the airway of the patient clear by extending the neck and ensuring nothing is occluding the nostrils.

b) Breathing- Is the victim breathing, If not, do mouth to mouth breathing (assisted breathing) but because of the prevalence of HIV, the use of AMBU bag is now in vogue.

c) Circulation- is the victim's heart still working, if not do a cardiac massage by gently pressing below the left nipple about seventy two times per minute.

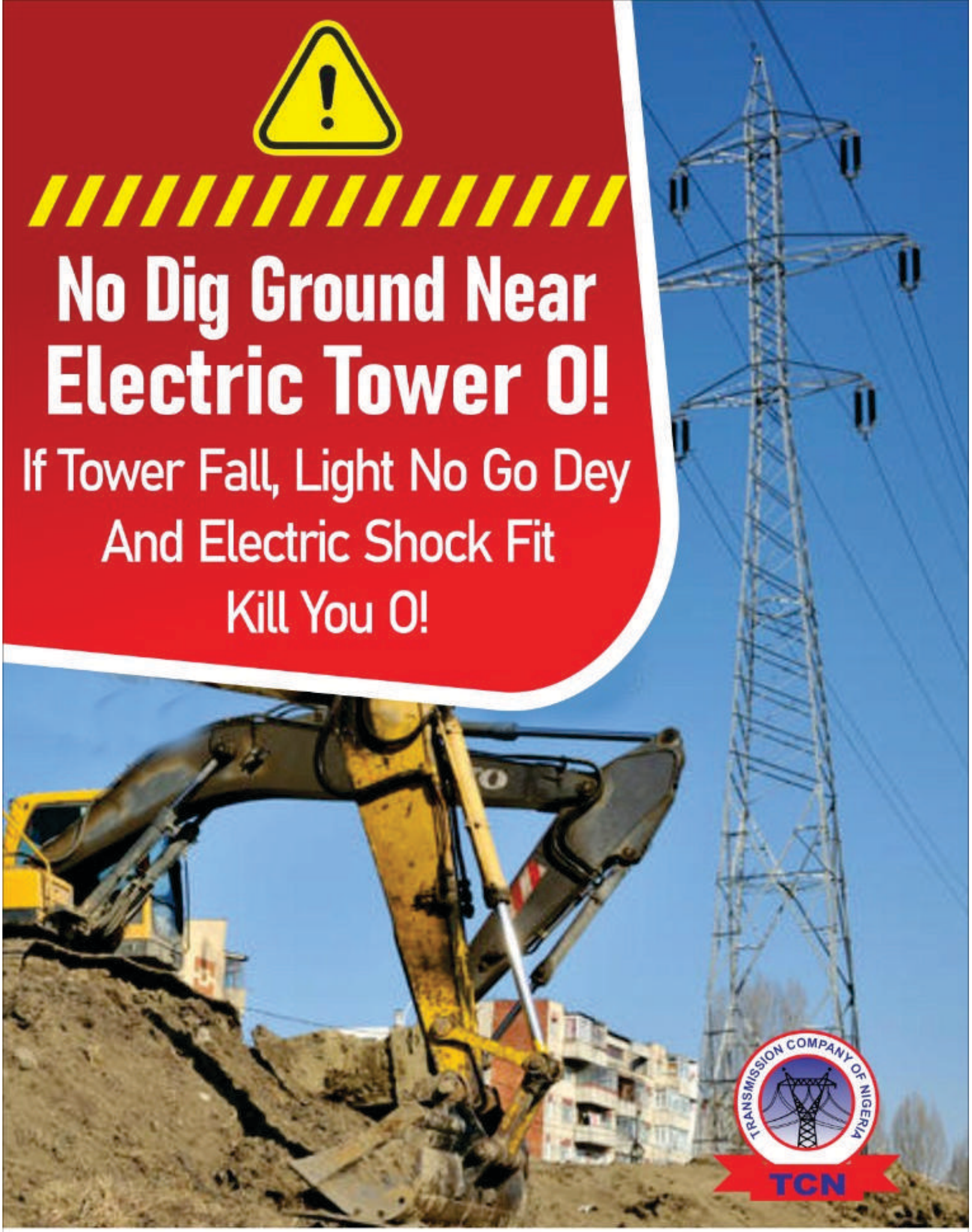
d) Drug- If you can't jump start the heart by the above procedure, medical professionals give some drugs like Adrenaline into the heart. It must be emphasized here that this procedure is only for professionals.

e) Electric Therapy- Specialized Electrical Machine (Defibrillator) could be used to stimulate the heart into action again.

f) Fluid- If the victim is in a state of shock with circulatory failure, we can give fluid directly into the vein.

g) Gas- If you are not winning, give oxygen.

h) Hospital- If all these procedures fail, quickly take the victim to the nearest hospital.



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