

Ad-Hoc Committee On Investigation And Review Of The Activities Of The Nigerian Power Sector

INVITATION TO A 2-DAY INVESTIGATIVE HEARING

Wednesday 8th & Thursday 9th July, 2020

Theme: Making the Power Sector in Nigeria to Work

We commend the resolve of the members of the House of Representatives in establishing an ad-hoc committee to **“Investigate and Review the Activities of the Nigerian Power Sector”**.

It is particularly a good time to review the activities of the power sector in Nigeria, as the downturn in revenue and the impact of COVID-19 in the short-to-medium term should "force" us to jettison the conduit pipes of wastages in our national life including the power sector.

The power sector privatization has failed and we must not be afraid to review, possibly correct, or even cancel the privatization if it is crystal clear that we will still be talking about **3,500MW of distribution capacity by 2030**.

The power sector is directly related to the economic prosperity of any nation. Nigeria has suffered great setbacks and may never be industrialized if the power sector continues with "business as usual".

To carry out a detailed review and reposition of the power sector, we must celebrate merit over mediocrity and be apolitical. The power system is a very complicated system and only the best amongst equals should be allowed to pilot its affairs.

IMMEDIATE STEPS

1. Comprehensive Review in the form of technical and financial audits of:

- The Distribution Companies (DisCos)
- Transmission Company of Nigeria (TCN)
- Generation Companies (GenCos)
- Gas Supply Chain

2. Comprehensive Review of the Privatization Process.

While it is better to see the privatization of the electricity sector as a journey, it must be with the right sets of players. Where it can be proved that the current players cannot, and have no intention to, take us out of the power sector conundrum, it must be reversed and a different arrangement, bearing the features of a socially acceptable privatized electricity system, should be put in place.

This will not be a **renationalization** to the old NEPA days.

We will provide details of how this can be realized where required.

Some of the reviews to be carried out will include but not limited to:

- Performance Agreements signed by parties during privatization in November 2013.
- Commercial Agreements signed – Gas Supply Agreement (GSA), Power Purchase Agreement (PPA), Market participation Agreement (MPA), etc.
- The Electric Power Sector Reform Act (EPSRA) 2005.

RETHINKING THE PRIVATIZATION MODEL OF THE NIGERIAN ELECTRICITY SUPPLY INDUSTRY (NESI)

The National Assembly has reasons to review the privatization of the power sector as performance targets have not been met. One area of interest in the last few months is the need to “Rethink” the model of Privatization that will best suit our social/political environment. As a key stakeholder in the developments in the Nigerian power sector pre- and post-privatization, we have carefully reviewed the opportunities available to us as a nation with regards to the realization of a vibrant power sector and wish to recommend as below:

1. The use of a **Performance-Based Incentive Model based on output measures** is now required. Under this model, targeted investment in the power transmission and distribution networks in a sustained and systematic manner will be required. There are steps to be taken before, during and after implementing this model to get the desired benefits. Performance Improvement Plans (PIPs) will be prepared and submitted for approval by the distribution companies (DisCos), performance targets are set, achievements of targets rewarded and under-performance penalized. The Investment programme by the DisCos will be supported by the Federal Government and backed by development finance institutions (DFIs).
2. Appointment of a Power System Architect consisting of a team of multidisciplinary technocrats who will take a whole-system and long-term responsibility for developing and agreeing the framework of architectures, standards, guidelines and protocols needed to reposition the NESI to attract investment from existing and new market participants while enabling a seamless response to challenges arising from policy imperatives as they emerge in the next decade or two. The proposed System Architect, to be led by a seasoned Power System Professional, should be a single clearly defined entity responsible for the management of the complexity of the evolving power system architecture in the public interest on behalf of the Federal Government of Nigeria. **We are available to set up and lead the proposed power system architect.**
3. Market signals have to be robust to attract foreign direct investment (FDI) as new sector entrants have to be seen to have demonstrable expertise in power systems. This will include the governance framework for the entire NESI.
4. The Implementation of (N-1) Security of power transmission and distribution supply philosophy at higher voltages. A similar security level is required for gas-to-power networks.

5. Transparency in revenue collection and remittances using technology as we deepen the gains of credible government policies such as the Eligible Customer (EC) and the Meter Assets Providers (MAP) Regulations.
6. Where availability of funds is an issue, we propose the decentralization of the power grid in the meanwhile with continued focus on distributed generation via on and off-grid renewable and non-renewable electricity systems.

THE NIGERIAN ELECTRICITY ROADMAP (NER) PROJECT

The Federal Government of Nigeria, in a government-to-government deal with the German Government, is engaging the services of power industry giant Siemens for the implementation of the Nigerian Electrification Roadmap in three phases. Phase 1 involves network upgrades that will ensure the current available generation capacity of 7,000MW (7GW) is made available to consumers in the NESI within 2 years of commencing the project. Phase 2 aims to carry out further investment activities that will realize up to 11,000MW (11GW) of distributed power to consumers while phase 3 hopes to ensure the availability of generation, transmission and distribution capacity of no less than 25,000MW (25GW) in the NESI.

With the planned financial interventions via foreign direct investment (FDI) and Federal Government's support in the power sector, it is important that we get value for money. In this regard, it is expedient that a Project Management Team be established to supervise the scope of work under the Nigerian Electrification (NER) Project, represent Government's interest, while ensuring the delivery of the project to time, to quality, and to budget.

The National Assembly (NASS) has a significant role to play for this project to succeed. The oversight function of the NASS is all the more important in areas including but not limited to:

- Appropriation and Funding
- Inputs to optimize deliverables and maximize benefits to a larger section of Nigerians
- Unlocking opportunities for skills acquisition and employment of Nigerians
- Aligning project implementation with existing laws on local content and environmental protection

With an installed generation capacity of 13GW, a transmission capacity of 6GW and a distribution capacity averaging 5GW, Nigeria's electricity supply industry, anchored on hydro and thermal technologies, grossly falls short of the power supply needs of its over 200 million population. In other more developed climes, the ratios are in reverse. The inadequate supply of gas, age of equipment in the wire business coupled with operational deficiencies and low managerial know-how further compromise the capacity to provide the best of the available supply to Nigerians.

The problems of the Nigerian Electricity Supply Industry (NESI) are multi-faceted. Aside from political will, we need committed hands who have demonstrable experience in power systems to lead the way.

To achieve progress and realize the country's potential, our value system has to be reviewed. We need to have the right leadership with the right mindset to set the right priorities for the NESI and

eschew selfishness, greediness and corruption. Also, we have to avoid putting square pegs in round holes and or the celebration of mediocrity over merit.

Strategic Thinking

To make electricity more available, sustainable and affordable within the current structure in the NESI, the following points are germane:

- The **best strategy** to accelerate energy access in the NESI is via distributed generation connected to regional grids and or the existing national grid system if it does not impede large scale penetration of distributed generation. For example, the northern region of Nigeria is superabundantly rich in solar and other renewable resources that can be harnessed for power generation. Power generation from these resources, in addition to hydro power generation from Kainji, Shiroro, Gurara, Mambilla and other rivers in the north, can sustainably serve the north while the abundantly available gas resources in the south can be used to generate power for the southern grid. A provision will be made to sell power across the north and south as need arises. Apart from the economy of scale, this will help to greatly reduce Aggregate Technical, Commercial and Collection (ATC&C) losses on the power network.
- As most consumers at the grassroots may not be able to foot their energy bills, the Federal Government (FG) should continue to provide financial interventions in the form of loans or subsidies to cater for the energy needs of such properly identified consumers.
- Our portfolio of energy resources should have various mixes including gas, hydro, **coal** and renewables.
- The electricity systems should include rooftop, mini/micro-grids and hybrid solar solutions for power generation.

Regulatory Interventions

The Nigerian Electricity Regulatory Commission (NERC) is taking steps to make the power system efficient, protected, reliable, effective and scalable to a level that is desirable. To achieve these objectives and others as contained in the Power Sector Recovery Program (PSRP),

- The EPSRA 2005 must be reviewed in view of the legal, economic, commercial, technical and regulatory realities of the NESI today.
- Appointment of NERC commissioners should maintain a higher percentage of established power engineers as we have it today for the next five (5) decades to ensure sustainable professional development of the industry. NERC forum offices should follow the same format to enhance better service delivery and customer satisfaction.

- Service Reflective Tariffs should be a precursor to Cost Reflective Tariffs and not the other way round. For future tariff reviews, DisCos have to convince consumers of the need to increase tariffs by improving the quality and reliability of their services over time.
- The recent performance improvements plans (PIPs) submitted by DisCos should be given adequate attention, scrutiny and monitoring. The outputs and key performance indicators (KPIs) have to be strictly monitored. NERC will need to recruit suitably experienced engineering monitors and auditors with clearly identified tasks and reporting formats in order to effectively monitor the performance targets.
- Estimated billing should be out-lawed.

Corporate Governance

Power system is a highly technical subject and unless the inputs of seasoned power engineers are taken seriously, there can be no headway. Admittedly, the solutions to the problems in the power sector will require inputs from various key disciplines like accounting, finance and law to mention a few areas, the overriding consideration shall be the technical implications of decisions to be made and professionalism is a key factor in this regard.

Management & Leadership in the NESI

Generally speaking, anyone that is competent enough to know how to achieve a desired objective is qualified to lead. However, in recognition of the fact that there is a serious dearth of great leaders in and out of our industries, we need to get the right person with the right skills set to lead and leave him or her to pick the most qualified professionals (based on technocracy and meritocracy) to lead various teams in order to achieve best results. For example, an accountant should not be made the head of a technical department where power engineering is required. Just as it will lead to murder to make an engineer head of a surgical exercise on cancer. In those peculiar instances, the professionals in relevant fields should take control of their turfs.

A good Managing Director requires a much more refined multidisciplinary skills set even in a technical field. With the right skills, any trained and well exposed engineer can lead and do so successfully. Private investors want the best of leadership to take care of their investment by skillfully meandering around the political, social-economic, scientific, cultural, technical and human environment of business, while deriving maximum profit in the process.

In conclusion, the leadership of any serious company should be people with these complex skills sets who recognize the need to put the right people in the right place to do the right thing and to work, not in silos, but as a well-coupled systemic team towards a defined goal - profits and sustained profits and continued profits!!!

Key Power Sector Agencies and operational entities should be led by seasoned power systems engineers in view of where we are in the cycle of power sector development

To achieve these objectives, such leadership, possessing the required skills and cognate experience in the electricity supply industry (power sector) must give authority and free hand to relevant professionals so as to be responsible and accountable for meeting their performance targets.

How to do it

At all levels, the governance framework for the NESI should include business/performance objectives that meet the S M A R T criteria which are S - Specific; M - Measurable; A - Attainable; R - Realistic; and T - Time bound. Such a setting will link performance to incentives and failure to penalties/sanctions as may be appropriate.

Human Capacity Development

A successful power sector depends on a highly skilled workforce. The dearth of knowledge and requisite skills in power engineering and management is a threat to the survival of the NESI. To change the narrative, we will suggest the following:

- Personnel recruitment shall be based on competence and should allow recruitment of foreigners only where local expertise is either inadequate or unavailable but strictly in compliance with the Nigerian Content policy.
- Development of structured management systems to guide effective and efficient management of the different sectors of the industry.
- Institutionalization of a structured leadership development programme to prepare engineering personnel for supervisory, managerial and executive leadership positions.
- Training & re-training of power sector workforce.
- Review and development of different aspects of power system curricula.
- Encouragement of research, apprenticeships, continuous professional development (CPD) including purposeful interactions between academia and the power industry.

Technical & Operational Efficiency

The following areas have to be given immediate attention to ensure the sustainability of reforms in the power sector:

- Enhancement of network performance by standardization of its design, construction, maintenance, protection and operation while enforcing compliance.

- Establishment of a certification body of global reputation (similar to the energy network association in the UK) for the industry to review/ monitor the implementation of standards, training, safety, quality and to, in general, be the voice of industry stakeholders.
- Network Planning - Network Analysis and power system studies in general have to be the norm not the exception in the NESI. For this, the need for accurate data cannot be over-emphasized. Data requirements are as detailed in the relevant sections of both the Grid and Distribution Codes. This will enable a coordinated planning of the power system.
- Network Protection – A reliable power system has to have a properly designed, installed and coordinated protection system. There must be periodic audit of protection settings and the calibration of relays especially after the installation of new networks (transformers, feeders, substations, etc).
- Every sector or segment of the industry should have asset, quality and safety compliance/enforcement units (and if possible obtain PAS 55 certification) that will ensure the requirements of all applicable standards are met and all deviations (derogations) are approved and documented. The head of these units shall report to MDs/CEOs of the respective companies in the sector.
- The power industry should have a special court to try those who act to compromise the power system by way of collusion, energy theft, vandalism, health, safety, and environmental breaches, etc.
- Procurement in the NESI must follow sound project management principles with a higher focus on total cost of ownership, value engineering and quality assurance compared to initial cost.
- TCN to focus more on system protection, reactive power control, voltage balancing, frequency stability, reduction in network losses, system dynamics, etc to avoid frequent system collapses.
- TCN should improve the National Grid system to be a ring or mesh as opposed to the existing radial networks.
- The gas, transmission and distribution networks should implement the (N-1) security standard to reduce the frequency of Power failures/system collapses in Nigeria.

Customer Metering

The Meter Asset Provider (MAP) regulation takes away the responsibility to provide meters for all consumers from DisCos who have no financial capacity to do so. However, they have frustrated

the MAP scheme. Thus, to increase confidence in the power sector reform and solve the liquidity problem, the FG needs to:

- Ensure the successful implementation of the MAP regulation by making the guided process totally independent of DisCos.
- Provide financial intervention aimed at providing meters to all consumers in the NESI if MAPs struggle to secure finance.
- Insist that electricity bills be paid into an escrow account that will be visible to relevant stakeholders.

Operational Excellence

Blanket use of a power factor of 0.8 in the NESI by a majority of operatives is patently wrong and a waste of power. For example, a 15MVA injection substation transformer is "pegged" to deliver no more than 12MW. **This needs to be reviewed.**

11kV & 33kV feeders are "loaded" based on the miscalculation using $1\text{MW} = 60\text{A}$ at 11kV and 20A at 33kV. This is based on fatal assumptions that arose because of human errors in the distant past but have been carried through over the years - **This has to be reviewed.**

Power factor correction to 0.95 provides maximum benefit. This takes reference from the known fact that good power equipment manufacturers usually build to higher standards than indicated on the plate labels. This underscores the need to procure equipment from trusted and tested manufacturers.

Observations/Recommendations

In view of the afore-mentioned points, we will enjoin the leadership of the House of Representatives and or the Federal Government to address the following issues as soon as practically possible:

1. Lack of Service Reflective Tariffs. No commercial business can run sustainably on less than minimum profit level tariffs.
2. Lack of or inadequate training and competency assurance. This is the bane of the industry which patently has not adopted best practices taken for granted in other advanced climes.
3. Illiquidity. The business of power is a capital intensive one and cannot be treated as a "Christmas gift". The system must guarantee that all power delivered by the grid will be accounted and paid for.
4. Lack of innovation and technology. Power systems are dynamic. Nigeria must grow its systems with this in mind so as to position it for growth, effective control and ease of upgradability.

5. Replacement of aged infrastructure. This is germane to success. Keeping old and dilapidated equipment in the network hampers efficiency and performance. The correct implementation of the Siemens' deal and the replication of same for the next two decades, will reposition the power sector progressively towards success.
6. Lack of political will and undue political interference. Privatization is a sure way to achieve the desired power sector development but the process should be measured, transparent and made to attract only those with the zeal for adding value to the system. In this regard, the electricity regulator must be truly independent.
7. Lack of or insufficient personnel remuneration and/or motivation.
8. Insecurity. The vandalism of equipment and acts of terrorism in some areas of the country are sure deterrence to needed private sector involvement in the industry.
9. Lack of a well-defined Health, Safety & Environment (HSE) provisions. Current provisions should be reviewed and codified to create the best possible environment to grow the industry.

NIGERIAN – GERMAN GOVERNMENT INTERVENTION (FGN/SIEMENS DEAL)

We commend the National Assembly (NASS) and Mr. President, Muhammadu Buhari, GCFR, for setting up and supporting the Presidential Power Initiative (PPI) as a power infrastructure upgrade and modernization partnership programme between the Federal Government of Nigeria (FGN) and Siemens AG of Germany. The FGN has taken several bold steps in attempting to solve the electricity conundrum in the Nigerian Electricity Supply Industry (NESI). Some of these include the Nigerian Electrification Roadmap (NER) project with Siemens AG (which aims to correct the value chain imbalance in generation, transmission and distribution capacities, add adequate protection/communication and control infrastructure to the network and then grow the value chain network capacity to a desired level of about 25GW within 6 years), Power Sector Recovery Programme (PSRP), Transmission Rehabilitation and Expansion Program (TREP), Distribution Expansion Programme (DEP), among others. More importantly, before these afore-mentioned initiatives, there have been numerous other ongoing initiatives such as projects sponsored by the World Bank, Japan International Cooperation Agency (JICA), African Development Bank (AfDB), etc and thus, it is imperative to state here that the FGN needs to find a way to ensure that the PSRP, TREP, DEP, NER and other initiatives are implemented correctly and synergized, to enable Nigerians have a power system to be proud of.

To assure the success of the Nigerian Electrification Roadmap (NER) project, the following points are worth highlighting:

- a. The Project Management Team (PMT) on the Nigerian side needs to include experienced power engineers. Also, the implementation of the projects by local contractors should be by agencies with proven track record of delivery.
- b. A reasonable target for the NESI is for the electricity value chain to be able to generate, transmit and distribute 30,000MW of electricity by 2030. **This should be tagged Nigerian Power Vision 30-30.**
- c. The Electric Power System is a critical infrastructure and is the backbone of any nation's economy, security and health. Nigerians feel its impact from the electricity used in our homes, the energy that pumps water for us to drink in our houses, trains and other efficient transportation systems that move us around, including the power for communication systems we rely on to stay in touch with friends and family. So critical and vital are these infrastructure (the assets, systems, and networks), whether physical or virtual, to the nation, that their incapacitation or destruction would have debilitating effects on national security, economy, public health & safety, or any combination thereof.

For the NER project with Siemens AG, a project conceived to provide a robust power system infrastructure for Nigeria's sustainable development, to be a success, the following should be considered:

1. Collaboration

There is need to secure the buy-in of the operators and key sector stakeholders in the Nigerian Electricity Supply Industry (NESI).

2. Total Cost of Ownership (TCO)

For every aspect of the project, Siemens AG is expected to put in place a robust maintenance/life cycle asset management plan for the installed plants.

3. Local Production of Spares

Intentional positioning of local businesses to undertake the local production of the required parts to be used to maintain these plants.

4. Local Manufacture of Electricity Meters

Local production of meters in line with Siemens' standards for the required expansion as we don't have to import everything. There already exists about five (5) indigenous Electricity Meter Manufacturing Plants in Nigeria. These companies should be made to produce to the standards and specifications of Siemens' AG and the Standards Organization of Nigeria (SON) and must not be allowed to die like the Ajaokuta Steel Complex for lack of patronage.

5. Training, Mentoring & Industrial Experience for Graduates

Training fresh graduates on design and production of the component parts mentioned in (3) above to ensure the longevity of plants even long after this administration and Siemens AG are gone.

6. Transparency by Siemens AG

True transparency (not the bureaucratic type) on all manner of procurement should be demonstrated even if we have no middle-men. Component parts designed and manufactured by Siemens do not have to be extremely expensive based on inability to compare with similar products in the free market.

7. The total cost of the project is yet unknown

The full cost of the project should have been determined ab-initio, even before the payment of 1.7 Billion Naira as part of Nigeria's counterpart funding was authorized. This can lead to cost variation and budget overrun. Has any contract really been signed? The Technical & Commercial proposals for the three phases of the project should be firmed up to avoid the kind of scenario which played out in the Ajaokuta Steel Complex Project with Russia.

8. Project Management Team

The President had directed that a Project Management Team (PMT) be put in place by an assigned Special Purpose Vehicle (SPV). The PMT should, as a minimum, include 99% seasoned Nigerian power system and project management professionals who have demonstrable experience of power engineering project management. The communication of happenings and dissemination of information relating to the project to the public can be improved upon by the PMT. Nigerians should get the authentic information about the progress of the project from the team periodically.

9. Synergy with Industry Stakeholders and Participants

There is need for synergy between Siemens AG, and the Project Management Team (PMT), with the Nigerian Gas Company (NGC), GenCos, DisCos and TCN on operational issues. Also, synergy with the Nigerian Electricity Regulatory Commission (NERC), Nigerian Electricity Management Services Agency (NEMSA), Standards Organization of Nigeria (SON) and other relevant stakeholders is required on compliance issues just as the need for realignment on Legal, Commercial and Technical frameworks with the investors in the privatized Nigerian electricity market (NESI).

10. Network Studies

Power System Studies are more reliable for determining load and non-load related investments in the power sector. Siemens referred to some studies done by others in their technical proposal. Siemens also carried out some independent studies. The studies or

reports have to be published or reviewed by the PMT and other relevant stakeholders. Baseline Network Losses was quoted in the proposal as 55%. The studies done to determine this has to be reviewed by the PMT and a loss reduction trajectory monitored as the project progresses.

11. Protection Systems

The details of protection requirements for the distribution network revamp aspects of the scope of work have largely been pushed to the DisCos. It is imperative for DisCos to seek professional help in outlining these requirements for review by the PMT and Siemens AG. Otherwise, Siemens should carry out a comprehensive survey in this regard in just the same way they did for the rest of the scope of work.

12. Deliverables from the project should among others include:

- Operations and Maintenance Manuals for items delivered and installed.
- Standardized Network Designs and Single Line Drawings.
- Detailed Design Pack.
- Operating Philosophies, protection scheme logic, Software designs, etc.
- Factory Acceptance Tests (FATs) and Site Acceptance Tests (SATs) witnessed by operatives in the relevant segment of the power value chain.
- Operator Training Station (OTS) to enhance the performance and training of staff.
- Detailed pre-commissioning and commission checks.

13. Documentations

All documents, manuals and items to be provided by Siemens AG on the NER project should be in English Language.

14. Local Content.

This project should comply, as a minimum, with the Presidential Executive Order 5 on Local Content and the Nigerian Content Act/ Regulation 2014 by NERC. The focus should include that:

- Detailed Engineering Design be domiciled in Nigeria to ensure sustainability.
- Siemens builds Manufacturing and Fabrication Yards in Nigeria for the production of transformers, switchgears, relays etc just as they have done in India, China, Iran and other nations where they have similar projects delivered.

This can then be a win-win situation for both parties.

15. Metering

Although the project provides for a technology-based solution for the visibility of revenue from consumers and the payments of relevant stakeholders, it does not aim to solve the metering problem in the NESI. We will recommend that the FG provides a separate financial intervention similar to this to provide meters for Nigerian consumers to allow the full benefit of this project to be realized. Such intervention measures should be given to local manufacturers to enable them grow capacity in-country with strict adherence to international norms, specifications, standards and best practices.

16. Technical Training

The plan for technical training by Siemens AG is apt. The planned training should be in collaboration with indigenous power professionals and known training facilities like the National Power Training Institute of Nigeria (NAPTIN). Power training Institutions should be proactive in getting their training centres ready to meet the training requirements from this project by recruiting freelancers who have the technical knowledge and experience to provide training as required in the detailed scope of training which is as yet to be developed by Siemens. Training in all aspects of Asset Management that will enhance the life-cycle ownership of installed assets should be included – Software tools (system planning, protection et al), Operations and Maintenance, etc.

17. Single-Sourcing

This contract arrangement is single-sourcing. It has definite advantages and disadvantages. The disadvantages should be mitigated by the activities of the PMT. Some of these disadvantages include but are not limited to:

- Possibility of monopoly of Price & Proprietary Software
- Difficulty of procuring competitive services many years after the completion of the three phases of this project.
- Risk of the lack of availability of spares - components, software tools and licences, equipment support, etc.

18. Alignment with similar activities and loans procured for projects in the power sector to avoid duplication/multiplicity of scope and the possibility of white elephant projects.

- Transmission Rehabilitation and Expansion Project – TREP
- Distribution Expansion Program (DEP).
- Power Sector Recovery Program (PSRP)
- Economic Recovery and Growth Plan (ERGP).
- Nigerian Economic Sustainability Plan (NESP)
- The Performance Improvements Plans (PIPs) already submitted by the DisCos towards the tariff regime in the next regulatory period.
- Approved loans from the World Bank, AfDB, JICA, etc

- Returns from the "Abacha Assets" which have been earlier earmarked for power system development.

NEXT STEPS

Adoption of centralised or decentralised grid network policy:

The fastest, most economic and technical way to develop the Nigerian power system is through the decentralization of the grid system using renewable and non-renewable technologies to connect distributed/embedded generation throughout the country. The existing national grid system will be used as an interconnector for the transfer of excess power flows from one area to another.

If this cannot be achieved, the existing radial networks (gas and electricity) have to become “a mesh or ring” to allow the (N-1) Security of Supply standard to take root in the NESI. Siemens should adopt one of these options based on their proposed plan in synergy with all other highlighted intervention programmes of the government in the industry.

Engr. Idowu Oyebanjo, MNSE CEng, MIET

MD/CEO, Idfon Power Engineering Consultants (iPEC) Limited

+2348171211754; +2347036852815; +447909597109; idbob@yahoo.com; ceo@ipecong.com

