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PTDF Digest

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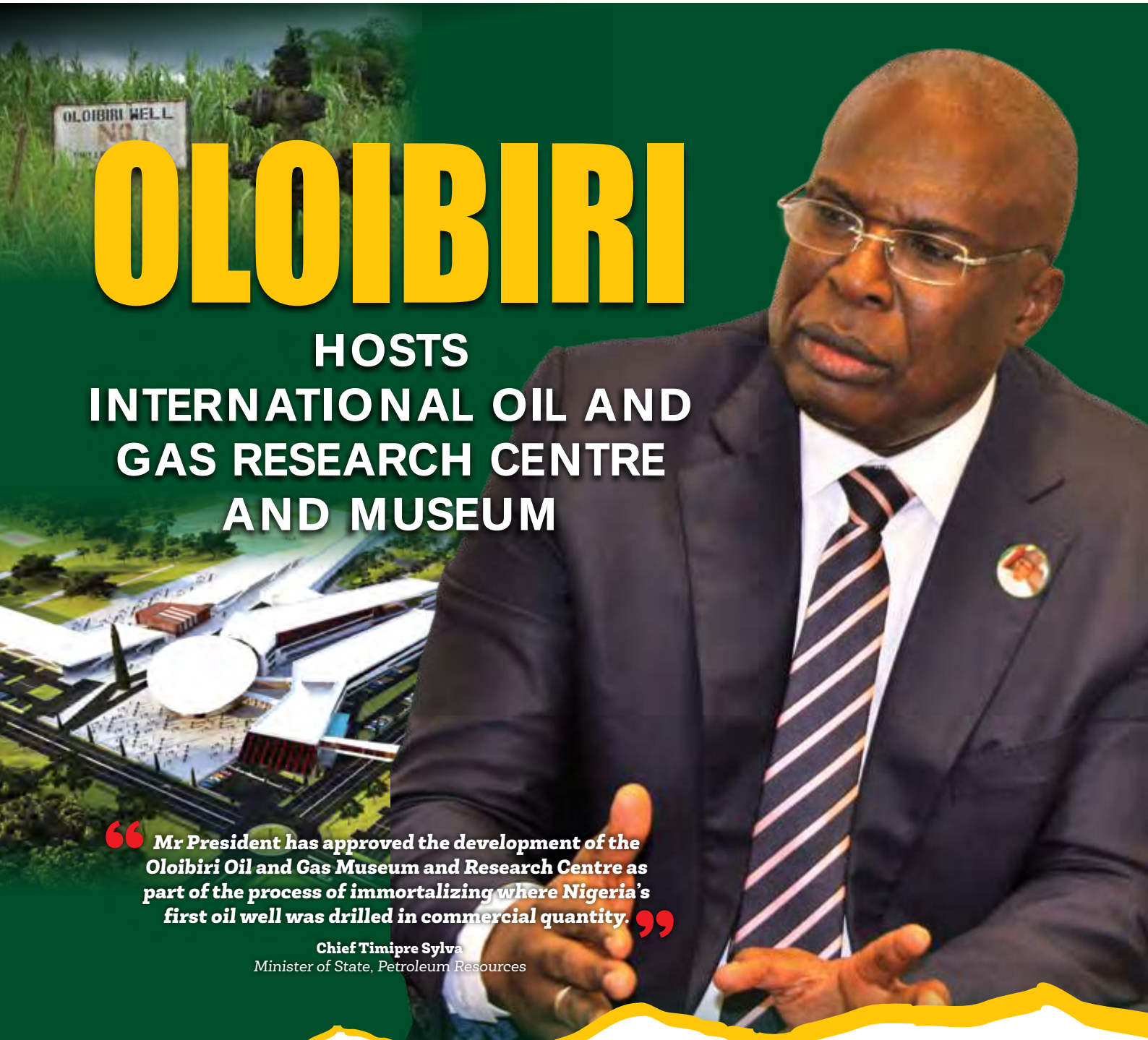

OLOIBIRI

HOSTS INTERNATIONAL OIL AND GAS RESEARCH CENTRE AND MUSEUM

"Mr President has approved the development of the Oloibiri Oil and Gas Museum and Research Centre as part of the process of immortalizing where Nigeria's first oil well was drilled in commercial quantity."

Chief Timipre Sylva
Minister of State, Petroleum Resources

COVID-19

PTDF Response to Pandemic

PTDF: TRAINING LOCAL WELDERS FOR THE GLOBAL WORKFORCE

Over 2,000 Nigerians have been trained in specialized welding and fabrication competences under PTDF Welders Training and Certification Programme.

From the Editor

As an in-house magazine, our scope and perspectives are usually confined to documenting the programmes and projects of the Fund and activities towards their implementation. The publication also highlights issues and concerns of the oil and gas industry that relate to building local capacity which is the primary mandate of the Fund.

In this edition our cover story goes beyond these confines as we share with you an exclusive interview with the Honorable Minister of State, Petroleum Resources, Chief Timipre Sylva. What was planned as a "footprint" interview turned out to be revealing, providing the Minister's insight on issues fundamental to the operations of the industry. Some of these include the challenges and opportunities of COVID-19 Pandemic on the oil and gas industry, pragmatic solutions to the vexed issue of production cost of crude in Nigeria, deregulation and subsidy removal, the achievements of the local content policy of government, the gas flare mitigation project and the transformation of Oloibiri, the location of Nigeria's first oil well, into an international hub for oil and gas research and repository of oil and gas artifacts.

These are worrying times for Nigeria's oil and gas industry and indeed Nigeria's economy as crude oil prices plummet from the highs upon which the 2020 annual budget was predicated. COVID-19 pandemic and the price war among cartels and major global producers created the uncertainty which is already altering our FOREX templates. Oil sales contribute 90% of our foreign exchange earnings and foreign reserve inflow.

While we ponder over this situation, there are however cheering developments in the industry, which though may not erase the present uncertainty are worth celebrating. The inauguration of the drilling of Kolmani River II Well in the Gongola Basin of the upper Benue trough by President Muhammadu Buhari signifies the commencement of oil exploration in Nigeria's frontier basins and marks a significant milestone in the application of PTDF research outcomes in solving specific problems of the oil and gas industry in Nigeria.

The Petroleum Technology Development Fund had envisioned a situation where Nigeria's energy sufficiency can no longer be sustained by hydrocarbon resources from the conventional basins alone, and the depletion of Nigeria's proven oil reserves from the over exploited Niger Delta and offshore regions. Realising that further discoveries of oil can only be achieved by exploring the inland basins of the country, PTDF instituted research chairs in universities contiguous to Nigeria's inland basins with the understanding that every exploration effort begins with research to determine the geology, stratigraphy and economic viability.

The breakthrough from one of these research endowments contributed to the founding of oil in the Benue Trough and inspired the ongoing exploration activities. We are indeed proud to be part of the success of a key initiative of the National Oil and Gas policy, which is the harnessing of hydrocarbon reserves in Nigeria's frontier basins.

The other key development is the assent by Mr. President of the Deep Offshore (and Inland Basin Production Sharing Contract) Act aimed at shoring up Nigeria's oil earnings. The landmark legislation took 20 years to come to being.

Our story on PTDF 'STEM' INITIATIVE addresses the foundational problems in the teaching and learning of science subjects in Secondary Schools. The initiative factors in the teacher, instructional materials, laboratory experiments and curriculum review.

COVID-19 is creating "new normals" in different aspects of life and PTDF is not left out. We will tell you how the Fund is responding to the challenges especially in mitigating the impact on our scholars.

Kalu Otisi ESQ.

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From the Executive Secretary

Dr. Bello Aliyu Gusau
Executive Secretary, PTDF

INSIGHT ON PTDF 'STEM' PROGRAMME

The Petroleum Technology Development Fund is a capacity building agency of government for the oil and gas industry. In the two decades of implementing our mandate, we have recorded measurable achievements in the areas of education and training, the development and upgrade of local oil and gas institutions and departments in universities, and patented breakthroughs in research and development. Evidence of the Fund's successes abound in great numbers. Many distinguished professors, lecturers, operators and managers of national and international oil companies are products of PTDF, and researches sponsored by the Fund are helping to solve specific problems of the oil and gas industry such as the refineries and hydrocarbon prospectivity.

In the many years of implementing its mandate, PTDF has been focusing on the tertiary level of education in its human capital development intervention. In this regard thousands of Nigerians have been trained at undergraduate and post graduate degree levels through the Fund's local and overseas scholarship schemes. However, in 2017, we instituted a strategic direction agenda, the main plank being to domesticate our training programmes with a view to redirecting the traffic of our scholarship beneficiaries away from foreign universities to Nigerian universities. As a result, in the 2019 scholarship year, the number of awards for studies in Nigerian universities was twice that for foreign universities. All along, the numbers have been proportionately in favor of universities abroad.

The PTDF 'STEM' programme is essentially a continuation of our strategic direction objectives of looking inwards to strengthen the capacity of our local training institutions particularly at the secondary school level of education. In the course of carrying out our mandate, we realized that there are fundamental weaknesses in the application of science, technology, engineering and mathematics 'STEM' subjects at the undergraduate and graduate levels of training. These are critical areas of study in the sciences and technology required to build relevant manpower and skills in the oil and gas industry. It is therefore apposite for the Fund to intervene at the foundational level by enhancing the teaching and learning of 'STEM' subjects in senior secondary schools. The target subjects are Mathematics, Chemistry, Biology, Physics, ICT, and English.

Nigerian public secondary schools face many challenges in terms of instructional materials, basic laboratory facilities, and adequate teaching staff especially for the science subjects. We commenced the pilot Stage of the programme with the identification of the one thousand secondary schools across the country that will be enrolled into the PTDF 'STEM' programme. These are made up of one secondary school from each of the seven hundred and seventy-four (774) local government areas, and one hundred and four (104) federal unity schools. The rest of the participating schools are drawn from special schools for the disabled and vocational institutions. The state governments and FCT authorities contributed in the selection of schools from the local government areas and area councils.

There are three components of

the PTDF 'STEM' programme. The first and obviously the most important is the training of teachers selected for the programme. Teachers are crucial to the realization of the program objectives. A school may have state of the art facilities, good buildings, well equipped libraries and laboratory, but if the teachers are inadequate, the academic objectives can hardly be achieved. We therefore decided that our first protocol is to attend to the capacity of the teachers under the programme. Altogether, six thousand (6,000) teachers will undergo the training. They are made up of one teacher for each of the 'STEM' target subjects from the one thousand secondary schools participating in the program. The trainings will hold in selected universities in the six geopolitical zones.

The other component of the programme is the provision of instructional materials especially books. We are working with the National Educational Research and Development Council to determine the kind of literature that will be relevant to the scheme. We hope to establish mini libraries in each of the secondary schools.

The other element is the setting up of laboratories for practical demonstrations of science and technology experiments. As we may not have the financial capacity to build and equip laboratories in all the 1000 schools, we intend to simulate the laboratory processes and experiments. Technology has given us the option to simulate an experiment, and this is being done across the globe. Our discussions with the Science Teachers Association of Nigeria revealed that there are 191 experiments that are conducted for science subjects in Nigerian secondary schools. We will transform each experiment that is conducted in Nigerian secondary schools into graphic/video format that can be deployed easily in the selected secondary schools through electronic playback.

The other component is to inculcate in the students the consciousness of scientific thinking, and science as a field of study in our secondary schools. This will assist the students to overcome the phobia on science subjects particularly mathematics. We shall encourage these secondary schools to form STEM clubs in order to claim ownership of the initiative.

'STEM' as a programme is not novel in the advancement of science education. While many organizations have done a lot of advocacy on STEM, PTDF intervention is designed to complement the existing curriculum for STEM subjects in secondary schools. The Fund desires through the programme to strengthen the capacity of the teachers in the delivery of lectures in the identified areas of study in order to increase the interest and performance of students in science subjects prior to commencement of tertiary education ■

Secondary School students performing laboratory experiments

FRENCH AMBASSADOR VISITS PTDF

His Excellency Jerome Pasquier with plaque presented by E.S PTDF

The French Embassy in Nigeria seeks to strengthen its partnership with the Petroleum Technology Development Fund (PTDF) and explore more areas of collaboration in the Fund's scholarship and other educational development programs.

French Ambassador to Nigeria, His Excellency Jerome Pasquier, who paid a courtesy call on the Executive Secretary, Petroleum Technology Development Fund, Dr Bello Aliyu Gusau at PTDF House in Abuja said the scholars sent from the Fund in the last three years are well organized and hardworking.

The French envoy said that the strong tie between PTDF and the Embassy and Campus France needed to be consolidated for the good of the two countries.

"We are aware of the importance of Nigeria, the biggest country in Africa, we have traditional relationship and we want to maintain it and explore new possibilities of cooperation. We have a wonderful cooperation and partnership with PTDF, your scholarship is more organized, and you send very good students, working well and very successful in France".

Executive Secretary, PTDF, Dr Bello Aliyu Gusau in his remark expressed the Fund's readiness to collaborate with all institutions that are ready to support the implementation of the Fund's mandate in Education, Research and Development.

He said the Fund has worked excellently with the French Embassy and Campus France and is willing to extend its programmes to some other French universities such as the Leon and Grenoble universities for joint research and other education and training programmes.

He said the relationship which started in 2016 with just Eight (8) students has grown to over 70 students in both Msc and PhD programmes, attributing the growth to the new selection process introduced by the Fund which produced high quality students.

"What I want to say is that, our relationship with France started just in 2016 but already it is turning out to be one of the most important relationships we have had. Infact presently France is the second biggest destination for most of the beneficiaries of the PTDF scholarships. Since that programme commenced in 2016 we've hardly had any mishap or serious issues. so, I want to thank you on behalf of PTDF for what the Embassy and Campus France have been doing. We look forward to expanding this relationship because our scholars are coming with fantastic results" ■

CANADIAN ENVOY SEEKS EDUCATIONAL PARTNERSHIP WITH PTDF

The Canadian Embassy in Nigeria is also exploring areas of collaboration with the Fund's scholarship and other educational development programs.

The High Commissioner and Head of Nigerian Mission, His Excellency Phillip Baker, who paid a courtesy visit to the Fund, said there is great potential in Nigeria and Canada working together in the area of oil and gas where both countries share complimentary expertise.

He informed PTDF Executive Secretary that his country had requisite technology and knowledge of the different specializations in oil and gas disciplines that can support PTDF's mandate of human capital development, by providing training facilities and research infrastructure to PTDF Scholars. Already a good number of Nigerians are undergoing different academic study programmes in Canada.

"*I see a lot of potential for Nigeria and Canada to work together because we have a lot of complimentary expertise. I think the oil and gas sector is an area where we can do more to be more visible in Nigeria and I think the PTDF is one key partner we need to be engaged with as we move forward towards that goal*".

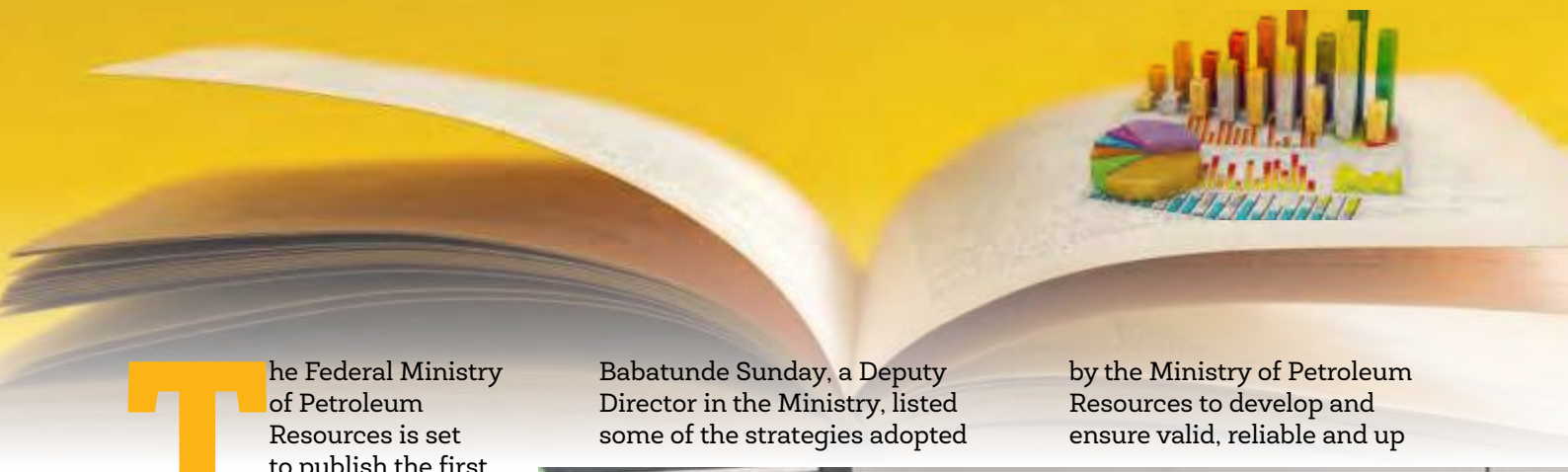
Executive Secretary, Petroleum Technology Development Fund. (PTDF), Dr Bello Aliyu Gusau commended the envoy's initiative in collaborating with PTDF as the lead agency of government for building capacity in the Nigerian oil and gas industry.

He said a delegation from PTDF visited two Canadian universities, the University of Alberta and University of Calgary to explore areas of partnership in the operation of the Centre for Skills Development and Training (CSDT), Port Harcourt, Rivers State being developed by the Fund.

"*While in Canada we had fruitful discussions with two key universities towards developing a framework of cooperation in terms of sending students there and more importantly we are looking at a joint venture partnership with the university in our project in Port Harcourt because we saw a similar arrangement they have in China. Alberta is the oil and gas region of Canada. One of the areas we would like to explore in future is research into the kind of heavy oil that is found in the region because there are acreages in Nigeria especially around Ondo and Lagos States which have similar hydrocarbon characteristics. It is an unexploited territory but a body like PTDF working with similar bodies in Canada can find ways of bringing this to the fore*" ■

E.S PTDF presenting information materials to His Excellency Philip Baker

NIGERIAN OIL AND GAS STATISTICAL BULLETIN DEBUTS



The Federal Ministry of Petroleum Resources is set to publish the first edition of Nigerian Oil and Gas Statistical Bulletin covering the period of 2010 – 2017. This follows the completion of a survey by the Consultative Committee on Petroleum Statistics (CCPS) set up by the Ministry to provide a comprehensive, reliable and harmonized petroleum statistics to aid evidence-based policy design and decision making.

Speaking during a courtesy visit on the Management of the Petroleum Technology Development Fund (PTDF), the Chairman of the Committee, Alhaji Musa Saleh, Director Planning, Research and Statistics of the Ministry of Petroleum Resources said that apart from the publication, the Committee also successfully established the Nigeria Petroleum Data Centre to serve as a one-stop shop in the collation, co-ordination, harmonization and dissemination of oil and gas data.

The Chairman (CCPS), who was represented by Mr. Babatunde Sunday, a Deputy Director in the Ministry, listed some of the strategies adopted by the Ministry of Petroleum Resources to develop and ensure valid, reliable and up

to date data for the industry. These include; Modernization and Transformation of the existing Nigerian Petroleum Data Centre(NPDC) in line with industry best practices; Stakeholders' engagement with relevant ministries, departments and agencies (MDAs); Harmonization of data and knowledge base through the existing Consultative Committee on Petroleum Statistics (CCPS); and Development of network access control mechanism to ensure Data Security Sharing Access control through the existing Memorandum of Understanding (MoU) between the Ministry and the National Bureau of Statistics (NBS).

He solicited the co-operation of PTDF in enhancing the skills of members of the Committee through sponsorship of training programmes in the areas of Oil and Gas data production and management, data analysis and interpretation, report generation and dissemination.

Executive Secretary PTDF, Dr Bello Aliyu Gusau noted the fundamental role of statistics in the operations of the Oil and Gas industry and promised PTDF continuing assistance to the work of the Committee. The Executive Secretary was represented by Mr Jide Adebulehin, General Manager Strategic Planning, Research and Documentation Department PTDF.

Membership of the Consultative Committee on Petroleum Statistics (CCPS) include representatives of National Bureau of Statistics (NBS), Central Bank of Nigeria (CBN), Nigerian Customs Service (NCS), Energy Commission of Nigeria (ECN) and Department of Weights and Measures, Federal Ministry of Industry, Trade and Investment. The Committee serves as forum for ensuring standardization and uniformity of application of statistical concepts and definitions in the Petroleum Sector ■

Members of the Consultative Committee on Petroleum Statistics (CCPS) in a group photograph with some management staff of PTDF

PTDF POST TRAINING ATTACHMENT FOR WELDERS

More beneficiaries graduate from the scheme

The Petroleum Technology Development Fund vocational skills empowerment programme for welders, the Post Training Attachment programme being implemented in Nigerian refineries, continues to record significant achievements.

At the Warri refinery, another batch of nineteen (19) welders completed the six-month post training attachment programme and are ready to apply their welding skills in different aspects of construction and manufacturing.

At the close out ceremony, the Managing Director, Warri Refining and Petrochemical Company (WRPC) Mohammed Abali acknowledged the positive contributions of the participants to the operations of the refinery during their internship. He made a commitment to strengthen the Refinery's partnership with PTDF in exposing the welders to hands on experience through the post training attachment programme.

The workshop maintenance manager of the refinery Joel Mukollos said that the participants applied themselves creditably in pipeline works during their six months period of internship.

Head, Mid and Downstream Division, PTDF, Umar Bello Mustapha, expressed the Fund's appreciation to the management of WRPC for making available the refining facility for the post training attachment exercise.

This is the 4th batch of PTDF trained welders that have successfully completed the internship programme at the Warri Refining and Petrochemical Company. The 5th batch of twenty (20) trainees was inducted to commence the post training attachment programme at the Warri Refinery ■

EXCLUSIVE INTERVIEW

WITH

THE HON. MINISTER OF STATE, PETROLEUM RESOURCES

HIS EXCELLENCY

CHIEF TIMIPRE SYLVA

Nigeria's Economy is heavily dependent on the oil and gas sector. Any hiccup in the operations of the sector has immediate implications on the health of the economy. The sector was therefore caught off guard by the rampaging effects of the COVID-19 pandemic leading to a plunge in oil prices globally. PTDF Digest crew spoke to the Minister of State, Petroleum Resources, Chief Timipre Sylva on the impact of this and other concerns in the industry.

As Minister of State, Petroleum Resources, you hold a very sensitive portfolio, as the economy relies on the performance of the petroleum sector. In view of the COVID-19 pandemic, are you apprehensive about meeting up with this onerous responsibility. You appear calm in the midst of an inclement oil climate, what is the secret?

Well the secret is to take it as it comes, I believe that everything that comes your way is because God allowed it to come your way and because of that I believe that ultimately it will be for our own good. Look at COVID-19, COVID came and we thought the whole world was going to end. The Group Managing Director (GMD) of NNPC says that COVID-19 has provided the opportunity for NNPC to reform and develop a digital infrastructure. It wasn't there before. So if you look deeply enough into any situation however bad it is, I am sure you are going to find a blessing, and if you cannot find a blessing at least you can find a lesson in every situation.

So in what ways has the present situation challenged the oil and gas industry in Nigeria?

Definitely, you know we are not just talking Nigeria now, we are talking globally, it is a challenge. You can see that things that happened in the industry were things that never happened before, oil going into negative territory, which means that you are actually begging people to pay them to take your oil. If this cannot count as a challenge then nothing will. So you can see that it's really been challenging but of course we have actually also found ways of going around the challenge. OPEC agreed on production cuts that are unprecedented, 10 million, 9.7 million barrels per day, it has never happened before, so a lot of things happening today have never happened before. Nobody living, maybe a few who are very advanced in age, have seen this kind of challenge before. I mean sometimes it's very strange, because you heard of this problem, it was very far away initially in China, and we thought okay it's a Chinese problem but to think that today it is even more of our problem than it is a problem to China. You can see the extent and magnitude of this challenge.

I am impressed with your optimism about the oil industry but certain happpenings in the industry seem to derogate from this optimism. For instance is the issue of importation of fuel. Our refineries don't work. This is an example of the distortions that seem to create imperfections within the industry operations. Is it within your consideration to make the refineries work? Right now we are importing more than

80% of our needs, is this sustainable?

I don't know if we are not importing more than 80 or maybe up to 90-100%, but on the contrary I see the optimism of the situation, that COVID-19 has provided us because crude oil prices were pushed down. COVID-19 gave us the opportunity to deregulate and take out subsidy, which is something we have always wanted to do as a nation but which was also difficult, because as you know, crude oil is refined to PMS and other products. So the crude oil price affects the product. If crude oil prices go up then the pump prices will also go up, if crude oil prices come down then the prices will also go down. We took advantage of COVID-19 and the reduction of crude oil prices internationally to now take out subsidy. Subsidy has been the main impediment against the development of the refining sector because a situation where you refine and sell at a loss is unsustainable. That is what NNPC was doing. How do you fix your refineries when you are selling the products at a loss? Now you are looking for money to subsidize the product, meanwhile your refineries also require money to get fixed and if you say I am fixing the refineries and meanwhile you are not able to subsidize, the people cry. So as a government we found ourselves in a catch 22 situation. So now, do I fix the refineries with the money that I have or do I subsidize. At that time government felt, look let us subsidize so that we can keep the people quiet and meanwhile the refineries suffered and that's where we are. So the solution to this problem is what we have been able to find through

COVID-19. We have been able to deregulate, to take away subsidy which means that we have now been able to open up a sector for investors. We are hoping that investors will come in and go into the refining process and we should be able to get out of the situation. On top of all this we are ensuring that the legal environment around the upstream, midstream and downstream is clarified through the Petroleum Industry Bill (PIB). We are going to send the PIB to the National Assembly so that we can have a right framework to govern the development and sustenance of refineries. This is where we are but I want to assure you that once these reforms kick in, this sector will blow up. What happened with the banking sector with deregulation, you know it, you were there, you saw it, the sector exploded more or less; what happened with the airline sector, with deregulation the sector exploded, so we are expecting that with deregulation and if the people can calm down and support us, we will have the sector also blow up and be of benefit to all of us.

At different fora you consistently kicked against the production cost of a barrel of oil. Has anything changed? Nigeria seems to be the highest in the world.

Well, I'll say that things are changing now because you see our laws before now were in favour of expenditure than of production because those who spent money were able to get it back from the system. With the OPEC cuts, what we are introducing is that we are going after the lower cost oil, so anybody who produces at lower cost, your production will not be cut. The higher cost oil is cut first so that we are not rewarding higher cost. Before now the reward was going more to people who were spending more in the industry. So they spend more and they take out more but right now we are going to reward those who produce at lower cost. So things are beginning to change and we're also beginning to see the cost of production coming down. So you can see that we're now rewarding companies who are producing at lower costs. That is one of the ways we're attacking this problem, and I can assure you that we're beginning to see a reduction in cost.

Other countries are gradually moving away from crude oil and going for clean energy, but we are spending much money trying to find oil outside the Niger Delta. How will you justify this?

That is also a challenge I must say, it's our challenge, we're not in the technology race, you'll agree with me. When you talk about the renewables, the basis of it is research, how much research is going on in Nigeria towards developing renewable fuel. You have not been able to have the proper level of energy from the dirty fuel, so to speak. So you cannot at this point begin to discuss renewables. I always say this, you must walk before you learn to run. The rest of the

We are going to send the PIB to the National Assembly so that we can have a right framework to govern the development and sustenance of refineries. This is where we are but I want to assure you that once these reforms kick in, this sector will blow up. What happened with the banking sector with deregulation, you know it, you were there, you saw it, the sector exploded more or less; what happened with the airline sector, with deregulation the sector exploded, so we are expecting that with deregulation and if the people can calm down and support us, we will have the sector also blow up and be of benefit to all of us.

- Chief Timipre Sylva

world is running, we're still walking. I don't expect that Nigerians expect us to join that race. Let us ensure that we have sufficient energy in Nigeria, even if it's through dirty fuel, because, a large number of people in Nigeria are without energy. Are we now going to be discussing renewables when we're at this level? At least let us ensure even if it's with coal, that's my own position, even if it's with coal, let us ensure that our people have energy and then we can stand on that step and begin to think about renewables. Right now, we are not there. The resource we consider foundational to us, on which we can build, is oil and gas. And that's why we are still discussing oil and gas because if we don't develop this foundation very well we cannot build on it. This is what gives us 95% of our foreign exchange. So anybody saying we should leave that resource and start pursuing clean energy development at this point is not being realistic.

Bid Rounds for marginal fields are ongoing. Are there mechanisms for ensuring transparency and integrity of the process?

The process is out there, everybody can audit it. That is the whole idea. I am actually not within that process at all, it is a DPR function. I have approved the process, the President has approved the process for me and the process is ongoing, I must stay above that process in order to be able to audit that process just like you. What we do is we monitor it very closely, it is out there on the website and everybody can access it, so you can now say this is the process. At any point anything is going differently from the processes we have advertised, please escalate it to me, and we'll deal with it.

Are you satisfied with the current participation of Nigerians in the oil and gas industry through the Local Content Policy?

Of course, I think that is one area we're doing very well. As far as the bid round is concerned, if I may go there again, we were quite happy because we never expected the surge in interest by Nigerian companies. With Covid-19 and everything we thought there would be a lack of interest but we saw over six hundred companies registered, which for me is indicative of the fact that Nigerians are hungry and willing to participate in the industry. On the local content front, we're actually now part of the industry. I am from an oil-producing community, when I was growing up as a young man, we were spectators in this industry. When the rigs came, our people would troop out to go and watch, they watched, they never even thought they could be part of the process, but today Nigerians account for at least 20% of production. We grew the ownership of vessels from 3% Nigerian content to 40% now, and it's still growing. So we're also hoping that in 2027 we'll be able to grow local participation in this industry to about 70%.

Is Nigeria likely to meet the target of eliminating gas flaring, by the target date?

I believe we will go very far. I declared this year 2020 as the year of gas and a lot is happening on that front. The gas flare commercialization program is going on. We are giving out the gas flares to people to manage. We have a lot of interest in that area, and we believe that the process will be concluded within the next month or so and we want to also deepen the usage of gas within Nigeria. We're looking at introducing auto-gas for cars, we're also looking at deepening the usage of LPG so that local people will begin to use gas because right now the utilization of gas is mostly concentrated in the cities. Even in the cities it is mostly the middle class and the upper class that use gas but we want to be able to drive gas usage to the lower classes as well. We have seen the impediments and we're tackling those impediments. And we believe we'll be able to, through all these programs, eliminate the gas flares by next year.

Is the Federal Government considering immortalizing Oloibiri that gave birth to commmercial oil in Nigeria?

I think you just took this from my mouth! I would like to announce to you that Mr. President has approved the development of the Oloibiri museum. We have set up a steering committee already and that process of immortalizing Oloibiri is ongoing.

PTDF is in the process of ammending its enabling law. Are you likely to support that exercise?

Definitely, if the management of PTDF feels that the law needs to be tweaked, that's what laws are for, laws must move with the time, if a law was passed 20 years ago and you need to tweak a few things in the law in keeping with the times now then of course it is all okay. I haven't seen the amendments that are proposed but I know that there are also roles for the PTDF in the PIB, but if they want to tweak some aspects of the PTDF Act, of course I will support them.

Do you see any overlap of functions between NCDMB and PTDF?

Well I would not say there is any functional overlap but of course PTDF does training and NCDMB does local content development which involves some form of training as well, they collaborate very well, so far so good.

Finally I want to congratulate you on your 56th birthday, I read your intimidating profile. Being in the legislature at an age where some of your peers are still in school and from there you became the governor of your state. How did all these prepare you for your current assignment?

Well I would say that everything in life prepares you for the next step, nobody knows what the next step will be, when I was going into the House of Assembly in 1992, I never knew that I was going to end up here but when I look back I see that everything that has happened in my life seems to have prepared me for what I'm doing today. I was in the House of Assembly, I became an assistant to a Minister of Petroleum, I became Governor of an oil producing state, and I was Chairman of the Oil and Gas-Free Zone Authority, so you can see that everything I have done in life seems to have prepared me for this portfolio. I hope that I will do well by the end of the day by the grace of God ■

Head, Press & External Relations, Kalu Otisi, Chief Officer, Timi Nwajueboe presenting PTDF Digest to the Minister of State, Petroleum Resources, Chief Timipre Sylva

PTDF Leads Implementation Team for the Establishment of Oil and Gas Research Centre and Museum in Oloibiri

A major fallout from the Minister's exclusive interview is the approval by President Muhammadu Buhari for the establishment of an Oil and Gas Museum & Research Centre in Oloibiri, Bayelsa state, where Nigeria's first oil well was drilled in commercial quantity. The essence, according to the Hon. Minister is to immortalize and promote the significance of Oloibiri to the economic development of Nigeria.

The Museum is conceived to have 3 main halls where geological formations, early exploration & production equipments, tools, platforms will be showcased. There will also be an interactive screen for digital engagement on the history of crude oil production and relevant oil and gas data. The Research Centre consists of an open field for testing prototypes, laboratories, store and control room designed to promote research and technology development.

Oloibiri where the first oil well was drilled in commercial quantity way back in 1958 is historic to the oil and gas industry as it laid the foundation for the growth and development of the industry and Nigeria's petroleum dependent economy.

There have been several attempts by institutions, state and national governments to immortalize the legacy of Oloibiri as the location of Nigeria's first commercial oil find. The Petroleum Technology Development Fund over a decade ago took some steps at establishing an international museum and research centre at the location. This was aborted due to logistics and financial constraints. The project was intended to harness the history of oil exploration in Nigeria and serve as repository of oil and gas artifacts.

Interestingly, President Muhammadu Buhari has given another opportunity for the project to be realized following his approval for the establishment of an Oil and Gas Museum and Research Center in Oloibiri, Bayelsa State. This no doubt conforms with his commitment to leaving lasting legacies in key sectors of the economy. The project no longer has PTDF as the sole implementer. There are now four (4) major promoters of the project who have been mandated by the Federal Government to ensure its timely realization. PTDF is however leading with funding contribution of 40%, Nigerian Content Development and Monitoring Board (NCDMB) 30%, Shell Petroleum Development Company (SPDC) 20% and Bayelsa State Government 10%.

The Museum is conceived to have 3 main halls where geological formations, early exploration & production equipments, tools, platforms will be showcased. There will also be an interactive screen for digital engagement on the history of crude oil production and relevant oil and gas data.

The research centre is designed to promote research and technology development with provision for standard laboratories for testing prototypes.

Two steering committees and five project teams have already been inaugurated by the Hon. Minister of State, Petroleum Resources, Chief Timipre Sylva to supervise the implementation of the project. The Steering committees will provide leadership and oversight of the project teams responsible for Construction, Funds Mobilization and Management, Community Relations, Health, Safety & Environment.

The Oloibiri oil and gas Museum and Research Centre will provide socio-economic benefits to the host community, and serve as Nigeria's hub for oil and gas artifacts and research. Apart from contributing to human capital development, the project is expected to facilitate the testing of research samples and development of prototypes from research breakthroughs, and the commercialization of patented works. It is also expected to accelerate home grown technology development ■

COVID-19

PTDF Response to Pandemic

As the dreaded COVID-19 pandemic made its entry into Nigeria, the familiar pattern of disruptions already reported by global news media in countries that had recorded cases began to play out in Nigeria. From school closures and suspension of all local and international flights, various policies limiting large gathering of people were made and enforced by government. When the Federal government announced the gradual easing of lockdown in the affected states and partial resumption of government workers, the Presidential Taskforce on COVID-19 gave general guidelines to MDA's and directed them to determine other risk reduction measures based on the peculiarities of their organization and sectors of operations. Accordingly, the Executive Secretary, PTDF, Dr. Bello Aliyu Gusau empanelled a committee to look at the impact of the pandemic on the operations of the Fund, and come up with a response plan. He also tasked the committee to make recommendations on ways the Fund can assist the Federal government in the fight against the pandemic.

The Management of the Petroleum Technology Development Fund (PTDF) had in a proactive move suspended the ongoing 2020/2021 Overseas Scholarship Scheme (OSS) interviews across the country. This step was the first of many other actions taken by the Fund in response to the COVID-19 pandemic. The Manager, Education and Training Department, Rabi Waziri-Adamu said *"interviews for the MSc held in all the 6 geo-political zones and we held PhD interviews in 2 centres with 4 outstanding centres which were put on hold because of the risks"*.

Understanding the financial, health and operational threats of the pandemic to the Fund, the Executive Secretary, PTDF tasked the committee to come up with a comprehensive response strategy to navigate the challenges.

In addition, the committee was mandated to determine how the pandemic had affected the Fund's operations, make recommendations to build the desired resilience to withstand any threat to its mandate. Although the effects of the pandemic were felt in various sectors of the economy, perhaps one of the worst hit is the oil and gas industry. This was complicated by a crippling price war between two of the biggest oil producers – Saudi Arabia and Russia- which led to historic new lows in oil prices. As an oil dependent economy, this spelt trouble for Nigeria especially its oil sector. As an Agency of government in the most affected sector, a lot was at stake for the Fund. Low oil prices would surely lead to funding constraints which will in turn impact the Fund's ability to meet its obligations to ongoing programmes and projects as well as future ones. In response to the various challenges to the Fund's operations, the Committee developed an action plan to address the immediate, medium and long term threats to the Fund's operations.

The Committee Chair, Manager Education & Training Department, Haj. Rabiah Waziri-Adamu gives further insight on the committee's recommendations and the way forward under the pandemic in this interview.

Q. How has COVID-19 affected the operations of the Fund?
Due to the global pandemic and the way it affected various sectors, the Executive Secretary constituted the COVID-19 team to come up with a response plan to the effects of the COVID-19 pandemic. In doing that, we looked at both the global and national impact, the low oil price environment caused by the price war between Russia and Saudi Arabia and the supply and demand imbalances that the COVID-19 has caused globally. The committee also looked at how the global happenings have impacted on PTDF operations.

We looked at it from 3 angles, the operations of PTDF and the business continuity

The Committee Chair, Manager, Education & Training Department, Haj. Rabiah Waziri-Adamu

and of course the most important aspect which is the human resource as well as the support to the Federal government. We thereafter undertook a risk assessment looking at the impact and recommended how the Fund will tackle all of this. On operations we looked at the funding and how PTDF will prioritize its operations and the effect it will have on its programmes. In looking at the human resource aspect we basically concentrated on the safety aspect of it. When the committee was working the lockdown was in place and it really affected the operations of the Fund and slowed down activities. We now had to look at when the entire country opens up. We looked at the resumption protocols to ensure safety of staff. In looking at the resumption protocol we looked at 3 strategies. One, containment of the virus by reducing spread within the organization to ensure safety of our employees. In addition to the NCDC guidelines on resumption, we looked at operation and maintenance of critical services if containment is not possible and then we looked at business continuity, how we can continue to operate safely during and after the pandemic and came up with a lot of guidelines on how the safety of our staff can be ensured using temperature detectors, hand sanitizers and other safety measures to protect our staff in carrying out their responsibilities. The guidelines have been circulated and is currently being used to ensure staff operate in a safe environment.

In looking at our operations we recommended the use of ICT and in doing that we had to ensure a robust ICT infrastructure is put in place. Based on this recommendation, all meetings are being held online and as much as possible we have minimal physical communication. Daily interactions are also being carried out online using emails, WhatsApp groups and Microsoft Teams for departmental and management meetings.

To manage files and other processes that can only be done manually, a decontamination/safety procedure was developed to reduce the risk of infections which entails keeping files in boxes for 24 to 48 hours and disinfected before the next person handles them. These are some of the measures we put in place to ensure safety of staff.

The committee also recommended that only programmes/projects of utmost importance should be carried out while programmes that will attract spending but are not critical should be stepped down. The committee went further to recommend that the Legal Department be mandated to review all the Fund's existing contracts in order to ensure the Fund's expenditure is kept at a minimum while carrying out the projects.

In looking at how the Fund will support the Federal government, we tried to tie that to our mandate and support the FG through research, innovation, and technology. We engaged our alumni group. As we all know the Fund has excellent scholars who have gone through rigorous trainings. So, we have a group of researchers and scientist who can support the Federal government in providing ventilators, state of the art chambers for disinfection, chemicals for testing COVID-19, sanitizers etc. They came up with an array of proposals to support the government in the fight against COVID-19

We have also leveraged our ICT infrastructure to support the Ministry of Petroleum Resources and other agencies to ensure that whatever engagements the Ministry has with its agencies will be online.

Q. Will the ICT support be in terms of meetings or documents they are sending?

Both actually, because once you have a platform where you can engage everyone you can have your meeting online and in terms of documentation you can have any document that doesn't have to be treated physically online via email or even have your approval process done electronically. I will say both physical interaction and documentation.

Q. You mentioned that the alumni group came up with proposals, has the Fund adopted any of the Alumni proposals?

Yes, there are some with tangible products which can be mass produced. We will support them to go into mass production but we will not go outside the mandate or the investment government has made through PTDF.

Q. You mentioned that the committee recommended the Suspension of non-critical programmes and projects requiring financial expenditure. Has the committee identified any program or project in this category?
Generic recommendation that the Fund should step down projects that are not critical was made. We also recommended that a Fund-wide financial assessment be undertaken, but the departments are in the best position to identify which project is critical or which isn't. The Executive Secretary has also directed that each department looks at the recommendations that are related to their activities and come up with an implementation plan. We are relying on the departments to look at their projects and programmes and determine those that will be stepped down to a later date and determine those that are critical and will have to be undertaken. We also recommended that a business continuity plan be drawn up which will look at all aspects of the Funds operations and I am sure will recommend which programmes and projects are to be continued and which to step down. The Strategic Planning & Documentation Department is spearheading the review.

Q. As the Manager Education & Training department what challenges were experienced in the management of the Fund's scholarship programme during the pandemic and how were they dealt with?
All the departmental programmes are ongoing. Operations continued online even during the lockdown. We had automated our processes even before the lockdown using virtual means such as WhatsApp groups and Microsoft teams to communicate between staff. In terms of operations, even during the lockdown we were still carrying on with our activities. For our engagement with scholars, we set up many virtual meetings with them. In fact, for stakeholders and partners abroad we have always held meetings with them online using skype, so it was not really difficult for us to switch to online communications with our stakeholders. Our meetings with stakeholders have gone on very well and we have been able to remotely manage the scholars effectively. Coming back to scholars we have been engaging them since the COVID 19 breakout to know how they are faring and most of them told us that they have carried on with their studies online where the schools are offering online classes. It is only the PhD scholars who needed to be physically present at the labs that had to stop at some point because they could not carry on. The others were not really at risk because classes were holding online, and the schools put measures in place to ensure students could order food and have it delivered to them. For the local scholarship programme, all schools were shut down by the Federal government and the students are at home. The short term training programmes have all been put on hold but we are looking at the option of conducting it virtually but that has not been sorted out because we have to carry out stakeholder engagement to ensure our stakeholders are comfortable with it before commencement.

Q. Before the total lockdown we had commenced interviews for the 2020/2021 scholarship year and were able to conclude that of the MSc. When the PhD interviews were put on hold, we promised to communicate updates. What is the decision on the way forward for the scholarship interview?
Interviews for the MSc held in all the 6 geo-political zones and we held PhD interviews in 2 centres with 4 outstanding centres which were put on hold because of the risks. We are studying the global response in terms of education before taking a decision on whether to go ahead to conclude the 2020/2021 interview. If we decide to go ahead, we have to consider online interviews because the new normal is less physical interactions and use of ICT. We would have to look at the panel of interviewers and the high number of interviews to be conducted. All of this will determine how the interviews will be done, but right now we have put the interviews on hold and have not taken a decision while we watch the response from our partners. Some have said they will commence their sessions in September while others have not given a direction on the way forward, but we are awaiting further guidance in order to make a decision.
In conclusion, let me say that the dynamic response plan by the Fund is aimed at transforming PTDF into a flexible, resilient organisation capable of adapting to gradual and sudden changes to its internal and external environments.

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Haj. Rabiah Waziri-Adamu

PTDF SCHOLARS IN THE SEASON OF COVID-19 PANDEMIC

The Fund conducted an online survey to determine how PTDF scholars are coping with the impact of the pandemic. Findings revealed that 15% were outside their countries of study at the outset of the pandemic while 85% were in their countries of study. On the impact of the pandemic, 59% of the scholars said they were adversely affected while 41% said they were not affected. On the mode of study during the pandemic, 3% said they were still undergoing physical studies, 61% said they were having their studies online, while 28% said their schools of study were shut down. The investigation was at the outset of the pandemic and the situation may likely have changed.
The Press and External Relations Unit of the Fund followed up with online interviews with the scholars to have further insight on the impact of the pandemic on their studies and well being. Here are excerpts.

Abdullahi Magaji Dauda
PhD student
Institute of Cancer Therapeutics
University of Bradford
Bradford, United Kingdom

On the 23RD of March, I received an email from the Head of school that we have to stop coming to the labs and start working from home, as the cases of covid-19 kept rising in the UK. My progression viva was due for the 27th of March. I got prepared and, on the day, I did my progression viva and passed with no corrections, but I was just 18 months half-way through my PhD so I couldn't celebrate as we used to. I wrote a mini review in the month of April, thinking every day I will see that one email I have been waiting for that says campus will resume tomorrow but nothing.
I am a lab-based researcher, so I didn't know how to work from home, also I had already passed my progression to PhD, so I have to start new lab experiments to have data to even write results and discuss them. Keeping in touch with my supervisor really helped because we decided to be doing a journal club weekly with members of my research group and it helped us keep the group connection.
Socially the pandemic affected all our lives, but the priority was to stay safe, I used the period to keep contact with family and friends and also have more connections with my fellow scholars, a lot of zoom meetings and participation in webinars and conferences online.
I am really proud of my sponsor, the Petroleum Technology Development Funds (PTDF), PTDF sent us emails after emails and covid-19 related email for scholars to contact the Fund if anyone among the scholars have been a victim of the pandemic and that alone gave me a reassurance that I was really in the right hands. PTDF also reached out to scholars with status update on how the pandemic affected us and I also participated in filling the forms and submitted my own evidences of how my studies was paused for that period.
The Funds also paid our allowances promptly and promised to further support us finish our studies, I am really proud, Gratitude is all I can say.

Abubakar Haruna
MSC Scholar, France

My name is Abubakar Haruna, I am from Zamfara State and a beneficiary of the 2018 PTDF Overseas Master's scholarship to France. I am currently in the second and final year of my Master program in Hydraulics and Civil Engineering at Grenoble INP. Gladly, I attained the first position in both the first and second year of my class of 37 students from at least 20 different countries spanning the whole continents. This success I believe is an achievement not only to myself, but to PTDF and Nigeria in general.

The Covid 19 pandemic is a unique experience that came with a lot of diverse challenges. Academically, I was already in my second month of research internship at one of the leading French research institutes when the pandemic began at the scale necessitating complete lockdown of the country. As a result, we changed to teleworking as was the practice of the day in the sectors for which it was possible. Luckily, my research involves numerical modelling and so all I needed was my computer and access to the servers we use for the heavy computations. Unlike my other colleagues whose internship had to be cancelled or postponed due to practical reasons, mine continued hitch free. Socially, it was really a sad experience because I was in my room without physical social interaction with anybody for almost two months. In fact, most of the students in our residence left for their respective countries to be with their families before the lockdown. However, the research institute introduced some avenues to chat using some IT tools to reduce the social stress arising from the isolation. The school also stayed in touch giving practical advice throughout the lockdown.

PTDF was very proactive and was able to make us feel safe by constantly communicating directly and through Campus France which manages our affairs on PTDF's behalf. We filled a questionnaire from PTDF to help know our individual situations and how the confinement might likely affect our studies and progress. Our allowances were paid very timely as usual. Very practical solutions were proposed by PTDF for scholars who have or are about to finish their studies and are not able to return home due to international flight restrictions. These include possible repatriation before the expiry of the scholarship or possible extension of the benefits as the case might be.

With the current experience and solutions provided and proposed by PTDF, I can only but say that PTDF has been more than efficient and excellent. This has also affirmed the Funds reputation, leadership and honesty to its mandate of ensuring the welfare of its scholars personally, academically and economically.

Miazor Ekom
MSC Scholar China

While the rest of the world braced for the limitations inflicted upon us by an epidemic that soon became a global pandemic, individuals and scholars in China had already been required to self-quarantine right from the beginning of the year 2020. All of a sudden, the cost of goods had tripled, research laboratories became inaccessible. At this point, staying alive was more of a priority than anything else. By the nature of a post-graduate research which requires a series of varying experiments, the inputs of peers, as well as conference meetings, it seemed rather difficult to make tremendous progress where necessary. Research topics of several scholars had to be modified so as to finish within the stipulated duration of study. Without a doubt, it had been quite a unique experience. Personal Protective Equipment (PPEs) took a large share of allowances provided. Eventually, even face masks became a scarce commodity, timelessly N95 masks had to be bought all the way from Korea. Waking up every day and watching the news was a nightmare as I longed to wake up to a reality that it was all a dream, not knowing that this would soon become the new normal.

The Fund was in constant communication with the scholars and learning more about the conditions in which scholars faced during this challenging period. The Fund ensured that there was a constant flow of communication with the scholars proposing several options on how best to serve the scholars during the outbreak.

The Fund ensured that the living conditions of the scholars were suitable especially regarding the accommodation of scholars. Another aspect is the Fund's timely disbursement of stipends so there can be a total focus on studies without being distracted.

Abdullahi Abba Dalhatu
MSC. Scholar Brazil

When I received the news that there been a confirmed corona case at USP (University of Sao Paulo), I was terrified. Not long after that, the patient died and school was closed down. With the school closed, research activity also reduced to the barest minimum. Despite my fears, I was optimistic that things might turn out well for me, after all, all I had to do was to ensure I used facemask, avoid crowds and touching my face and washing my hands frequently. I thought, how hard can it be to stay and work from home? But after a while, the reality of the dire predicament started to sink in. I earlier intended to visit some companies in Rio de Janeiro to experience some useful practical operations that would aid my research, but due to the social health condition, all that were ruined.
I started struggling with panic attacks and nightmares being trapped in my little room and with little or no idea on how best to cope with this new situation. Nevertheless, over time I discovered ways of dealing with the panic and pressure by including doing things I enjoyed doing with my studies like drawing, playing online games and writing. I also started spending time with my family by talking to them on WhatsApp. I had not realized how much I missed them. After sometime, I began to feel much better, I soon found myself conducting online meetings with my supervisors, planning for new directions, writing my thesis again and looking forward to a better future.

Michael Moses
MSC Scholar, Brazil

Although physical activities in school were indefinitely suspended, research progress meetings continued online. The online meetings though helpful in advancing my research, haven't been as effective as having physical meetings. On the other hand, I have had to learn to work remotely and independently which is a growth opportunity I gained from this experience. However, because of the remote and skeletal work, most academic and administrative activities are significantly slowed down, so this may affect my time to finish my program even though, I'm already at the terminal end.

Patience Shamaki Bello
MSC Scholar, Brazil

The school officially closed all physical activities on 15th March due to the first corona virus case in the school. I have had to work from home, making a lot of adjustments working virtually from home, this adjustment required psychological adjustments too, especially since I was very close to rounding up. Online tools were made available to continue my research and communication continued with my supervisor and other colleagues through online platforms. However, virtual communication is not as effective as physical communication. This is because a research program team interaction is involved. I experienced many impediments which slowed down my research such as using a laptop which cannot effectively handle the softwares required for my simulations; not able to interact well or share ideas with my supervisor,
Socially, I have had to adjust to habits to be safe and keep others safe. The sudden change was emotionally and psychologically difficult as there was too much uncertainty of the future especially as Brazil situation started growing and also coupled with the fact that the finish line has been moved to an uncertain distance.

Amir Muhammed Sa'ad
PhD Scholar, Brazil

Brazil is one of the most beautiful places I have visited in my life. Being the largest country in the South America continent, it is full of individuals from neighboring countries. It's social life is wonderful, many interesting activities to participate. They have good and sound universities. Unfortunately due to the pandemic, access to both social and academic activities has been reduced. University of Sao Paulo (USP) now has resorted to online classes and access to school has been restricted. Therefore, researchers and students are unable to access the laboratories and classes to continue their research and studies. However, researchers that don't really need access to laboratory are doing their work from home (online). This new reality has made us adjust to taking online classes and having online meetings. And in some way this has been a form of personal development for me. Unlike before when I always have to go to school to study now I have learnt to schedule my time more diligently.

Funsho Olaitan Kolawole
PhD Brazil Scholar

At the early stage of the COVID-19 pandemic in Brazil, I was still running some of my experiments in another University (Universidade do Vale do Paraiba, Sao Jose dos Campus) 3 hours away from Sao Paulo city, so I had to travel every day from 9th to 13th March, 2020 in order to conclude that phase of my research. It was really scary to travel at that period, due to the fact that I had to make use of several train stations and buses to go and return home, but I had to, in order to conclude that phase of my experiment in the neighboring university and to focus on the 2nd phase of my experiments, which was to be carried out in my university. I had just scheduled appointments in the university laboratory to commence the second phase of my experiments which was to start on 30th March, 2020 (for a duration of 6 months), when I received an email from the university that as from the 23rd March, 2020 the university will be closed due to the spread of the COVID-19. Since then I have been anxiously waiting for activities to return to normal in the university campus. I have also tried to talk with my supervisor to allow me entrance into the laboratory to run some experiments of my samples, but his application to the university was turned down, stating that only those who are carrying out researches related to COVID-19 can be allowed entrance into the department or any laboratory. We have also recently received an email from the university stating that the face to face (physical) activities may only return next year January 2021.

Ojonugwa Adukwu
PhD Scholar, Brazil

I study at the University of Sao Paulo (USP), Sao Paulo, Brazil. The first case of the COVID-19 was detected in Brazil in February 2020. During this time normal activities were still on going in USP hence my research was going on and I was preparing for my qualification. On 11/03/2020, a case of COVID-19 was detected in USP and a decision to close the school started with the Geography Department, where the first case was discovered, thus, Department of Geography was closed the very next day. On 17/03/2020, the entire school was closed down and all activities were to be done online.

USP felt her first casualty on 28/03/2020 when a student of chemistry died. During this period, I was doing my research at home and communicate results with my supervisor. The disadvantage of this approach is that I am extremely slow for three reasons (1) I cannot sit face to face with supervisor to show him the problem I have with simulation result. Consequently, it takes between 2 to three weeks more to make the same progress in research result now than before the closure. (2) My children's school was closed too, meaning I have them at home with me all day. Their distractions slowed down my research too. (3). Contact with other research members have been reduced. In addition is the boredom of being at home all day. Another effect was the delay in my qualification which was to take place early April but took place in May due to the covid -19 pandemic and the school closure. The presentation was online and not face to face.

Okhiria Dickson Udebhulu
PhD Scholar, Brazil

I had earlier travelled to Nigeria to obtain geological data for my research but unfortunately, the Nigerian and Brazilian airspaces were closed even before my scheduled return date (April 9th) because of the scourging pandemic and the ultimate need to minimize the spread of the virus. I was thus, fortunately stranded with my family in Abuja as I don't have to worry so much about their safety from the pandemic.

I'm in constant communication with my supervisors and my research is progressing though slowly, largely due to distractions from my family members; poor access to journals and other research materials; and the fact that study from home isn't as efficient as studying in a school environment.

It is interesting to note that, though I'm away from Brazil, my qualification has been scheduled by my supervisors to hold via Skype. Thus for me, the pandemic hasn't significantly affected my studies, it only requires improved dedication and discipline towards my study schedule, research work plan and timelines.

PTDF QUARTERLY LECTURE SERIES

SETTING AGENDA FOR THE OIL & GAS INDUSTRY

Developing the capacity of Nigerians to be effective in the operations and management of the oil and gas industry is principally the business of PTDF as a capacity building agency of government. But it cannot successfully implement this onerous responsibility without a deep knowledge and understanding of the dynamics of the industry in order to effectively plan, develop and provide the required capacity needed by the industry.

The PTDF Quarterly Lecture Series on the Oil and Gas Industry was initiated by PTDF Management to increase the Fund's engagement with the industry and to appreciate its fundamental processes through presentations by serving and retired oil and gas experts. Since the commencement of the lecture series, eight (8) notable oil and gas scholars and subject matter experts have made presentations on critical issues affecting the oil and gas sector.

We distill from these presentations the suggestions, recommendations and prescriptions of these highly respected and acclaimed voices in oil and gas matters particularly in proffering solutions to current and future problems of the industry as well as proposing new frontiers for capacity building by PTDF to sustain its relevance in the industry.

NIGERIAN OIL AND GAS INDUSTRY: QUO VADIS

by **Mr. Egbert Imomoh**

Mr. Egbert Imomoh, a foremost oil and gas expert and former Deputy Managing Director, Shell Petroleum Development Company, flagged off the PTDF Quarterly Lecture Series with a presentation on "*Nigerian Oil and Gas Industry: Quo Vadis*". He reviewed the history of oil exploration and production in Nigeria, the evolving energy dynamics and technological advancements, future growth and challenges and made the following recommendations to the Nigerian oil and gas industry:

- That while there is a present and future necessity to continue to grow the oil and gas industry, government should be less reliant on crude oil income
- There is need to develop a gas based industrial economy leveraged on the enormous Nigerian gas reserves to minimize the negative impact of exposure to cyclical oil prices
- A system should be put in place where a bid round is carried out every two years to ensure that our reserve base is sustained while PTDF benefits from revenues accruing from such exercises

"Against this background, my stand is that we must continue to strengthen our position in oil and gas base, we must grow and strengthen the oil industry and use the revenues for future economic growth. We must continue to invest, what do I mean by that; Assuming we are producing 2.2 million barrels per day today, at the end of this year if we don't continue to invest, decline will set in and by the end of the year we will be producing 2million barrels per day and if we continue in that manner, it's only going downwards. So, we must continue to invest. If you say let oil not be the revenue source, you still need to keep it at a certain level to drive the income that comes to you. Similarly, our reserves have to grow by investing to find new oil. This is why I believe that we must have frequent bid rounds".

Mr. Egbert Imomoh also called for the intensification of deep offshore exploration and production with improved technology as recent findings indicate the presence of huge fields in deeper waters. He also made far reaching recommendations on gas as follows:

- The creation of a governance framework that addresses and situates gas as a standalone commodity
- The development of an industry structure that clearly defines the roles of all stakeholders and shows a clear market structure identifying investment opportunities along the value chain
- Promoting investment in gas development
- Identifying key infrastructure projects and opening the midstream to private investments ■

OVERVIEW OF NIGERIA'S NATURAL GAS POLICY AND POLITICS

by **Dr. David Ige**

The second presentation in the quarterly lecture series was by Dr David Ige, Chief Executive of GasInvest Limited and former Group Executive Director, Gas to Power, NNPC. Focusing on the Nigerian Gas Sector, his presentation identified with the current global narrative on natural gas being the fuel of the future. This he said is the impetus behind the drive by the Federal Government to move the nations economy from a crude oil export base to gas based industrial economy.

"Gas is a product that can transform the economy of any country and that is because of the diverse uses gas can be put into. Methane on its own is the most dominant in gas. About 80 per cent of the components of gas from the ground is methane. Methane is used primarily as fuel, so that is what we use in the power plants, in the furnaces, in the industries for the boilers and so on. Methane also comes in as fuel for cooking in the house when you have a gas pipeline. It is the primary feed stock for ammonia urea, which is fertilizer, for methanol and of course gas in liquid. So, if you look at the industrialization agenda for fertilizer and methanol, methane is the primary feed stock. So gas is not just a fuel, it is also a feed stock for industries, that's why when we were doing the gas industrial park in Ogidingbe, Delta State, the idea was to create in one location an industrial park that takes gas as feed stock to produce fertilizer in commercial quantity and methanol as well. These are all the things you see in industrial production. So, gas is very crucial to industrialization based on methane. Ethane, another product from gas is a key input in petrochemicals. Also are propane, butane which is LPG. Apart from being used as cooking fuel it is also an input in petrochemicals and almost everything you have around you are derived from petrochemicals, the chairs, the leathers, everything can be linked to petrochemicals and that's why part of our industrial strategy when we were doing the gas master plan was to see how we begin to use the Nigerian gas to drive the economy by applying our gas to things like petrochemicals and so on".

He said it is imperative for PTDF that is involved in capacity development to refocus its training programmes to reflect the new emphasis on gas development. He suggested new areas of trainings to include gas engineering, cryogenics, petrochemical technology, gas transportation and utilization technologies and safety engineering for high pressure and cryogenic systems.

Dr Ige said very few Nigerians have what he termed a bespoke gas engineering degree that would play critical roles in pipeline engineering. He said PTDF can also provide training that addresses

environmental challenges. Cryogenics which involves the handling of LNG at subzero temperatures also requires special engineering skills that need to be developed by PTDF in its capacity building programme. Other areas like petrochemical technology, gas utilization strategies and new safety standard requirements for the management of natural gas should be taken up by PTDF. According to Dr Ige, PTDF needs to start training people who understand how to deal with high pressure and low temperature regimes. He said that gas being a highly commercial product requires the development of a body of experts capable of negotiating commercial agreements with respect to gas.

"As to PTDF that is involved in capacity development, what does this mean? We have seen that there is a whole lot that we are doing on gas right now. It is a tip of the iceberg. We are just starting, and our skills set are geared towards crude oil rather than towards gas. So, if we are to be sending people for postgraduate programmes or training, there're areas where we need to focus on now; gas engineering is one. In universities like Oxford where you can actually get a master's in gas engineering, there are very, very few people in our system today who actually have a bespoke gas engineering degree. So, they will understand gas in its totality and how to engineer and manage it. Those kinds of people are going to play critical roles in our pipeline engineering. So, how do you handle liquids at minus180C, so we are going to have LNG moving around now. What kinds of safety requirements are required, I mean you don't want to touch minus 180C pipe or hose or anything? How do you handle sub-temperatures like that? There is an entire engineering discipline around cryogenics. I doubt if there's any Nigerian today who is an expert in that area. This is an area where we need to develop capacity so that we are able to manipulate these liquids more effectively for our own use".

Dr. Ige said that there are some practical issues affecting our environment that can become possible research topics for PhD students that are sponsored by PTD. *"So, we need to do something that is specifically relevant to the challenges of our environment in Nigeria. I think that PTDF has the capacity to begin to structure this even in a very informal way. Wherever there is post implementation reviews or post construction reviews, PTDF should be the repository of knowledge on lessons learnt"*■

FISCAL REGIME FOR NIGERIA'S OIL AND GAS INDUSTRY

by **Dr. Timothy Okon**

Dr Timothy Okon, an expert on fiscal policy and regulations delivered the 3rd in the quarterly PTDF lecture series titled "**Fiscal regime for Nigeria's oil and gas industry**". Dr Okon highlighted the fundamental problems, issues and challenges of the current fiscal system and fiscal arrangement in Nigeria's oil and gas industry. He identified some of the flaws in the existing fiscal framework to include the royalty system, the production sharing contract structure and risk service contract agreements.

On PTDF, he said the current fiscal arrangement that provides for discretionary bid rounds for acreages makes the funding of PTDF uncertain. He recommended a system where bid rounds are carried out more regularly to ensure that the nations resource base is developed, investors and technology are attracted leading to increased production. This will ensure that PTDF has regular source of revenue to carry out its capacity building efforts in the oil and gas sector.

"*What we are trying to do with the fiscal policy is that for you to get that signature bonus, you have to have a sequenced well placed programme of acreage bidding system, so you know that every three years there will be a bidding round in which people come to bid for blocs and end up paying that signature bonus. So, PTDF interest is in sustaining its technology development activities through a reliable source of revenue. So we need an open transparent system where acreage is available, and people bid for it; and income comes so that you can continue with the work of training and development*".

He said PTDF should intensify its collaboration with the industry to identify existing capacity gaps for the purpose of developing the required manpower to fill the gaps ■

THE FUTURE OF REFINING AND PETROCHEMICALS IN NIGERIA

by **Engr. Tony Ogbuigwe**

The fourth in the PTDF quarterly lecture series was delivered by a foremost refining expert and former Group Executive Director refining and petrochemicals NNPC Engr. Tony Ogbuigwe. It was not surprising therefore that the focus of his presentation was on "**The future of Refining and Petrochemicals in Nigeria**". So, what were the takeaways from his lecture? He identified six reasons for the poor performance of refineries in Nigeria. These are inadequate funding and lack of autonomy; poor governance arising from distant decision making; poor maintenance; interference by political forces; problem of subsidies which discourages competition, and delayed turn around maintenance.

"*The problem started when turnaround maintenance was not being implemented properly in the Refinery in the mid-90s onwards and that's when things started going bad. As turnaround maintenance became epileptic, then the condition of the plants could no longer be assured and then there was a lot of hemorrhage of staff and there is this issue of governance model. Allow the refineries autonomy to take decisions in terms of execution of turnaround maintenance, in terms of promotion of personnel, in terms of appointment of personnel. The best model really now is for us to have a private public partnership in the refineries. Indeed, for the oil sector as a whole because that is the best thing that ensures success of the sector for the good of the nation. The important thing is that we need to produce the products for our nation. Right now we are importing more than 80%, in fact, sometimes 100% of our needs are being imported; It's not sustainable. We are exporting crude and then spending money importing petroleum products. If we build refineries here to refine our crude, then those refineries will still pay for the crude at world market price, so you get the same money that you are getting when you sell the crude abroad plus they will produce the products that you need and sell to our internal market. So, the foreign exchange we earn can be available for other things rather than the waste that we are experiencing right now expending that money in importing products*".

Engr Ogbuigwe said the regulated PMS price is a major challenge facing the refining industry in Nigeria as it makes the economics of refining unprofitable, scares investors, creates an inefficient marketplace, creates incentive for rent seeking, creates incentive for smuggling and is an unnecessary drain to the nation's resources. His prescriptions for the future are far reaching. These are the deregulation of the downstream sector, the divestment of government equity to below 50% in existing refineries, the construction of largescale refineries both conventional and modular refineries, stimulate switch over from Kerosene and wood for cooking to LPG and the establishment of more petrochemical and fertilizer plants. On PTDF Engr Tony Ogbuigwe said the Fund is in a unique position to help develop the people that can make the future of refining and petrochemical in Nigeria a reality because according to him it is the people that create the future ■

Modular Refinery

Fullscale Refinery

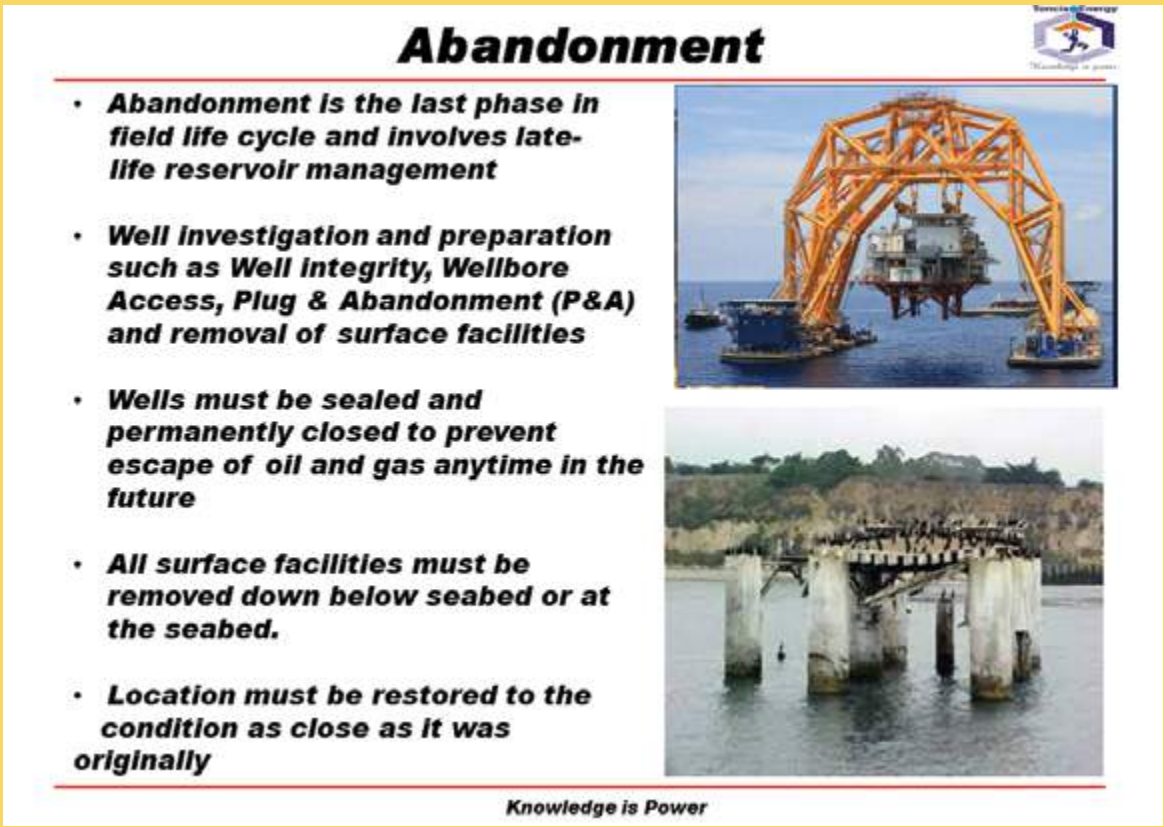
OVERVIEW OF THE NIGERIAN OIL AND GAS UPSTREAM OPERATIONS: FROM FIELD DEVELOPMENT TO ABANDONMENT

by **Prof. Godwin Chukwu**

Professor Godwin Chukwu's presentation, the fifth in the Lecture Series entitled "**Overview of the Nigerian oil and gas upstream operations: from field development to abandonment**" explained in detail the different activities in the upstream, midstream and downstream segments. These he said involves exploration, development, production and abandonment, transportation, processing and storage, refining, distribution and retail. With a focus on the upstream segment, Prof Chukwu explained the upstream operating and regulating framework and the life cycle of exploration activities which commences with the acquisition of license to operate or manage an oil and gas block, the development which involves drilling and the production stage involving production, processing and export.

Finally, he said is the abandonment stage which involves plugging uneconomic wells, shut-in wells and the restoration of sites to its original form.

"Abandonment is a very important aspect of upstream operation because it comes when your productivity can no more meet with your expenditure. So, you decide to abandon that well because more expenditure on it is going to put you on a negative cash flow which you don't want. So, in this sense now, there is a regulatory procedure for you to abandon that particular project or the well. Somebody asked what the processes are or why is abandonment not actually happening; It is happening but just that the implementation is a problem, the implementation actually faces some challenges. we have the rules and the regulations for abandoning but whether they are followed, we don't know. The effect is not on the economy, it is on the environment because if you don't plug a well adequately, the environmental issues might be very much detrimental to the ecology, in terms of the fish, the ponds, the water tables might be polluted, that is why you have to make sure that the well is restored nearly to its original state" ■



DOMESTICATION OF LPG IN NIGERIA

by **Mr Adedayo Adeshina**

Mr Adedayo Adeshina, an LPG expert and Programme Manager of the National LPG Expansion Implementation Plan took the stage at PTDF Lecture Series to make a case for the Domestication of LPG in Nigeria in the 6th edition.

Nigeria, he said is the second largest producer of LPG in Africa after Algeria. However, the adoption of LPG in the Nigerian Market is still at low levels compared to other African Countries. Nigeria according to him has the 9th largest proven natural gas reserve in the world. However, only a very small percentage of LPG produced in Nigeria is utilized domestically. In terms of domestic energy consumption in Nigeria, only 5% of households use LPG, 5% use charcoal, while 60% use firewood and 3% Kerosene for cooking, his paper reveals

"In order to mitigate that, we need to deploy nationwide LPG cylinders and stoves to get people to start using LPG so that they can stop using firewood to cook. So essentially, you are swapping one for the other but it won't happen in a lot of places because of the high cost of switching from firewood to LPG and which is where our own work starts, which is helping to mitigate that by making sure that the LPG equipment is available, the LPG is available in those areas, stimulate investment from private sector, get investments in filling plants, investments in manufacturing facilities, investments in trucks, investments in the entire value chain to be able to deploy infrastructures to those places where people need them".

He said ongoing effort to popularize and scale up the use of LPG include the inclusion of gas infrastructure in building codes and fiscal incentives such as VAT and TAX exemptions on gas infrastructure.

"In the building code there is nothing on gas in there and if there is nothing on gas you are not mandated to deploy any gas infrastructure. Now we need to have LPG infrastructure in homes. Here in Abuja there are places where you have 5000 homes and then everybody is carrying cylinders around the whole place, it doesn't make sense. You should be able to have a central storage somewhere that you can pipe; its localized reticulation that we call it, you can pipe the gas to each individual home,

that's what needs to happen going forward rather than you carrying cylinder around the whole place".

Other measures to shore up confidence in the use of LPG by households include awareness creation, and making LPG acceptable, accessible, available and affordable.

"We need to be able to change people's mindset, there has to be stakeholder's engagement, there has to be community awareness because the people we are dealing with most of them don't even understand how to connect the hose to the cylinder or to the stove. On affordability, we are looking at some of the switching cost and how we can make that cheaper for a

cylinder injection because if it is more expensive for people to switch them, they are not going to switch. It will be easier for them to go back to cutting trees and buying firewood. The distribution infrastructure should be deployed nationwide. For instance, the entire north east has only 63 filling plants whereas Lagos alone has 70. So, there is disparity, but we need to cover the entire country with filling plants if not, we are bound to fail".

PTDF, he said, has a fundamental role to play in the LPG utilization project considering the urgent need to develop indigenous manpower across the LPG value chain that is required to operate and maintain the infrastructure, technology and safety requirements of the project.

"*The importance of the PTDF for us is in every aspect of this value chain. So, training is crucial, very crucial; we've had in the industry almost 12 explosions within the last 5years and a lot of them are avoidable, a bulk of them is during discharge at filling points. So, if we are to embark on this journey successfully, PTDF will definitely play the key role when it comes to the training of personnel in every single aspect of this value chain*".

The areas of capacity building in the LPG value chain include inland and coastal transportation, storage, distribution, bottling, refining, butanisation, cylinder filling and management amongst others.

The ambition of the government, he said, is to increase the domestication of LPG consumption from the present 5% to 90% by providing the enabling environment for private sector investment.

"*The Private sector in this country must be commended because from 2007 to 2017 the market saw a 1000% increase growing from 70,000 tons in 2007 to close to 850,000 tons in 2017 and this is all without government support. So, you can imagine what can happen now there is government support. Government is going to act as an enabler and allow the private sector to take its rightful position in continuing to push for the expansion*" ■

LOGISTICS IN MID AND DOWNSTREAM AND ASSOCIATED HUMAN CAPACITY AND LOCAL CONTENT IMPERATIVES

by **Dr. Nosa Omorodion**

The seventh lecture in the PTDF Quarterly Lecture Series was presented by Nosa Omorodion, an oil and gas professional and council member, Nigerian Mining Engineers and Geosciences Society. His lecture on '**Logistics in Mid and Downstream and Associated Human Capacity and Local Content Imperatives**' highlighted what he termed as the unfortunate misconception of local content as indigenisation. He argued that local content only provides a forum for locals to be empowered to develop their skills, creates the enabling environment for technology to be deployed and is not intended to create local brief case entrepreneurs.
PTDF he said, should go beyond implementing the human resource development aspect of its mandate to also ensure the development of relevant technologies required by the industry.

"My belief is that the name itself (Petroleum Technology Development Fund), as an outsider I would expect that beyond human capacity development, it should equally be geared towards intervening and deploying unique technologies that this industry will need to be able to compete and be at par with its peers globally".

Giving an insight on the direct, indirect and induced benefits of the activities in the upstream, mid and downstream segments of the oil and gas industry to the economy and particularly on job creation, Mr Nosa Omorodion said more values are being created from the mid and downstream sub sectors.

"A larger percentage of the enablers, implementers and generators of these wealth are largely none degree holders. These are largely graduates of strategic technology institutions. Fabricators, welders, technicians, instrumentation engineers, etc, they play a massive role within the midstream and the upstream sector. Do you need to be spending 90 percent of your training effort on recruiting geologists and petroleum engineers only? There is enough expertise and enough technology and enough know how on exploring, developing and producing. Where there is a lack and not enough expertise, technology and knowhow is in the midstream and downstream. We know how to explore oil, we know how to develop and we know how to produce but we don't know how to refine, we don't know how to convert it to plastic bottles, we don't know how to take the end products and convert it so it will be available and affordable by so many people and that is where you can leave your name in the sands of time" ■

LOCAL CONTENT DRIVE: THE PROSPECTS AND CHALLENGES OF ACHIEVING SYNERGIES

by **Dr Ernest Nwapa**

The 8th in the PTDF Quarterly Lecture Series was on "**Local Content Drive: the prospects and challenges of achieving synergies**" delivered by Dr Ernest Nwapa, pioneer Executive Secretary, Nigerian Content Development and Monitoring Board, NCDMB.

He said, with the milestones achieved over the past years in local content development, most African countries are now adopting and applying Nigeria's model of local content in their jurisdictions. Nigeria should therefore take advantage of this favourable disposition of other African countries by creating a collaboration model for cross engagement of skills developed through the local content initiative.

Nigeria, he said is becoming self sufficient in engineering, drilling, fabrication and procurement jobs and for PTDF to be more effective in implementing its mandate, it has to work more closely with the industry.

"The responsibility on the shoulders of institutions like PTDF and NCDMB is enormous. The country benefits a lot from the Programmes of these agencies that create jobs and add value to the operations of the industry. The ability to create value, develop our supply chain is important for the oil and gas industry.With the signing of executive order number 6, there is a lot of work to be done and all of us both serving and retired people with the experience should come together to support the made in Nigeria policy that the Federal Government under President Buhari is pursuing. That way, we can guarantee a better future for our children for our industries. It will begin to transform our economy and we will begin to see growth not only in the industry but across the sectors and I think PTDF is properly located, giving its antecedent and pedigree as a human capital development institution. And the best way of achieving the objectives of government is for these agencies of government to synergize, to work together so that they are not pulling in different directions".

PTDF commenced the Quarterly Lecture Series in 2018 to provide a platform for insightful presentations and analysis of issues and concerns of the oil and gas industry by notable retired and serving industry experts ■

COUNCIL OF MINISTERS OF APPO MEET ON REFORMS AND TRANSITION

Nigerian emerges Secretary-General

The Extraordinary Meeting of the Council of Ministers of African Petroleum Producers Organisation (APPO) was preceded by the meeting of the Executive Board and experts of APPO member countries. The meeting which held in PTDF conference facility deliberated on crucial issues affecting the management and operations of the organisation. Nigeria's Minister of State, Petroleum Resources, then APPO President, Chief Timipre Sylva set the agenda for the meeting in his opening speech. He announced that Nigeria has completed the assignment given to her by APPO Council of Ministers meeting in Malabo, Equatorial Guinea on the implementation of APPO reforms and was ready to submit its report to the council of Ministers' for approval. He charged the meeting of the Executive Board to deliberate on the report and make recommendations that will assist him in presenting the final report on APPO Reform to the APPO Council of Ministers' session.

"As you are all aware, Nigeria was given the responsibility for the implementation of the recommendations that arose from the report of APPO strategy and implementation committee ASIC Reform Project by the Council of Ministers' in Resolution 262".

Chief Timipre Sylva of Nigeria therefore urged members of the board to objectively examine all the

issues at stake by putting the organisations' interest above personal or country's interest.

The Extraordinary Meeting of the Council of Ministers' of APPO member countries followed two days later to consider the report of the Executive Board and committee of experts. Primarily for consideration is the report on APPO Reform and Transition which in the words of the then Secretary-General Mahaman Laouan Gaya are crucial to the smooth functioning of the organisation.

"APPO needs a fresh start, and today Nigeria given its position in Africa and world oil scene and for various other reasons offered better technical, financial, political and strategic support to this reform. I believe that today, we are in the process of breaking with the past that characterised APPO and ready to respond to the real concerns of member countries and to the world major energy and oil trends".

After 30 years of serving as platform for cooperation, harmonisation of efforts, collaboration, sharing of knowledge and skills among African oil producing countries as championed by Nigeria, the organisation was yet to find its feet necessitating the call for reforms by Nigeria.

In recognition of Nigeria's commitment to the success of APPO, the extraordinary session of the Council of Ministers in 2017 resolved to establish the APPO strategy and implementation committee comprising of 7 APPO member countries, with Nigeria as chairman. It was mandated to review the mission, vision and strategic objectives of APPO and develop a strategic implementation plan with key performance indicators and related human and financial reforms.

Nigeria's Minister of State, Petroleum Resources, then President of APPO, Chief Timipre Sylva in his address to the Council of Ministers' of APPO, highlighted the key decisions to be taken at the meeting to include the choice of the host country for APPO headquarters, the selection of a new Secretary-General and some key officers of the APPO Secretariat and the recapitalisation of African Energy Investment Corporation.

Nigeria's President Muhammadu Buhari declared open the Extraordinary Session of the Council of Ministers' of African Petroleum Producers Organisation

Delegates at the Extraordinary Session of APPO Council of Ministers

(APPO). He called for an urgent revamp of APPO having failed to live up to the vision of the founding nations of creating a continental oil organisation that will mitigate the near total dependence on foreign technology and foreign market for member countries oil. While he acknowledged the progress recorded on studies in stratification and local content development, these he said came as a result of bilateral programmes between member countries and not under the auspices of APPO. President Buhari who was represented by the Minister of State,Petroleum Resources, Chief Timipre Sylva however commended the reform initiative of the organisation whose completion he said will re-invigorate APPO to pursue its original mandate and face the challenges of global paradigm shift in energy.

He also commended the steps being taken to reform and recapitalize the African Energy Investment Corporation, which is the APPO fund for international development (AEICORP).

"*The importance of recapitalizing AEICORP cannot be over-emphasized for us in Africa. As you are aware, due to the global paradigm shift away from oil as energy source, investment funds are fast drying up for the oil industry. This is happening at a time Africa is finding more and more oil and gas. Without the required funds, these reserves will remain on the ground untapped, while our people go without energy. I need to remind you that Africa has 600 million out of the 850 million people in the world who do not have access to modern energy. We need to exploit what we have to take our people out of energy poverty and by extension economic poverty*".

At the end of the Extraordinary Session of the Council of Ministers of APPO, Nigeria's Omar Farouk Ibrahim was ratified as the new Secretary – General of the African Petroleum Producers Organisation. He took over from Mahamman Gaya.

Other new appointments as contained in the communiqué issued at the end of the Council Session include Waeil All Atharam, Director, Rilwan Lukman Research and Development Centre, Mme Maha Fouda Attia, Director Support Services.

The council also unanimously appointed the Minister of Petroleum, Republic of Niger Foumakoye Gado as APPO President and Minister of Energy, Democratic Republic of Algeria, H.E Mustafa Guitouni as APPO Vice President.

The council congratulated Nigeria on provisional maintenance of APPO headquarters in Abuja pending its final decision and successful end of transition. The council agreed to retain the APPO headquarters in Congo.

Former Secretary-General of APPO, Mahamman Laouan Gaya

From Left: ES PTDF, Dr. Bello Aliyu Gusau, ES PPRA, Mr. Abdulkadir Saidu and Ahmad Rufai Shakur, Acting Director DPR

New Secretary-General APPO speaks on areas of priority

The new APPO Secretary-General, Nigeria's Omar Farouk Ibrahim has served as Governor of OPEC for Nigeria, and former Group General Manager, International Energy Relations, Nigerian National Petroleum Corporation NNPC. He spoke to PTDF Digest on his vision for APPO, areas of priority and the reform exercise.

Q: You have been Governor, OPEC, Nigeria and Group General Manager, International Relations NNPC, how did these prepare you for the position of Secretary-General (APPO)?

A: I guess I've been in international energy relations for about 17yrs now beginning with my joining OPEC in February 2003 as Head of Department, Public Relations and Information at the OPEC secretariat, I was there for 7yrs and I was invited to come to Nigeria as adviser to the then Minister Dr. Lukman. I worked briefly with Lukman and I moved to NNPC as Group General Manager, Public Affairs, and in 2014 the then Minister moved me to the office of the Minister as Group General Manager OPEC matters, an office he created. After Two and half years a new minister,Dr. Kachikwu was appointed and we worked on trying to integrate the functions of the various international energy organizations that Nigeria belonged to, OPEC, IEF, APPO and GCF, and we decided to have an office to handle that. In the past OPEC was being handled by NNPC as the national representative, the governor was at the ministry, there was no coordination. Since the Minister is the head of delegation to all these organizations, we should also have a coordinating office where the Minister can just say look I need this and that person should be able to say this is it, whether it is APPO, GCF,IEF or OPEC. That office was created and I was appointed Group General Manager International Energy Relations and in that capacity I was also OPEC Governor for Nigeria and Executive board member for Gas Exporting Countries Forum. The Ministry held the position of executive board member for APPO and IEF.

Q: Before your appointment as APPO Secretary General, you were doing some works for APPO regarding the reform and the transition exercise. Share with us the work you were doing for APPO under the reform and transition exercise?

A: I mentioned to you that in the past, the Ministry of Petroleum Resources was handling APPO completely. In my first meeting at APPO, I recall vividly, I wasn't happy with the conduct of the Executive Board Meeting

and I was asked to preside at the meeting because Nigeria was hosting the meeting. I looked at the programme and said look, we don't need 5 days to do this meeting, this meeting should be done in a day or two. They said no, this is not the way we do it. I said this is the way I want it; Nigeria cannot afford to waste money on accommodation and transportation of all of you. I'm going to work on this and I want to make sure that we start this meeting today and by noon tomorrow we should be done, and immediately after that I think we sent a signal to quite a number of people that wow! This people really mean business, and I told them look, I've been in OPEC; I have been in GCF and really, I don't understand why we should spend 5 days holding a meeting on issues like this. Before then the Ministers had as far back as 2013 concluded that the association at that time really wasn't fulfilling the objectives for which it was set up and they were concerned. They set up a committee to reform it. They brought in a consultant from Germany and they were working on it when Kachikwu became Minister. Nigeria really demonstrated a lot of drive in leadership and as a result of that we were given the mandate. Initially seven countries were appointed to work as a committee on the reform of APPO with Nigeria as leader. When we submitted our report called the APPO Strategy and Implementation Committee Report (ASIC), there were two committees set up, one was on APPO, the other was on the APPO Fund. We went to Rwanda and submitted the report, and everything was accepted. No change! The other committee's work headed by another member country was rejected by the Ministers and because they were impressed with what we did, they asked Nigeria to head the implementation of the reform and we told them okay we will do that but we can't see how we can lead a reform in Nigeria when the secretariat is in Brazzaville. So for the period of the reform the secretariat was temporarily moved to Nigeria with the Minister as head of the transition. I was appointed as the defacto chair of the transition team and we were reporting to the Minister. We worked until April last year. We took our report to the Ministers and they were very happy once again, and they adopted everything we proposed and said that we've come to the end of the transition and that before the end of the year Nigeria should host a meeting of Ministers to fully implement the report and that is what has happened now.

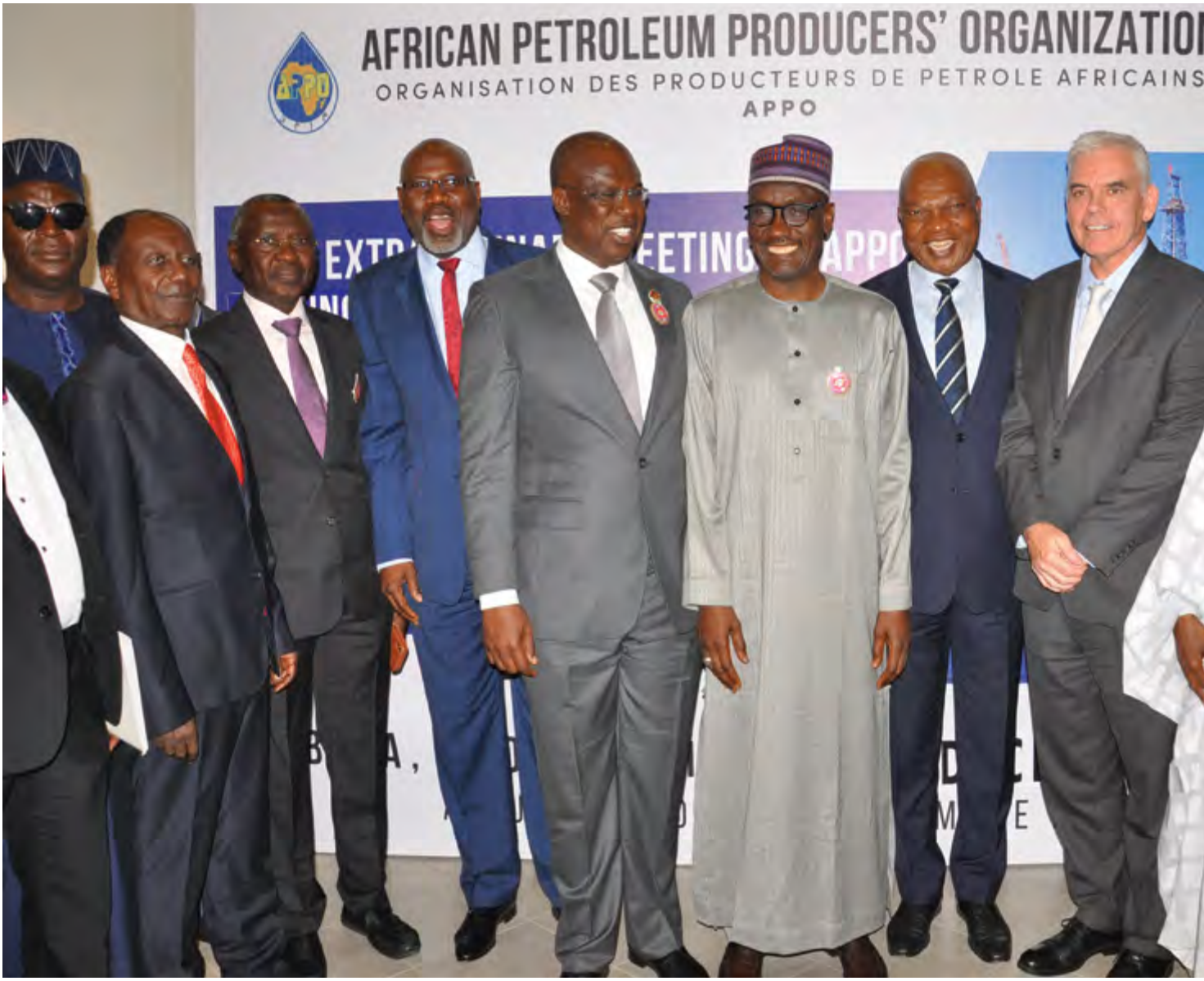
Q: What were the problems with APPO that necessitated the setting of the reform and transition committee. What is the way forward now as the Secretary-General?

A: One thing we noticed about APPO is that when it was founded in 1987 it was modelled after the Organization of the Arab Petroleum Exporting Countries OAPEC and the Organization of Latin American Petroleum Producing Countries. The objective is to bring together African countries that were just getting into the industry and help them grow, collaborate in marketing, in regulation, in fiscals and everything. Unfortunately, from 1987 up to about seven years or so ago not much was achieved, basically because that cooperation or collaboration wasn't there for several reasons, a lot of which are political. Countries wanted to do things solo. And we realized that, look if we go this way there is absolutely no way that we can make the progress that we need to make. The oil industry is a very capital-intensive industry. The oil industry is also very technologically driven. Africa, we don't have the capital, we don't have the money, we don't have the technology and we have continued to deceive ourselves into believing that those with technology, Europe, America and now China, will come and give us technology, no way. The earlier we rid ourselves of this belief that we can borrow technology, or it can be given to us, the better for us. So, we made it very clear that APPO should focus on local content, continent wide. APPO should look for funds to do what's needed to be done in the industry, we should not sit and expect IOC's or foreign investors to come and do what will help us out of this. Yes, they do come, but seriously speaking, these guys are not humanitarians or philanthropists No! they want to make money and they want to get as much as they can and there is absolutely no way somebody will go and spend a lot of time and money to do research and then come and just give you that technology. China did not get technology from the west by borrowing, no, what they did, they decided some 30 yrs ago

Unfortunately, from 1987 up to about 7 years or so ago not much was achieved, basically because that cooperation or collaboration wasn't there for several reasons, a lot of which are political. Countries wanted to do things solo. And we realized that, look if we go this way there is absolutely no way that we can make the progress that we need to make.

- Mr. Umar Farouk

that look, we want to move ahead and they decided that they were going to send their people to Europe and America, but they will make sure they come back. When they come back, they try the same technology they learned, and they adapt it. Initially, the west particularly America was complaining about patent. China said look, we paid the school fees for our children, you took hundreds of thousands of dollars from us, it is in their head. They decided to close their system and worked on it for nearly 15 to 20 years. Everybody was saying their products are not good but today, they have changed. On the part of Africa, until we sit and tell ourselves that there are things that we have to get to do in the next 5, 10 or 20 years, if doing so means going against WTO rules, do it. These rules were not set up by us, and they set these rules and we go and append our signatures. I will give a very good example, we were among the first countries to sign this Paris Climate Change Agreement. In the next few years, we will be forced to implement what we have willingly signed. We will then find out that it was a big disaster we did to ourselves, our economy is dependent on oil and gas today, we have been made to believe that the era of oil and gas is gone, because of emissions, because of climate change. I doubt this argument, but even if it's true that emissions caused all these, who caused it? Did Africa cause the emission? Industrial revolution did. The number of emissions coming out of Europe and America is incomparable to those from Africa. So, if it is also agreed that without energy no society can develop, why are you denying us that development, by literally telling us that yes you have this here, but in the next so many years, it will be criminal of you to use it, because you are harming the world. To help you we will give you pittance, and then leave that resources that you have and then come, we are going to develop renewables then you will get it from us, you'll buy it from us. Because let's face it, the technology for renewables, even if you're in the Sahara, in Sokoto, Maiduguri and so on, the panels, the batteries and so on, we do not have the technology we will still be dependent on this people. So, basically what APPO is trying to say is this; In a lot of African countries we have resources, all



Minister of State, Petroleum Resources, Timpre Sylva, GMD NNPC, Malam Mele Kyari flanked by delegates to the APPO meeting in Nigeria

we need to do is to come together, pool the resources together by creating the basic infrastructure that will allow you tap into it. We started with the African gas pipelines. From Nigeria, we pump gas to Benin Republic, to Togo, to Ghana. I was in Ouagadougou where governments of ECOWAS countries agreed to extend the west African gas pipelines to Cote d'ivoire, Senegal, Mali and Burkina Faso, in the next 10 years. When you have done that, I think you will now be able to interconnect and bring development to these areas. On the second issue of financing, about 7 years after the founding of APPO, the Ministers realizing that they needed money to implement projects, set up the APPO Fund for technical cooperation. Like APPO it didn't work, and when we were reforming APPO, one of the things we also decided to do is to reform the APPO Fund. The APPO Fund, when it was created, was essentially focusing on governments to subscribe, so it was purely an inter-governmental financial institution. Today we've changed that, we expect to raise $1billion.A maximum of 49% should come from the government and the rest should come from the private sector, financial institutions, the world bank, AFDB and so on to contribute the balance. That way, if we need to do projects that cut across borders, we have where to go and get the funds. We don't expect $1billion to do this project but if we have 1billion in our kitty we can use that to go and get bigger loans from the World Bank and others. That money is not to be used for the project. The problem as you know is to them that have much shall be given and to the have nots, even the little you have will be taken away. So, you must show that you are rich before you can get a loan. So if we have one billion in our kitty and we have the support of the government institutions, we can then go and say we need five billion dollars to do Mali to Burkina Faso or Senegal and we expect that in 5 years we should be able to pay this. Basically, these are the areas we are focusing on and we hope to make a difference in our first or second term ■

So, basically what APPO is trying to say is this; In a lot of African countries we have resources, all we need to do is to come together, pool the resources together by creating the basic infrastructure that will allow you tap into it. We started with the African gas pipelines.

- Mr. Umar Farouk

PTDF 'STEM' INITITATIVE

Highlights:

- ✓ **1,000 Secondary Schools**
- ✓ **6,000 Teachers**
- ✓ **Simulation of 191 Laboratory Experiments**
- ✓ **3,000,000 Books**

Between 2010 and 2011, the Petroleum Technology Development Fund (PTDF), implemented a "*Catch Them Young*" quiz/debate competition for secondary schools. The programme involved the participation of secondary school students across the country and was aimed at popularizing petroleum technology at the foundation level of education by raising the interest and consciousness of senior secondary school students in science subjects that are relevant to the study of oil and gas courses. The winning students and their schools received various rewards such as ICT equipment, sponsored visits to oil and gas installations locally and abroad and opportunity for university scholarship awards.

The PTDF "*Catch Them Young*" programme was in later years transformed to PTDF "*Emerging Talents Science Competition*" with the same objective of encouraging senior secondary school students to develop interest in science subjects needed to pursue careers in the oil and gas industry.

Secondary School students carrying out laboratory experiments

While the "*Catch Them Young*" and "*Emerging Talents Science Competition*" may have succeeded in arousing the interest of secondary school students in the sciences,

they however failed to address the fundamental problems affecting the teaching and learning of science subjects in secondary schools. PTDF is therefore seeking to address the foundation gap in science education by instituting its variant of Science, Technology, Engineering and Mathematics "**STEM**" programme in senior secondary schools.
Executive Secretary, Petroleum Technology Development Fund, Dr. Bello Aliyu Gusau said that PTDF has for long been concentrating its capacity building efforts at the tertiary level of education through sponsorship of undergraduate and postgraduate studies.
"*What we are trying to do is to address the foundation gap in the teaching and learning of Science and Technology based courses. So, we chose six subjects: Mathematics, Chemistry, Biology, Physics, ICT, English and brought them under 'STEM' (Science, Technology, Engineering, and Mathematics) programme*".

Munir Surajo, Head of Training Division, PTDF and member, implementation committee, PTDF STEM Programme said the review of the Fund's interventions on tertiary education, brought to the fore the serious foundational weakness in sciences and technology with most graduates still struggling with their study, even at Masters and PhD levels.
"*So, we looked at it and felt the best way to address it is to go to the root of these problems, which is the Senior Secondary Schools; look at how sciences and mathematics are taught, what gaps exist, where the problems are and try as much as possible to address them. That was what brought about the institutionalizing of science, technology, engineering and mathematics "STEM" as a programme of the PTDF*".

While other levels of educational development in Nigeria have coordinating and regulatory bodies, it was not until recently that the Federal Government set up a panel to see to the take-off of a National Commission for Senior Secondary Education. In existence are the Universal Basic Education Commission coordinating all aspects of basic education, the National Board for Technical Education for Polytechnics, the National Commission for Colleges of Education, and the National Universities Commission coordinating the university system. In deference to its mandate which relates essentially to the promotion of science and technology, PTDF decided to contribute in building a firm foundation for the teaching and learning of science and technology based subjects at the senior secondary school level, that lead to clarity of knowledge of STEM based courses. Munir Surajo said that PTDF as an institution has the mandate to build capacities in the oil and gas industry.
"*You can't have oil and gas operations without sciences and engineering, and you can't have science and engineering without having a strong background in the basic subjects of especially physics, chemistry, and mathematics. So, that is where the link is. Whatever level you reach in your career as a scientist, geologist or an engineer, so long as you don't have that strong background, you will still be seen to falter in your operations, so that is why PTDF is looking at that level. We have built capacities over the last two decades at mostly tertiary levels, so now we are focusing on the lower levels, at senior secondary schools so that we build capacities at that level, rekindle interest of students at that level in sciences, let them know that they have a future in science and engineering which they need in order to operate or practice in the oil and gas industry. As long as that interest is not there, as long as the strong instructions or the training is not there, there is no way they can perform optimally even if they decide to pursue a career in the oil and gas industry*".

PTDF commenced the 'STEM' programme with a pilot involving one thousand Secondary Schools across the country. This is made up of one secondary school in each of the 774 local governments areas nominated by state governments, the one hundred and four (104) Federal Unity Colleges, special schools for the disabled and vocational skills training schools. So far, all the state governments and FCT have submitted their nominations of the secondary schools that will participate in the programme. PTDF followed up by administering questionnaires to assess the state of the nominated secondary schools, the state of facilities and the skills level of teachers in these schools to know what gaps existed. Similarly, the teachers nominated from these schools for the exercise were administered questionnaires to know their level of education, competence and experience. The basic qualification for any teacher participating in the programme is either BSc or B.Ed in any of the STEM subjects.
The PTDF STEM programme has different implementation components. One is the selection and training of teachers, another is the provision of teaching aids such as laboratory and books, and then the establishment of STEM Clubs. But the main focus is on teachers of the six core subjects of Mathematics, Chemistry, Biology,

Secondary School students conducting laboratory experiments

Physics, ICT and English at the senior secondary school level. In this regard PTDF will put the teachers through an intensive and focused training programme lasting for a period of between one and two weeks to upskill their competencies and enhance their effectiveness in the teaching of the core six subjects. With one teacher for each of the six subjects from one thousand secondary schools, a total of six thousand teachers will be selected for the intensive training programme. This approach is based on the realization by PTDF that the fundamental problem in the study of Science, Technology, Engineering and Mathematics "STEM" lies in the teaching of the subjects.

According to the **Executive Secretary PTDF, Dr. Bello Aliyu Gusau** "*From each of the one thousand schools, we are going to pick one teacher per subject i.e. one Mathematics teacher, one Physics teacher, one Chemistry teacher, one Biology teacher, one ICT teacher and one English teacher. So, our plan is to get about six thousand (6000) teachers across the country and put them through this training.*"

No doubt bringing together 6000 teachers in one location for the purpose of training them may be counterproductive and may not achieve the desired objective. PTDF therefore plans to decentralize the training by utilizing the facilities of Faculties of Education in select universities in the six geopolitical zones of the country. PTDF is also in consultation with the National Universities Commission(NUC), the National Teachers Institute(NTI), the Nigerian Educational Research and Development Council(NERDC) to develop a programme of training for the selected teachers to aid their ability to teach the six different subjects in their schools.

From each zone we will take between two to three universities. For instance in the North West, we have the Ahmadu Bello University covering teachers from Kaduna and Katsina; Bayero University Kano covering teachers from Jigawa and Kano state, and Usman Danfodio University covering teachers from Kebbi, Sokoto and Zamfara states. In the south west are the University of Lagos covering teachers from Lagos and Ogun states, University of Ibadan

From each of the one thousand schools, we are going to pick one teacher per subject i.e. one Mathematics teacher, one Physics teacher, one Chemistry teacher, one Biology teacher, one ICT teacher and one English teacher. So, our plan is to get about six thousand (6000) teachers across the country and put them through this training.

- Dr Bello Aliyu Gusau,

Federal Government College, Kano

for teachers from Oyo and Osun States, etc. In each University there is a Faculty of Education with departments dealing with science education. Our plan is to bring together departments of science education in the Universities to develop a programme of training for the secondary school teachers to aid their ability to teach these different subjects in their schools" says PTDF Executive Secretary Dr. Bello Aliyu Gusau.

To address the dearth of study and lecture materials in the identified core subjects, the Fund will set up in each of the one thousand secondary schools a PTDF mini STEM library with 500 books provided in each of the six subjects areas.

"We realize that most of these secondary schools do not have libraries and where they do have, there are no current and relevant books. So we will provide books in each of these subjects and make sure that they are available for all the students and teachers to access. We need to provide the full complement of the materials required for the teaching of science subjects".

Realizing that effective teaching and learning of science and technology-based subjects require experimentation in the laboratory, PTDF in consultation with the Science Teachers Association identified one hundred and ninety-one laboratory experiments required for practical understanding of the science subjects within the spectrum of senior secondary school education. In view of the huge cost in procuring physical laboratories and their consumables for the one thousand secondary schools, the Fund is opting to produce graphics/video illustrations of these experiments. This will be in the form of simulation software that can be run on operating systems like Microsoft. This will have the capacity to demonstrate what obtains in physical laboratories and perform other experiments required for the training of scientist and engineers.

"It will be difficult for us to provide laboratories to all these schools" says Munir Sirajo. *"But we can have these experiments simulated so that you can have a real-life experience of what the experiments are all about. Currently there are various science laboratory simulations in the market, but we want to have bespoke experiments developed from those that are within the curricula of Nigerian science subjects. We will have the teachers trained on how they can use that to teach the students. We will also provide the facilities required to run the simulators such as computers, projectors, and screens for these experiments".*

On the part of the students, the Fund will establish in each of the 1000 secondary schools a PTDF STEM club to popularize the programme among the students, secure their buy in and institute a STEM Culture. This according to Munir Surajo is expected to create interest and awareness on STEM.

"It is going to be very elaborate, it will involve a lot of creativity, technology and all that. And those that excel in all these processes will have the opportunity to fit into the Fund's higher-level capacity building initiatives. So, if you are good

We realize that most of these secondary schools do not have libraries and where they do have; there are no current and relevant books. So we will provide books in each of these subjects and make sure that they are available for all the students and teachers to access. We need to provide the full complement of the materials required for the teaching of science subjects.

- Dr Bello Aliyu Gusau,

Students of Grundtvig International Secondary School, Anambra State during practicals

at the secondary school level and you participated in STEM activities and you come out with good results, then that makes it easy for you to fit into the Fund's local scholarship or overseas scholarship programmes. We are also promoting the appointment of STEM ambassadors in each school. We want to make sure that in each of the subjects there is a STEM ambassador that will work actively with these students and make sure that the advocacy is done effectively to bring all these activities to the students attention".

To monitor the effectiveness of the PTDF STEM programme, the implementation committee has developed a comprehensive periodic impact assessment programme that will measure the values created by the intervention. This will be measured by the performance of the students and the interest generated in the teaching and learning of science and technology-based subjects.

The measurement of the success of the programme, according to PTDF Executive Secretary, Dr Bello Aliyu Gusua is determined by periodic assessment of the performance of beneficiaries in key examinations.

"*Let's say after implementation, the next year, the second year, the third year, you find out how the students in these schools are performing compared to previous performances. How many of them are also shifting away from other subjects to science subjects and how many of them are going to universities pursuing similar courses?*"

Munir Surajo explains further

"*When you pick somebody from let's say senior secondary school one (1) SS1, and within that school you have institutionalized a STEM Programme, you have provided all the facilities; it is very easy for you to monitor and see what progress that student makes. We will know from records what the level of performance of students in this school is. Then down the line after they have finished their secondary school (after 3years), we would be able to see what impact the STEM programme has made in their performance. Then at each milestone after secondary school, if they are able to fit into the Fund's LSS programme, we would be able to monitor their progress; observe improvements in their performance in schools. So, there will be an effective monitoring and evaluation mechanism.*"

STEM as a programme is not novel in the advancement of science education. While many organisations have done a lot of advocacy programmes on STEM, PTDF intervention is designed to compliment the existing curriculum for STEM subjects in secondary schools. The Fund desires through the programme to strengthen the capacity of the teachers in the delivery of lectures in the identified areas of study in order to increase the interest and performance of students in science subjects prior to commencement of tertiary education.

"*Most of the attempts made before in addressing these problems did not really go down to the root of these problems. Attempts made by various agencies were mostly at advocacy level; adverts, getting students to go through quiz competitions and all that. But the problem goes beyond that, you have the problem of teachers; they too need to have capacity and skills, you have the problems of infrastructure, you have the problem of even getting the students to understand that look, if you want to have a career in a particular field, there are certain disciplines that you need to focus on. That is why the programme as conceptualized by the PTDF is different from any other STEM initiatives*" ■

IMPLEMENTATION

Review of Teachers Guide, Training Manual and Curriculum of Science and Technology Subjects in Senior Secondary Schools

Participants at the flag off ceremony on the Reveiw of Teachers Guide

From Right: ES PTDF, former ES NERDC, and some management staff of PTDF

After mobilising the One Thousand Secondary Schools and Six Thousand teachers participating in the novel PTDF "STEM" programme, the Petroleum Technology Development Fund took the first fundamental step at implementation by facilitating the review of the teacher's guide, training manual and the curriculum of some science and technology related subjects in senior secondary schools. The review is in collaboration with the National Educational Research and Development Council (NERDC), the federal government agency responsible for curriculum and instructional materials development.

At a workshop to flag off the review and update of science, mathematics and english studies teachers guide for the implementation of PTDF STEM project, participants agreed that the review will strengthen the teaching and learning of science and mathematics and contribute in rebuilding and strengthening the educational system through teacher capacity building and effective content delivery hinged on sound knowledge of the curriculum contents.

Giving further insight on the review exercise, the **Director, Continuing Education Centre (NERDC), Dr Garba Dahiru Gwandu**, said the objective is to develop training manuals that will be used to scale up the capacity of teachers in the selected 1,000 schools. "*these manuals will go a long way in the training of teachers and serve also as instructional guide that the teachers will rely upon for effective content delivery and classroom management and better educational outcomes*".

He described PTDF initiative at raising the capacity of teachers in one thousand schools as a serious revolution in the education sector in Nigeria, and one that has not happened before.

The review and update of the teacher's guide being facilitated by PTDF in collaboration with NERDC also involved developing the scoping and sequencing for the school curriculum in the target STEM areas of Chemistry, Biology, Physics, Mathematics, Computer studies and English Language for senior secondary education in Nigeria.

According to the **Deputy Director, policy and programmes (NERDC), Dr Grace Ajagun**, the teacher improvement programme involves the review of the teacher's guide and the development of a

training manual that will be used to build the capacity of teachers on how to effectively teach the curriculum of the six subjects in senior secondary schools, unity colleges and special needs schools. "*In this particular phase, which NERDC is handling in collaboration with PTDF, we will train the teachers on how to scope and sequence the curriculum themselves, develop model lesson plan under our supervision*".

She said PTDF STEM programme intervention is timely and laudable, and capable of creating a critical base of people who will go to tertiary education to study the required courses that will help to ensure the success of the oil and gas industry in Nigeria.

Indeed, one of the challenges of educational development is the inability of teachers to effectively implement and deliver the contents of the teaching curriculum, and this manifests in the gap in tertiary education with regards to science subjects. The workshop brought together core content specialists with specializations in the subject areas of Chemistry, Mathematics, Physics, Computer Science, Biology and English. Also in attendance were university Professors, school teachers, and tertiary educators.

Some of them expressed their views on the review and update of the teacher's guide for the PTDF STEM programme.

Professor Donatus Ikechi Igbokwe, Dean, College of Physical and Applied Sciences, Michael Okpara University of Agriculture, Umudike. "*The essence of the programme is to improve on the teacher's guide so that they know what they should do in terms of the teaching and learning processes in the classroom. We discovered that the curriculum is designed in such a manner that it doesn't specify the aspect of sequencing that enables the teacher to know which topic to be taught first. What we are doing here is a sort of in-house training for specialists, who will train teachers to acquire the skills and the capacity to do it.The hope of the workshop is to develop the curriculum in terms of scope and sequencing and we believe any graduate teacher who is properly trained should be able to do that*".

Professor Patricia Nkechi Uzoegwu is a professor of Educational Evaluation, University of Nigeria Nsukka. She prepares students to be teachers of English Language in secondary schools and coordinates language education in the department. "*I have been invited along other professionals to prepare the teachers guide that will help teachers of English language teach this very important and core subject properly in the secondary school. The idea is to get the students properly grounded in English language. English language is a core subject and every student in the secondary school is supposed to study it. You cannot study the sciences without the English language. If you have a good command of English Language it means you will do the sciences very well and that is what I think the PTDF is out to ensure. If the students are properly grounded in English language and in the sciences, technology and communication will be improved in our country. A lot goes into the teaching of English language, the teacher is there, the students are there, the instructional materials are there, the physical environment is good. Everything about the neighborhood helps in the teaching of English language. If any of these things are lacking, then English language will not be taught properly*".

Professor Mamman Musa, President, Mathematical Association of Nigeria/Former Director, School of Basic and Remedial Studies, Ahmadu bello University, Zaria. "*The NERDC develops the curriculum that is sent to schools for implementation. But in the*

wisdom of PTDF, it is good to break down and sequence the curriculum. We realize that developing curriculum alone and sending to schools for implementation will not help the teachers very much. What will help the teachers is to break them down into topics, then topics will now become lessons, from lessons now you can develop a sample of lesson plan and then the teachers can now pick from there and continue. And by the end of the programme we intend to have a blueprint that will make it easy for teachers to deliver the curriculum.

The intervention by PTDF is timely. I sometimes feel that most of the things PTDF supports could have gone to the primary and secondary first, let's clear that level first because our problems seem to be hereditary from level to level. So if the foundation is made solid by supporting activities in the primary and secondary levels, you will have a solid foundation to aspire to greater things. The government should make concerted efforts at instituting policies on teacher education, curriculum and curriculum implementation".

Dr Godwin Olatunde Ojukwu, ECI Academy Zaria, *"I belong to the Science Teachers Association of Nigeria (STAN) and in many of our workshops and conferences we have been talking of science, technology, engineering and mathematics. But unfortunately, when it comes to teaching STEM it is capital intensive. If you go to secondary schools where the learning of science is supposed to start, the rudiments are not there. So, PTDF initiative is a step in the right direction. With PTDF coming in now, it means schools that are not equipped will now be equipped and with that this STEM thing will become very popular with many students offering science subjects. So, it is a welcome development for PTDF to come in and provide those materials that will make children to be interested in the study of science"* ■

Group photo of participants at the Review of Teachers Guide and Curriculum of Science and Technology Subjects by PTDF and NERDC

PTDF DOMESTICATION POLICY

...Nigerian universities play major role in implementation

The domestication of PTDF interventions especially the Overseas Scholarship Scheme is intended to achieve the purpose of stemming the escalating costs and also to relocate the benefits from foreign training institutions and bodies to indigenous institutions. This is a core priority of PTDF Strategic Direction Agenda unveiled three years ago. The impact is already being felt with the phenomenal increase in the number of local scholarship awards for studies in Nigerian universities.

The highest number of 1,435 was recorded in the 2018/2019 undergraduate and post graduate local scholarship awards. This is a clear manifestation of the shift by the Fund from the sponsorship of overseas Scholarships to local Scholarships. For example, in the 2019/2020 Overseas Scholarship Scheme, only 342 awards were given out by the Fund representing a significant drop in the number of scholarship awards for studies in foreign institutions.

According to the Executive Secretary PTDF, Dr. Bello Aliyu Gusau "*Hitherto we have conducted most of our trainings in foreign universities, but the whole purpose of upgrading oil and gas departments in some Nigerian universities by PTDF is to ensure that more and more of this capacity building is done within the country. In fact, that is the whole purpose of the local content programme that this industry has been pursuing actively in the last few years. We are also keying into that process. We want to ensure that our own universities do have capacity to deliver world class teaching, learning and research on a sustainable basis*".

This development did not just happen overnight, The Fund took deliberate steps at ensuring that the local universities met the high standards required by the Fund before populating them with PTDF scholars. To lay a solid and enduring foundation for the success of the domestication of PTDF training programs, the Executive Secretary,

Dr Bello Aliyu Gusau

convened a landmark meeting and interactive session with Vice Chancellors of Federal Universities in Nigeria, an indication that Nigerian universities will now play a major role in PTDF domestication agenda.

According to Dr Bello Aliyu Gusau, the domestication of PTDF training and capacity building programs is at the centre of the Fund's strategic direction agenda, and collaborating with Nigerian universities is vital to the implementation. "*At the moment, the kind of Scholarships we offer are disproportionately in favour of foreign universities, but we want to reverse that trend so that the bulk of Scholarships that are on offer here will be in Nigerian Universities. But for us to do that, we need to agree on some terms with the universities*" says Dr. Bello.

In setting agenda for discussions at the meeting, the PTDF Executive Secretary listed some of the information required by the Fund from the universities to include the areas of competence of the different Universities, the departments offering programmes that come under the sponsorship

of PTDF, the fees structure, admission processes, the selection criteria, the possibility of reserving admission slots for PTDF sponsored students, the duration of study of the various programmes and the nature of certification in the case of split site PhD programmes.

The **Executive Secretary, National Universities Commission, Professor Abubakar Adamu Rasheed** described PTDF as the single most important intervention agency outside the education family that is intervening in capacity building in selected areas of educational development.
"PTDF has demonstrated adequate responsibility and interest in changing the knowledge industry in our Country. PTDF has invested in several Physical development Projects in quite a number of Universities. Most public Universities have benefitted from one form of intervention or the other in terms of physical infrastructure, building departments, building computer centres and equipping them".
He said with the myriad of problems besetting post graduate training in Nigerian universities, the initiative by PTDF will further strengthen Nigeria universities.
Professor Rasheed emphasized the necessity to reform Post Graduate training in Nigerian universities.
"We must reform our Post Graduate training. A Staff of the Commission (NUC) came to my office to happily inform me that she has completed her PhD Studies in a University in Nigeria after twelve years. While I congratulated her for finally completing the programme, I said she was lucky to have spent only twelve years because I know several people who spent between fifteen and twenty years working on a PhD. Now how can you plan, how can a funding agency anywhere be involved if completion period is uncertain. You may know when to start, but you will not know when to end the PhD. So, we need to reform our Post Graduate training. We have long realised that there is very little correlation between the number of years you spend doing the PhD and quality of the outcome. We are not blaming the universities alone, we are not blaming the lecturers alone, we are not blaming the students alone, we are not blaming the system alone but all of these share in the blame".

Professor Adebiyi Daramola, a former Vice Chancellor, Federal University of Technology, Akure, said that the PTDF initiative to domesticate its training programmes using the Nigerian universities is a timely development given the fact that the Nigerian university system has developed to the extent that it can offer the same quality training as foreign universities.
"I must say that faculty members in Nigerian Universities are world acclaimed, internationally recognised Scholars and Scientists who are in their own right qualified and competent to even teach in some of these universities we send our Students to go and study abroad. What is most important is to work on the environment within the university system by providing the facilities that are comparable to what we have abroad, and it will be a more cost-effective way to spending our scarce resources".
He also stressed the need to harmonise Post Graduate academic calendars to bring about certainty in the duration of programmes. *"One area that is problematic and we need to work on is the disparity in the calendars of resumption, examination, and sessional closure. We need to really harmonise it and this includes factors that are outside the control of the University system like the unions. I mean if they go on strike, they make teaching and learning impossible. These are the wider dimensions that the Nigerian government needs to look into in terms of stabilising the academic calendar in Nigerian Universities"*

Professor Benjamin Chukwuma Ozumba, Vice Chancellor, University of Nigeria, sees the PTDF initiative of collaborating with Nigerian Universities to domesticate its training programmes as most realistic given the huge amount involved in foreign trainings and the fact that Nigerian Universities have the capacity to provide such trainings.
"I am a product of domestication. A full-fledged Nigerian trained medical doctor with all the qualifications and experience to function globally. What's the point spending so much money in training someone who is not domesticated, and he will go abroad and start telling stories about Nigeria which are not true. Whereas if you are domesticated, it does not stop you from going abroad for further training. I was fully trained here; I was already applying for my professorship before I went for my first training abroad and I continued growing. Doing your first degree here does not stop you from going further if you are really an academic material. So, it is by no means a waste or a wrong move".
He suggested that PTDF should deploy more resources in the upgrade of more oil and gas related departments and the endowment of professorial chairs for research and development.

The **Vice Chancellor Ahmadu Bello University Zaria, Professor Ibrahim Garba** said the interactive meeting with Vice Chancellors of Federal Universities

initiated by PTDF raised many issues and concerns. The discussions on these issues however enriched the PTDF proposal on domestication. He commended the leadership of the Fund for taking what he termed a radical re-direction of its strategic priorities in training Nigerians for engagement in the Oil and Gas industry.

"For me, it's a new PTDF trying to look at things pragmatically and realistically in a manner that more value maybe derived from the resources that PTDF relies on in training Nigerians for the oil and gas industry. We've been able to contribute to enrich PTDF in its own thinking, on the best way to achieve the overall objective. Many issues were raised that revolved around challenges and prospects for meeting the aspiration of PTDF in training Nigerians within Nigeria, in more numbers than before so that by so doing they will minimise the number of scholars that go abroad because of the challenge of funding".

Dr Ganiyat Adejoke Adesina- Uthman, Dean

Faculty of Social Sciences, National Open University of Nigeria who represented the Vice Chancellor at the meeting made a case for the computerisation of the processes of Post Graduate Schools.

"If you want to really domesticate sponsorship in Nigeria and you want to enhance the quality of certificates that are issued to both postgraduate students and undergraduate students, there is need to computerise the system especially the Postgraduate Schools in such a way that there won't be delays in the selection process, there won't be delay from students not even knowing the focus of what they are in for after their admission. There will not also be delay from students graduating for MSc or PhD programmes. In other realms, as you get your admission letter, you have a stated number of semesters that you can use minimum and maximum and if you are not able to do that, you will be advised to quit and reapply. And getting progress reports for students should not be an issue if the system is computerised because each student portal will be updated every semester to show how the student is progressing and the students also don't need to go to their supervisor or meet anybody to know their performance and the stage where you are and how to move faster to meet up with the minimum or maximum period" ■

ES PTDF, Dr. Bello Aliyu Gusau, ES NUC, Prof. Rasheed in a group photograph with 40 Vice Chancelors of Federal universities

TALK BACK

The Nigerian Extractive Industry Transparency Initiative (NEITI) in its Fiscal Allocation and Statutory Disbursement (FASD) Audit Report for the period 2012-2016 observed as follows:

- The need for PTDF to domesticate its training programmes especially the Overseas Scholarship Scheme.
- That it is difficult to ascertain the proportion of successful scholars of the Fund's overseas scholarship scheme who came back and were integrated into the Nigerian Oil and Gas Industry.
- Clarity on the impact of the Fund's capacity building programmes on the Oil and Gas Industry.

PTDF RESPONSE

The Fund in 2017 developed the "PTDF NEW STRATEGIC DIRECTION FRAMEWORK" that clearly addressed the concerns of NEITI in its report. The framework is anchored on six strategic priorities, the implementation of which has impacted positively on the Fund's delivery of its mandate. These are

I. Domestication of the Funds Interventions especially the Overseas Scholarship Scheme, with a view to stemming the escalating costs & relocating the benefits of these programmes from foreign training institutions & bodies to indigenous institutions.

IMPLEMENTATION

- Gradual phasing out of the Overseas Scholarship Scheme (OSS) and re-directing the traffic towards Nigerian Universities leading to a geometric increase in local scholarship awardees from 286 for the period 2012 - 2016 to 1,480 in 2019.
- Establishment of PTDF University of Science and Technology through Joint Venture arrangement with reputable overseas universities.
- Expanding the number of Nigerian universities participating in the Local Scholarship Scheme from 23 to all Federal Universities.
- Streamlining the number of partner universities of the Fund's Overseas Scholarship Scheme in the United Kingdom (UK) to only 17 Universities selected based on their strategic importance.
- Negotiated with partner universities in the UK to secure discounts of up to 50% in tuition fees.
- Established partnerships with the German Academic Exchange (DAAD), for part funding of visa fees, health insurance and expenses for

6 months language course. The Fund is also in partnership with the French Government through Campus France, where the latter provides funding for up to 10 MSc and PhD scholars of the Fund.

II. Creating linkages with the Nigerian oil and gas industry with a view to ensuring that the benefits of PTDF capacity building interventions are seamlessly realised through increased participation of Nigerians in all aspects of the country's oil and gas value chain.

IMPLEMENTATION

- Engagement with the Department of Petroleum Resources (DPR) that resulted in the Fund participating in the Work Programme presentation sessions by operators in the oil and gas industry to ascertain the human resource requirements and research needs of the industry.
- Engagement with the Nigerian Content Development and Monitoring Board (NCDMB) leading to the upload of the Fund's OSS products onto the Joint Qualification System with a view to providing employment opportunities for past scholars.
- Engagement with the nation's refineries to secure internship placements for the Fund's trainees, under a Post Training Attachment Programme.
- Engagement with Dangote Refinery that led to offer of employment to some of the Fund's OSS products.

III. Utilization of oil and gas centres of excellence developed in strategic locations to drive the actualization of the Fund's mandate.

IMPLEMENTATION

- Engagement with reputable foreign universities with a view to establishing Joint Venture Institutions at the Fund's facilities in Kaduna and Port Harcourt.
- Upgrading oil and gas related departments in 26 universities across the country which are expected to serve as platform for the Fund's domestication drive.
- Completed the development of two Oil and Gas Federal Polytechnics in Ekowe, Bayelsa State and in Bonny, Rivers State.

IV. Reposition PTDF to be a major source of cutting-edge research for the Nigerian and global oil industry.

- The Fund's Endowment Programme and Research Grant Competition provide the necessary platforms for industry-academia collaboration. This has resulted in using research sponsored by the Fund to solve specific industry problems and the patenting of several research outcomes.
- PTDF brought together key stakeholders in the oil and gas industry to address the problems of the refineries by setting up a National Zeolite Working Group. This will chart the way forward for the local production and commercialisation of zeolite catalysts used by the refineries.
- PTDF is playing a key role in the National Gas Flare Commercialisation programme as a result of the Funds new emphasis on Gas in its Research and Training Interventions. The Fund created a Gas Technology Development Division to support government vision of moving Nigeria from a crude oil export-based economy to a gas based industrial economy.

SUSTAINABLE DEVELOPMENT OF HUMAN CAPITAL FOR THE INDUSTRY

Despite efforts by PTDF to ensure that its scholars are successfully absorbed into the oil and gas industry, the limitation of its enabling law makes it difficult to achieve that objective. Furthermore, human capital development in Nigeria's oil and gas industry is presently uncoordinated as manpower development initiatives are being implemented by industry players in silos. There is therefore an urgent need for a vibrant umpire to articulate a focused and coordinated human capital development initiatives in the industry towards meeting national goals and ideals.

This makes it imperative for a single national platform for human capital development in the oil and gas industry to evolve. These limitations have been acknowledged by the Federal Government which directed the review of the PTDF Act. A committee comprising the Federal Ministry of Petroleum Resources, Federal Ministry of Justice, Office of the Accountant General of the Federation, Department of Petroleum Resources, and NNPC is working on the project.

Furthermore, in recognition of the relevance of PTDF in the oil and gas industry, the Federal Government appointed the Fund into the Joint Implementation Committee on National Gas Flare Commercialization Programme to identify and develop the technical expertise required for the successful implementation of the programme.

CONCLUSION

PTDF has over the years been diligently and transparently implementing its capacity building programmes in the oil and gas industry with measurable achievements recorded. PTDF will continue in this regard, taking cognizance of the fact that no nation is successfully developed without the necessary human capital. With the faithful implementation of our strategic priorities, we are confident that the successes already achieved will be surpassed in the future.

OIL AND GAS INDUSTRY PERSONALITY INTERVIEW

MR JOE NWAKWUE

Chairman, Society of Petroleum Engineers (SPE)

Q: Could you introduce yourself?
A: I am Joe Nwakwue, a petroleum engineer by training and practice. I worked for 20 years in the upstream Nigeria before I came to work for government for three (3) years as SA to the former Minister of State, Petroleum Resources and thereafter I went into a private consulting practice. I'm presently the chairman of SPE in Nigeria.

Q: Give us more details about your involvement in the industry. Your different engagements?
A: I was involved in several Federal government policy initiatives in the recent past. We did the Nigerian Gas Flare Commercialisation Programme (NGFCP), we also pushed through Federal Executive Council the deep-water amendments in June 2018 which Mr President assented to. So, we worked across refining and all the issues around the modular refineries space. We took on the 7 big wins initiative to look at all the quick fixes, things that we could do that will have the most impact on the industry. And I spent a lot of time equally working on the PIB bills, it was four at the time, right now I understand it has been scaled down to two. We looked at the petroleum industry governance (PIGB) bill, but unfortunately it didn't go through, then we looked at the fiscal bill where we developed a fiscal policy document that went all the way to Federal Executive Council during our time. We looked at the Host Community Bill which was actually an interesting one that ultimately didn't work. I hope that the new players will pick them up, upgrade and hopefully get them passed into law, because those were critical elements of what will move the industry forward. So, we used to describe this as the four tyres of a vehicle, so if we got the four bills passed, the vehicle will be able to ride smoothly. So, that's the sense in which we looked at those issues.

Q: You have at different fora expressed concerns about issues affecting the oil and gas industry. Can you share with us some of these concerns?
A: I come from this perception that we haven't done well as a country in managing our oil industry. For example, is Norway by comparism. We are far bigger; we have a much higher resource endowment than Norway, but they have done a whole lot better than us. They have a sovereign wealth fund that is in excess of one trillion dollars and the interest alone can fund our budget. We haven't done well in this regard. Though regrettable, it is an opportunity for us to do better. So, I would like to highlight the things we can do differently. Whether it is the fiscals; trying to make sure we get a better cut of the pie, whether its

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- Mr Joe Nwakwue

environmental, trying to make sure we leave our operating environment as close as we found it, not flaring gas every day, wasting the resources. In fact, one area I think we missed out so terribly is the midstream. Basically, the midstream is where you do processing, refining, gas, and really, we haven't taken up that advantage. So, we have remained an extractive industry, so we extract oil and then ship it away rather than the one that adds value and the opportunity for value addition really is in the midstream. So that's one area we need to work on. We had a draft regulation; domestic gas pricing regulation that I don't know where it is today, but we worked so hard on it. One of our key deliverables was to leave the domestic gas sector much better organised, much better aligned with our priorities which was basically gas based industrialisation. So, I think harnessing the opportunities in the midstream in Nigeria will add a whole lot of value because that's where the employment opportunities are, that's where the value addition is. If we are processing gas for petrochemicals or whatever, that is where you will get value. It is not the raw product that we export today, we export raw gas, NLNG takes raw gas, we export crude. We are not adding value to those commodities and I think for a nation, the size of Nigeria with our resource endowment, there is no reason why we can't lead the world in these areas. So, that's really what influences my thinking.

Q: What are your views about the operations of NNPC as a National Oil Company?

A: The Nigerian state had a policy of state participation, so they created NNPC to deliver on that objective. My personal belief is that we didn't structure it well enough for performance. There is nowhere in that act that NNPC is required to turn a profit except in Section 9, where it says if they have surplus that the president will tell them what to do with it, which I think again is anachronistic with corporate governance. You don't do that, what you should have done is to corporatize NNPC; make it a commercial entity that makes money. So, there is no reason why you should sit on huge asset and not make adequate return. If it is in the private sector, you will fire whoever is running it. So, we can't mix politics with commercial activities, it just doesn't work. And that's part of the reforms that is ongoing with the PIGB which basically would have taken NNPC out of the claws of politics and governance to a place where it would be measured by its output results. I still believe that is the only way we can get value. PETRONAS is a state-owned Malaysian oil company with presence in thirty something countries and we started before them. So, when I say, we've underperformed, you must

see it from that perspective. We are not the only ones, PETROBRAS is here; it is a national oil company like NNPC, much younger as well. So, we can do better. Why are we not out there doing well? Why is NNPC not in any place else, its not in Tanzania, its not in Angola, it's not anywhere else. Those are the questions that we should be asking ourselves.

So, I think harnessing the opportunities in the midstream in Nigeria will add a whole lot of value because that's where the employment opportunities are, that's where the value addition is. If we are processing gas for petrochemicals or whatever, that is where you will get value. It is not the raw product that we export today, we export raw gas, NLNG takes raw gas, we export crude. We are not adding value to those commodities and I think for a nation, the size of Nigeria with our resource endowment, there is no reason why we can't lead the world in these areas. So, that's really what influences my thinking.

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Q: There are some issues affecting the industry that are of concern to many people including operators in the industry. We want your objective assessment of the situation in our refineries; The benefits of the Deep Offshore Amendment Act recently assented to by Mr President, what benefits will accrue to Nigeria as a consequence of that? The Industry is said to be very opaque with little information that could assist investors to make meaningful projections as to how they can invest. We want you to also look at the joint venture operations; The pursuit of hydrocarbon prospectivity in the North against the fact that there is a global shift from crude to cleaner energy; The subsidy issue and the effectiveness of legislations governing the oil and gas industry.

A: I will take the issue of refineries and subsidies; They are both interrelated. My sense is this, we've had four (4) refineries since the 1970's, I do not remember anywhere, anytime that those refineries ran optimally, so my push even while I was in government was that we needed to get the private sector to take over those refineries. The model to use is up to government. When you say private sector, it doesn't mean sale, it could mean concession. There are multiple arrangements. The assets require huge investments that government can ill afford. So what you want to do is to give it to those people who will bring the money to run it and they will get their money back. You can still keep ownership of the asset if it is so important to you. So, my sense is that we needed to get those assets away from government hand into private hands operationally. To do that will mean a lot of things especially for decision makers but I think it is something that ultimately if we don't do, we might end up with scraps of steel. Everyday those refineries are sitting down there, they are deteriorating. What is ultimately going to happen is when you get there, the cost of revamping it, you will be probably be saying why don't we build a brand-new refinery than fix this. So, the earlier we take a stand and get on with it the better for everybody. And eventually, if the market opens up especially with the coming of Dangote refinery, you will become very uncompetitive; nobody will touch it. We have a time window within which we can get that thing offloaded.

But the government is not intending to spend its money but is inviting foreign investors to rehabilitate the refineries?

A: we have been at the business of inviting private sector people to take over the refinery, I remember sitting in those meetings and asking okay, who will bring his money if he thinks that the entity that will run it; you see, people want security for their investments. So, I will not put my money if I know its going to be run by some entity who has not demonstrated that they can make money. So, I will put my money in an institution knowing that the man that operates it can make money, it is when he makes money that I get my money back. So, that is an issue, and I imagine that there is money out there for stuff like this. It is just hard when you are fixated on a model, I think we need to open our minds to multiple models and there are models out there that have been tested and proven they can work.

ON SUBSIDY

Subsidy removal I think we either do it now or do it sometime, its like a man who is going to take a fall, he can prepare for that fall or he can

deceive himself that he is not going to fall, eventually when he falls he might hit his head on the ground. So, my sense is, we have a chance to look at it and plan our fall. It's painful and again I hope there was no politics in all of these, but it affects people, so it becomes political. I think that ultimately, there is nothing wrong with subsidy, people talk about it and I always say this, I'm not a trained economist but I am a streetwise economist and I understand a few things. You subsidise production, we can have the argument from now till tomorrow. Everywhere in the world, the best practise is to put subsidies on the things that have productive outcome not consumption. And somebody reminds me that fuel is productive as it enables people to move about, I say well wait a minute, it has to be targeted. And I like subsidies in fertiliser, you know where its going right, it is targeted. I am not sure we are targeting very well with fuel; somebody needs to sit back and think about it and make a call. I think where I sit, I don't think its much of production, I mean power is more, so if you say there is subsidy in power which we do have; I can argue yes, that is productive. People need power to run their businesses; if you give them power it will be less of an argument. Whether subsidising fuel is a productive incentive or consumption, I think its more of consumption. So, we need to think about it. The other reason is that right now we cannot sustain it; we can't fund it. As a nation, we are practically on our knees financially. So even if it is desirable, we need to be asking ourselves how do I continue to provide this. We are in the place where it's tough to fund it. So, I think we need to rethink it.

Q: How realistic are the legislations governing the oil and gas industry in Nigeria?

A: Well, they have developed overtime, to the extent that they are patch works of legislations. We wrote laws in response to challenges, frictions that we see and developments in the industry. So, it has evolved overtime, there is need for consolidation. They are not bad laws, I will say that; though we can do a few things differently, we can be a bit more clear with the provisions in the Acts and all that, but there are no bad laws. So, what we can talk about is okay can we clean them up; consolidate, make sure where there are overlaps and gaps, that they are properly tidied up. That I think is what the PIB offered.

Q: What about the existence of multiple regulatory bodies?

A: And again, its tied to the

law, we have created this, and it is not just in the oil sector. I was talking to someone few days ago and he told me that whereas Oronsaye report documented about 500 and something agencies, there are now about a thousand agencies. We made a joke that the only tool in the National Assembly's toolbox is to create agencies and MDAs, it is just a joke. But I think that we need to step back, people who make laws for us need to recognise that there is a cost for this, there is a fiscal impact, when you keep creating; if you have headache you create an agency that deals with that, it is not the way to go. We need to look at the entire business of governance, creating agencies is not all there is to governance, governance is taking care of all of us. So, when you take resources away from fixing things that affects me and you're paying salaries of civil servants, and there needs to be a rethink. If you think of some agencies that were created a while ago, the functions they were set up to carry out do not exist anymore, but we still keep the agency, staff it. I think we need to step away from that, a thousand plus MDAs is way too much for a country this size. I think in-fact 200 is a lot in my view so, we need to rationalise this. If you look around you will see a lot of those institutions and you wonder what they do.

Q: What are the benefits of the Deep Offshore Amendment Act?
A: I thank God that eventually some leader stepped up to do this. If you think about it, since 2008 we've been trying to get a simple amendment done; it just tells you how dis-functional and the value that has been lost. The truth is, in the intervening years oil got up to a hundred and something and all that and we couldn't get any benefit from it. I hear people today saying they could get that back; I don't know how they could do it but my thought is that it is better late than never. I'm glad they did that, I do have a few concerns about the provisions and all that. I wish the process was a bit more consultative, there are provisions there for constant review and really people need to understand that the investment community does not like those reviews in law. It doesn't create an environment of fiscal stability. So, I'm a bit concerned about some of the provisions, but I am glad that we finally got to do this.

Q: The aspect of opacity in the oil and gas industry in Nigeria. Can an investor get sufficient information for a good investment decision?
A: I think things have opened up quite a bit. Remember that prior to 2015. NNPC was not producing reports. Since then every month now if you go on their website you will see reports, which essentially is a report on the entire industry. So, as a consultant that's the site I go to every day, so there is a lot more information available for people to work with today. I hope it would be constantly updated for people to access information. Ten years ago, yes, that would be a fair comment, today I think there is a lot more openness, a lot more information is getting out, and I think a lot more Nigerians are interested in what goes on in the industry as well. So, I think the industry is opening up.

Q: Do you think Nigeria is deriving optimally from its natural resource of crude?
A: NO, it is a capital NO. I think we could have done a lot better; I think that we should be at the point today where we export refined products not crude. Nigeria has no business exporting crude oil, so the employment situation won't be this bad today if we were not exporting crude. If all our outputs are refined domestically what will happen is that associated industries would have sprung

all over the place. So, we lost an opportunity to tie the bigger economy with the oil economy, so we have this isolated oil economy that is not very well connected to the entire economic system and that's a problem. So, my answer is, we could have done better.

Q: Finally, we recently celebrated the founding of oil in the North, meaning there will be more production of oil in Nigeria. But is Nigeria isolating itself from the global shift to renewables and cleaner energy resources?

A: It's a cheering news that we found oil, I mean it is not new because there had been a discovery of hydrocarbon up North, but this has proven that indeed there is more there. So, I'm waiting anxiously to hear what the volumes will look like. It helps us diversify sources of resource, imagine if there was a refinery up North that takes that product directly and refines it, that will ease off all of these long-distance crude piping and all that. There are obviously advantages to doing that, I hope we will find oil especially in the landlocked areas, it will reduce the cost of moving products from the port all through those long distances and it will help from an energy security perspective, it's really where you want to be. So, I am very delighted at that news. Should we be looking for oil at this point? Yes. Oil still has value today and I imagine that if I have oil, I want to maximise the use now. We are in a transition, I don't know how long; a lot of researchers think it's a 15 year transition, you know it's academic; how long that transition is before oil becomes useless but its useful today and we have it and we should use it.

Q: You are the president of the SPE in Nigeria. What do you do as an association? Do you regulate the activities of members?

A: Well, we don't regulate. We are just a group of industry professionals, SPE primarily exists for its members and I will say this, we help build capacity within. I have been a member since my undergrad days, I was student chapter president; so, I have grown in it, it is probably a part of me. We help our members develop skills but in Nigeria we have assumed the additional role of being a kind of an advocacy group as well because we recognise that there are policy challenges and so we try to collaborate with both industry, our body of members and the government. We try to bridge that gap, and again the relationship between the industry and government has not been one of trust and it's a problem. The industry looks at government with significant distrust and the government looks at the industry with significant distrust, so, it is generally meant that a body like SPE and NAPE as professionals in the industry should try to bridge the gap because our members work in the industry and we are Nigerians. Naturally, we are being pushed into the middle to make sure that we bridge that gap. So, those are some of the things SPE does here, and we have a pet project for instance; we have been looking at how do we get R and D funding from the industry to the academia. Its an ongoing challenge, the Nigerian universities are training people but there is very little in terms of research products. The industry has problems, so they shift the problems away to their home countries to be solved, meanwhile we have people here; we have brains here. if we create the right environment, we can get out solutions locally. The idea is to create a process where the industry will provide what their problems are to the institutions for research to find solutions and then of course they will backup that with resources for them to do at a high level that's what that will mean. So, it will be a symbiotic relationship between the academia and the industry, so that the industry gets solutions to its problems; hopefully cheaper than it would have come in and their part with some bucks to keep those doing the work happy. So, that's hopefully what we want to achieve.

Q: Thank you very much for the time you spent but before you leave, we want to feel your pulse regarding the way PTDF has been implementing its capacity building interventions?

A: You can't build technical capacity in isolation, it is a wholistic approach, you have to take on other players, without them we will still have problems. So, if we build all the nice technical capacity and the laws are not properly done, we will have problems. I totally support involvement in building legislative capacity; that's one area I think you should look at. The National Assembly make laws, I think there is need for capacity building within that institution as well, especially when it comes to oil related matters, I think PTDF can step in to help them. So, with judges, excellent; I agree with that. It is not just technical, there are other skill sets that are critical to what we hope to achieve with the industry.

The other suggestion I will have is that yes, I like the scholarship idea, but I think with time we need to scale that down, the foreign scholarship particularly. We need to be looking more at how we domesticate some of the skill sets that we already have. Create may be centres of excellence in 6 universities, chose specific departments and fund them. And part of what you need to do, I always say this; universities are international entities, they are not local. So, if you put a PTDF chair at ABU and advertise it and you get a British professor to come, I would say you've arrived. Don't make it to be as if you are not from Zaria you won't be there. Please, those are the problems we have because by then you are in the realm of mediocrity, its like okay you have to come from Zaria to be a PTDF chair in Chemical Engineering at ABU, that's not what we want. So, if it is from New Zealand or wherever, you will get a renowned professor of Chemical Engineering, you can get him, and you have the resources to make him want to stay here. You will find that over time that will attract foreign students to come to Nigeria to school, which hasn't happened except while we were in school we had South Africans, they have all gone now; I don't know of any South African in Nigeria universities. Universities are global Centres of Excellence they are not localised. So, we should step away from that and I think as PTDF you can start that, get that going and people will see the value in doing it differently ■

OIL AND GAS INDUSTRY PERSONALITY INTERVIEW

DR NOSA OMORODION

Director, Schlumberger, Nigeria

Dr Nosa Omorodion, is a Director with Schlumberger Oil Company in Nigeria. He has over three decades of oil and gas experience, working across the spectrum of the entire value chain from upstream exploration and production to service and local content. Before joining Schlumberger in 2001, he worked in different capacities with Mobil Producing, Eso and Exxon Mobil.
Dr Nosa Omorodion who holds various degrees in Geology, Petroleum Engineering and Project management has also held different responsibilities in Schlumberger. These include Operations Manager for North Sea operations in the United Kingdom, the Nederland's and other Scandinavian countries, Portfolio Manager in Houston, United States, and General Manager, Local content for Sub-Saharan Africa. He is presently the Director responsible for Independents and National oil companies, Schlumberger.

Q: You have had an exciting career in the oil and gas industry particularly with the private sector. How do you view the relationship between International Oil Companies and the Federal Government? Do you think government is deriving sufficient benefit from the oil resource through the Joint Venture arrangement?
A: Let me say one thing that we don't pride ourselves with enough. While we started about the same time with the Brazils, the Mexicos, the Norways in the world, everybody is ever so quick to compare the growth of the national oil companies with those countries, but what nobody ever realized is that over the period of time, we have been able to incubate a domestic and independent sort of entrepreneurship in the country. We are probably a country with the biggest growing independent indigenous companies in the industry. We have Nigerian companies that have taken advantage of the last 60years of oil discovery, exploration and production to grow. So, we have companies like Seplat that are quoted in New York and London stock exchanges. There are others that are quoted in the Canadian stock exchange. So, you have Nigerian companies that have taken on the battle and replicating exactly the same kind of service of excellence as the IOCs. If you look at the acreage ownership in the country, about 10 years ago, it was probably five to ten percent local ownership. Today it's almost fifty percent. So Nigerian companies in terms of acreage ownership hold almost the same size as the IOCs. So, in production, from about one percent ten years ago, local companies today operate fifty percent of the entire national production. In terms of how the industry has evolved, the entrepreneurship spirit of the Nigerian oil and gas industry has really made the industry to grow. Obviously, we would have done a lot more with better regulatory intervention and fiscal incentives. But be that as it may, we are pioneering indigenization and independent operatorship not just across sub-Sahara Africa but across the globe. If you talk about the top nations in the world with such entrepreneurship, we will probably be number 3 or 4. This wouldn't have evolved if government had not opened wide the opportunities for independents to take advantage of it.

Q: Is the government really getting the best out of the relationship it has with the Joint Venture partners in terms of fiscal arrangement? Is government getting what it deserves from the natural resource?
A: It's a two-way traffic, you have to appreciate how it works. You are in a joint venture with a private

enterprise, a lot of the time, you are unable to provide your own funds to meet your obligation in terms of contribution. So the guy carries you 100 percent, it is not freebies, first and foremost he is a business man, with a business plan to recover his cost because there is a cost to borrowing. If government is able to make available its portion of the contribution to march the other persons, then you will have a more equitable result but there is always a cost to somebody carrying you and enabling you to do what you are supposed to do.

Q: Another contentious issue is the fact that oil revenue contributes 80% or more to the national economy and yet has very little contribution to the country's GDP. Why is it so?

A: I wish I could twist that question around, and say, why have we not taken advantage of the resources we have? Why are we not managing it the proper way it should be managed? So, the answer is very obvious. If you have a company and you allow that company to run, the company generates funds and you do not allow that company to take charge of part of that fund, to plough it back to improving its operations, you'll always have that problem. And it is in such a scope that a body like PTDF has a very unique role to play. I know you evolved from the old gulf oil arrangement. It's a challenge to PTDF. Beyond the human resource development that you do, I have always felt that from the name itself Petroleum Technology Development Fund, the focus should always be to ensure that at any point in time, the technology, not just the people or human resources, that this industry needs will be of priority in your interventions. There's been so much focus on human resource development. Most times developing human resources does not translate to economic development. If you look at other countries particularly in the Middle East, they have what is called the national production monitoring system. These are efforts that were built through intervention funds that enables the entire nation to be able to have access, monitor and challenge the production of the country. PTDF has done very well in human resource development, but it should also deploy its Intervention on technology developments. When Hamisu was the Executive Secretary Way back in 2003 – 2004, I led the first industry PTDF intervention in the sector based on a concept I showed to them. So we picked some people from DPR and a few staff from PTDF, we deployed what is called petroleum economic evaluation tool through DPR to the industry and the whole idea then was to use some software and hardware to have better holistic view of the entire national reserves by reporting, running economics and being able to ascertain the volume and the extent of the reserves. Such interventions will add extreme value in moving this industry forward.

Q: What is your concept of Local Content in the Oil and Gas Sector vis-a vis human capacity development?

A: First of all, there is a misconception and it's quite unfortunate that local content is indigenization, nationalization or total domestication. Local content is supposed to provide the forum, the empowerment for people to develop their skills and provide the enabling environment for technology to be deployed, manufactured and grown locally so that you can impact the sector. People have taken advantage of the word "local content". What local content has done today largely is that it has increased what you call briefcase entrepreneurship whereby you have people promoted, in the name of local content. Oh, I am a Nigerian by birth, and so have right to be patronized without the requisite expertise. There are no reporting measurements to be able to measure the recipient of such ventures. So, local content is awesome if it is well implemented and we've seen the benefit. A lot of technology and expertise are being domesticated in the country, that's what local content is but you just don't wake up one day and say okay, you are stopping everything and then you want only Emeka, Gbenga, Ahmed, Nosa, Ikaite to now be executors without being ready. When you do that, the nation pays more, it comes at extreme cost because the cost of delivery will be higher. There's no commensurate or measurable index of value addition. It is exciting time. One of the best things that has happened to us is the local content policy ■

There is a misconception and it's quite unfortunate that local content is indigenization, nationalization or total domestication. Local content is supposed to provide the forum, the empowerment for people to develop their skills and provide the enabling environment for technology to be deployed, manufactured and grown locally so that you can impact the sector.

- Dr Nosa Omorodion

MANAGING COSTS IN OIL AND GAS PROJECTS

"The need to achieve effective cost management in the oil sector is an urgency of yesterday"

Chief Timipre Sylva,
Minister of State, Petroleum Resources

The Oil and Gas sector is the main stay of the Nigerian economy and is therefore strategic to the nation. However, in the recent past there are global concerns about the unstable pricing of crude oil and more particularly for Nigeria, the high cost of production of crude oil. In furtherance to its strategic objective of creating linkages with the industry and providing innovative solutions to current and future problems of the industry, the Petroleum Technology Development Fund organized a workshop on "***Effective Cost Management in the Oil and Gas Sector***" in collaboration with the

Quantity Surveyors Registration Board of Nigeria.

The problem of cost in the cycle of exploration, production and refining of Nigeria's crude oil was brought to clearer focus by the Minister of State, Petroleum Resources,

Chief Timipre Sylva, in his speech at the workshop which held at the PTDF office complex.

According to him, crude oil production cost has risen progressively from between four (4) and six (6) US dollars per barrel in the 1990's and early 2000, to its current cost of thirty-five (35) US dollars per barrel. This is very high and unsustainable when compared with other major oil producing nations like Kuwait and United Arab Emirate (UAE) that produce at less than ten (10) U.S dollars per barrel of crude oil.

"In the regime of $50-$60 per barrel of crude oil, a cost of over $30 per barrel is unsustainable and that is why we need to come up with what we need to do to reverse the trend. In other words, the need to achieve effective cost management in the oil sector is an urgency of yesterday"

Some of the key cost drivers identified by the Minister of State, Petroleum Resources as unique to Nigeria include insecurity in the oil producing regions, long contracting cycle, the governance structure, fiscal policies of government, local content issues, regulatory issues, excessive bureaucracy, overlapping National Oil Company (NOC) functions, infrastructure deficits, the national body politics and corruption amongst others.

"As Quantity Surveyors and Cost Engineers I challenge you to henceforth deploy the principle of Total Cost Management and collaboratively come up with solutions on how to minimize the impact of these cost drivers. Effective Cost Management involves-deploying the best practices of project controls which include but not limited to Planning and Scheduling, Cost Estimating and Cost Controls".

The Minister of State, Petroleum Resources, Chief Timipre Sylva also made useful suggestions to the workshop participants on how to optimize cost in oil and gas production process in Nigeria. These are the deployment of flawless and disciplined cost control practices, targeting price budgeting backed by historical matrix and benchmarking, good risk analysis, tight change management, trending and forecasting.

"It is my hope that we shall use the outcome of this Conference to give our oil sector the propulsion it requires to bring down the cost of crude oil production to a single digit as obtained in other economies."

He was represented at the workshop by **Engr. Moses Olamide, Senior Technical Assistant to the Minister of State, Petroleum Resources**.

The Minister of Works and Housing, Mr. Babatunde Raji Fashola SAN acknowledged the relevance of the oil and gas sector and challenged the workshop to proffer credible and implementable solutions to the high cost of production of infrastructure projects.

According to him, the oil and gas sector contributes about 10% to Nigeria's National GDP and activities in the sector are therefore considered crucial and relevant to the growth and prosperity of Nigeria. The Minister therefore expects that the involvement of Quantity Surveyors in oil and gas project costing will have an appreciable impact in cost control and management of such projects.

"However, to achieve optimum result in our national life, synergy among relevant professionals must be embraced, giving room for division of labour and specialization rather than closing our gate to others that can add value to what we are doing. I must commend the Executive Secretary of Petroleum Technology Development Fund for his foresight and desire for inclusiveness for the overall benefit of Nigerians".

The **Deputy Director, Quantity Surveying Department of the Ministry, Samuel Temitope Kpemi represented the Minister of Works and Housing**.

For the Nigerian National Petroleum Corporation NNPC, effective cost management has for long been an in-house management process culminating in the establishment of a Cost Engineering Department in 2011, says the Group Managing Director Mele Kyari in his goodwill message.

He said towards a more aggressive cost reduction in the oil and gas sector projects, NNPC is developing a historical project database that will be deployed for target pricing, benchmarking and validating cost estimates.

He was represented at the workshop by **Group General Manager, Supply Chain Management Division, Abdulhamid Aliyu**.

"We have in NNPC trained our staff and continue to develop their

*competencies in cost engineering and cost control in order to optimize the cost of our OpEx and CapEx. Almost all our staff in the Cost Engineering Department are members of both local and international cost engineering associations and have been exposed to many cost seminars within and outside the country. Indeed, many of them have acquired cost engineering certifications. The theme, "***Effective Cost Management in the Oil Sector***" is very apt when putting into perspective the need to maximize revenue from our oil sector".*

The **President, Nigerian Institute of Quantity Surveyors, Obafemi Onashile** is of the view that the closed nature of oil and gas operations contribute to lack of transparency in the costing of oil and gas projects. He said that the involvement of Quantity Surveyors will help in the contractual management of infrastructural development projects in the oil and gas industry.

"The oil and gas industry has for years been a closed-door environment with controlled market situation, very similar to what we are taught in school as oligopolistic market and by this you know am talking about very limited competition in operating in the industry. The coming of the quantity surveyor into oil and gas infrastructure will create fairer competition in the industry and more economic production of infrastructure as we have already successfully done in the building industry. This involvement will also achieve greater price stability and more effective contractual control of infrastructure developments in the oil and gas industry".

The **President, Quantity Surveyors Registration Board of Nigeria, Murtala Aliyu**, said that as carbon-based energy resource is progressively being challenged by renewable energy, the survival of the oil and gas industry depends on prudent management of cost in the value chain.

"As soon as the cost of renewable energy comes down, it will be more attractive, and it will quickly usher out the carbon-based energy. So, how do we avoid this? It's by managing the cost of production, the cost of processing, the cost of marketing so that the cost of consumption will become attractive, so it can compete for now with the renewable energy base".

Executive Secretary, Petroleum Technology Development Fund, PTDF, Dr. Bello Aliyu Gusau acknowledged that cost management has become a central issue in oil and gas operations. Regarding PTDF, he said that its industry skills and competency gap analysis indicate that issues of cost engineering, cost control, cost estimating, cost management are areas of great challenge in the oil and gas sector necessitating the Fund's collaboration with QSRBN in addressing the issue. The Federal Government, he said is deeply concerned about the escalating cost of oil and gas production and other infrastructure projects and has set a roadmap to drastically bring down the cost of producing a barrel of oil.

"PTDF is willing to partner and collaborate with credible institutions and bodies in finding solutions to critical issues affecting the full realization of government's vision for the oil and gas industry and will be prepared to work with professional associations and the academia towards developing homegrown solutions to support the oil industry efforts to stay competitive through effective cost management"

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- Dr Bello Aliyu Gusau

ES PTDF, Dr. Bello Aliyu Gusau and President, QSRBN Mr. Murtala Aliyu

Keynote papers were delivered at the technical session of the workshop, on cost engineering, cost control and cost optimization in Nigerian oil and gas sector, Cost Management Issues in the Oil and Gas Industry;– the quantity surveying perspective, Effective Cost Management in the oil and gas sector; and contextualizing the Quantity Surveying Profession within the oil and gas industry. The keynote speakers gave insights on the focus of their presentations.

Engr. Johnson Awoniyi, Group General Manager, Engineering and Technical Division, NNPC

My presentation is just about cost engineering and cost control in the oil and gas sector. Cost is key, if you do not control your cost, your budget gets ballooned, project becomes bankrupt. The more project you do on time, on budget, the more progress you will have, the more growth you are going to enjoy. But if you do project that keeps on failing and failing, you are going to have problems because poverty will be very close to you. Cost control is key, also in the era of 40, 45 dollars per barrel, we need to minimize our cost so that we can get more revenue for government projects, that is very key.

Q: So, what are your recommendations

A: The Executive Secretary PTDF, confirmed that cost engineering is one of the areas that has the widest skills gap in Nigeria. Today Nigeria has only about 40 certified cost engineers. No wonder our projects are never on schedule, they are never on budget. Because you need to have these experts, the techniques on how to drive your project, cost control it, manage it, trend, forecast and close out properly, without those things, projects will keep on failing. Good cost control will make your projects succeed, on schedule and on budget.

Q: What are your views about this initiative by PTDF?

A: PTDF has sponsored about 90 staff of the Ministry of Petroleum Resources in cost control both locally and abroad and they now form part of the committee that is driving the cost restriction in the Ministry. Our cost is becoming on schedule and our projects are becoming more successful. And the more projects we do successfully in this country, the better growth we will have. More projects are done on budget and this is good for the economy.

Dr Uche Ajator, Department of Quantity Surveying, Nnamdi Azikwe University, AWKA.

Q: Your presentation to the workshop highlighted some cost management issues, can you give us an insight on some of them?

A: In the paper, I tried to identify the critical issues in cost management of oil and gas projects in Nigeria, and I identified the techno-professional issues in addition to other administrative issues that need to be put in place to appropriately cost manage oil and gas projects. We discovered that quantity surveyors play key roles in the building and environment industry including infrastructure development projects. In these services, there are extensive planning, estimating, budgeting and controlling of projects that will enable us to develop a project cost baseline that will facilitate monitoring and evaluation or bench marking the actual cost of the project with the standard cost that had already been projected up front for the project. In this way, it provides effective management that enables us to avoid cost overrun. if we are able to identify cost that should be appropriate for solving a problem, then we will now monitor the implementation of the project to ensure that the cost is not overrun, that the schedules are not overrun because once you overrun the schedule, you will certainly overrun the cost. In planning, we project into the future, we strategize, identify those critical issues that will create problems and develop strategies for managing them. And then in the developing and implementation

stage, we monitor the actual development and benchmark it with the standards we have set to ensure that the standards or the schedules are not overrun. So, that's basically what we do. But we have discovered that in the oil and gas sector, there is limited capacity probably because the quantity surveyors have not been extensively or reasonably involved.

A situation where cost of production is overrunning the income generated by the project in terms of price per barrel of oil is simply not the best way of managing our God given natural resource ■

In planning, we project into the future, we strategize, identify those critical issues that will create problems and develop strategies for managing them. And then in the developing and implementation stage, we monitor the actual development and benchmark it with the standards we have set to ensure that the standards or the schedules are not overrun.

- Dr Uche Ajator

JUDICIAL DECISIONS ON OIL AND GAS CASES

…PTDF builds capacity of Judges and Justices

In 2017, the Petroleum Technology Development Fund (PTDF) in a landmark and proactive move brought together judicial officers of various court jurisdictions to a unique capacity building workshop on enhancing the quality of judicial services in the Petroleum sector. The positive outcome of the engagement process with jurists responsible for interpreting the law through judicial pronouncements on oil and gas related matters, created the impetus for PTDF to again host judicial officers to a 2 day capacity building workshop focusing on Nigeria's Oil and Gas Laws and Regulations.

Mr Balarabe Ahmed, General Manager, Legal and Secretariat Services Department of PTDF justified this second intervention on the basis that the oil and gas industry is dynamic and constantly evolving and therefore requires constant training and education of those involved in its operations and management.

"*We want to also raise*

their consciousness as to the challenges we're encountering in operating the laws and regulations as they are today, The specific areas we are looking at is the Petroleum Act of 1969, which is really the main law. In our mind, it gives too much power to the Minister which we think is not in accord with international best practices, so there's need to review that law. We are also going to look at the issue of Joint Venture, the issue of Production Sharing Contracts (PSC). Nigeria is not up to date with the cash calls obligations. Based on our constitution all revenues of government goes to the Federation Account and there are competing needs of infrastructure, education, health, etc. and it is out of that money that we need to pay our counterpart funding for the operations of the oil and gas under the joint venture and sometimes that is a big challenge; we are not up to date, and you know these oil companies they are not into charity, they are not red cross; they are here for business. They are the operators; they have the expertise and they bring their technology. So, government becomes like an interloper notwithstanding that, legally the Federal Government owns the resource. We will also look at the aspect of the production sharing contract with regard to offshore operations where to a certain level government doesn't get anything; we need to review the PSC's to enable government to have bigger stake from what is derived in offshore operations"

The workshop had as its theme "**Review of legal instruments governing the operations of the Nigerian Oil and Gas Industry**". Apart from section 44(3) of the 1999 constitution of the Federal Republic of Nigeria, which vests the entire property and control of all minerals; mineral oil and natural gas in Nigeria including its territorial waters and exclusive economic zones on the Federal Government, there are other thirty Four (34) Acts, twenty six (26) Regulations, twenty (20) orders governing oil and gas operations and management in Nigeria. These are on Fiscal, Governance, Regulation and Control, Environment, Nigerian Content and Capacity Development.

The capacity building workshop was attended by Justices of the Court of Appeal, State Chief Judges and Judges of the various jurisdictions. Some of the participants spoke on the relevance of the workshop to the discharge of their judical functions.

Justice Obinna Nnadi, the Chief Judge of Imo State said that in view of the vastness, technicality and huge investment capital involved in oil and gas the resolution of disputes by judicial officers require a clear knowledge of the intricate workings of the industry.

"So, in a conference of this nature, the judges are exposed to better ways of ensuring expeditious disposal of oil industry related cases".

Justice Cecilia Mojisola Olateregu of the Federal High Court Lagos, said the Federal High Court being the court of original jurisdiction for oil and gas matters, judges of the court will find the conference extremely useful and beneficial to the discharge of their judicial functions, particularly in deciding issues connected with the upstream, mid and downstream segments of the industry.

"It's good that we come here and listen to experts speak

to us on issues relevant to the oil and gas industry. We find the workshop very useful. It is also an opportunity for us to refresh our memories in respect of areas regarded as technical. So, it's always a good thing to be here"

Also commenting on the essence of the workshop, **Justice Ibrahim Buba of the Federal High Court, Enugu** said that as judicial officers, intimate knowledge about an industry that contributes substantially to the Nigerian economy is crucial to the dispensation of justice in the sector.

"It is very important to keep judges and judicial officers abreast of the technical terms in the industry such that when such matters come before us for adjudication, we will be able to follow the arguments and make determinations".

Executive Secretary, Petroleum Technology Development Fund, Dr Bello Aliyu Gusau gave reasons why the Fund continues to extend its capacity building interventions to judicial officers.

"We in PTDF appreciate the fact that operations in the oil and gas industry is beyond technology, beyond technical operations. The industry is constituted by a complex relationship of laws, regulations and guidelines affecting different legal entities and personalities. It is therefore necessary for those that are charged with the responsibility of administering justice in this country to constantly engage with this important sector of our national life. We are also very familiar with the fact that the technical operations and legal relationships are constantly changing and evolving; The laws, regulations and guidelines must correspondingly change along with these changes. The system of administration of justice therefore must also evolve with these changes. It is for this reason that we deliberately focused our attention on the review of legal instruments that govern the operations of the Nigerian oil and gas industry".

The workshop, he said, provides an opportunity for the participants to discuss broadly on the major evolving aspects of the Nigerian petroleum industry. These include the laws governing mid and downstream operations, overview of the domestic gas utilisation in Nigeria, oil and gas content act and arbitration as an alternative dispute resolution mechanism in the oil and gas industry.

Administrator, National Judicial Institute, Co-organiser of the workshop, Justice Rosaline Bozimo, acknowledged that the first capacity building workshop organised by PTDF in 2017 was far reaching in broadening the perspectives of Justices and Judges on emerging trends in the oil and gas sector. She said that the current workshop will further expose Judicial officers to fundamental developments in the sector and build their capacity in the interpretation of relevant laws and policies governing the oil and gas sector. The Judiciary, she said, plays strategic roles in the efficient and effective development of oil and gas laws in Nigeria.

"The judiciary plays a significant role in ensuring better public governance. This is attributed to the fact that there may be a surplus of guidelines, rules and procedures as it relates to the sector. But when disputes arise, they have to be settled in our courts of law. Consequently, this workshop will highlight issues that are critical and germane to the substance of the legal and regulatory framework of the oil and gas sector".

The National Judicial Institute is the capacity building organ of the Judiciary for conducting and facilitating continuing education for Judicial officers. PTDF as the capacity building agency for the oil and gas industry deemed it expedient to collaborate with the National Judicial Institute to organise capacity building programmes for Justices and Judges to aid their adjudicatory functions in oil and gas cases. The Ministry of Petroleum Resources is the supervising Ministry of the Petroleum Technology Development Fund.

Its representative at the workshop, former Director of Legal Services, Mohammed Saidu Diri, asserted that the hosting of the workshop by one of its agencies reflects the Federal Government commitment to further assist the Judicial arm of government in enhancing the competences of justices and judges for effective and efficient administration of Justice.

He stated that with the changing dynamics of the Nigerian oil and gas industry where exploration, production and contracting processes are rapidly changing and increasingly complex, there is a consistent need for their lordships to be current on the latest happenings in the industry.

"For many years, the Nigerian oil and gas industry has been operating in an agglomeration of legislations and guidelines which sometimes are not in harmony with current trends in the industry globally. The Nigerian oil industry has developed focusing on increasing indigenous participation in the industry. This is reflected through the Nigerian government initiative of increasing the local content and ensuring that indigenous companies have a greater part in developing oil and gas assets".

The Nigerian government, he said, regulates exploration and production

of natural gas and crude oil based on the authority provided by the Nigerian constitution, the petroleum Act and other regulations which vest the ownership and control of Petroleum on the Nigerian Government on behalf of the people. The government, he said, is therefore interested in having a well informed and updated members of the bench to ensure better and speedy dispensation of justice in oil and gas related matters.

"It is my expectation that the workshop will extensively look into major challenges in the administration of justice as it relates to the Nigerian oil and gas industry. It is also my expectation that the workshop will look into Alternative Dispute Resolution mechanism for better administration of oil and gas agreements".

The keynote address by the Chief Justice of Nigeria, Justice Ibrahim Tanko Muhammad, was delivered on his behalf by

Justice Monica Dongban-Mensem, President, Court of Appeal. In it, the Chief Justice welcomed the strategic collaboration between PTDF and NJI to build the capacity of justices and judges on contemporary laws and procedures regulating the oil and gas sector.

"As we are all aware, the impact of the sector to the development of our economy is certainly overwhelming and the need to sustain this development by a sound and effective judiciary is essential. Considering the gamut of legal issues that may arise from the activities of different components of the sector, there is the need for our justices and judges to be sufficiently skilled and proficient at all levels of the sector. As you are all aware, the principal role of the judiciary is adjudication. This therefore implies that a dispute or controversy must exist before the court can be called upon to adjudicate. Consequently, in order to discharge this responsibility efficiently and effectively, judicial officers must have a proper grasp of the law and this forum provides us with the viable opportunity to achieve same".

The Chief Justice of Nigeria therefore urged the Judicial officers to adjudicate with circumspection, disputes that arise in the different segments of the oil and gas sector.

"I must emphasize at this forum the fact that the organizers of this workshop recognize the constitutional role of the judiciary in ensuring stability in the oil and gas sector. With the benefit of hindsight and bearing in mind that the sector is a major source of revenue for the nation's economy, disputes arising from this sector must be dispensed within a reasonable time. In line with the foregoing and as part of the active case management process, you must consistently encourage parties to explore more consensual ways of alternative dispute resolution in certain disputes. I'm certain that the adoption of ADR processes will assure investors and other major players in the sector that their assets and investments are safe".

The Judiciary, he said, remains the upholder of the rule of law and the enforcer of rights and as such will continue to play its role in ensuring stability in the Nigerian oil and gas sector through effective interpretation of laws and applicable policies.

"it is my firm belief that this forum will keep our justices

and judges informed on the rudiments of the sector so that they can continue to apply the fundamental principles correctly and effectively when performing their adjudicatory duties. Our deliberations and interventions at this forum will in no small measure have a direct impact on gainful reforms of the oil and gas sector".

The five papers presented at the workshop addressed the theme "**Review of Legal Instruments Governing the Operations of the Nigerian oil and gas industry**".

The first paper entitled "**Overview of the Nigerian oil and gas laws** was presented by

Mr Joe Nwakwue, an expert on policy, gas and power. It laid the foundation for the various perspectives of the workshop theme. He identified the Petroleum Act of 1969 as the principal law governing the operations of the Nigerian oil and gas industry. Others he said are the fiscal legislations, governance, regulation and control, legislations governing issues of environment, local content and capacity development as well as the land use act, territorial waters act, oil pipelines act, hydrocarbon oil refinery act and oil terminal dues act. All these legislations were enacted between 1956 and 2010. In general, he said the legal framework for the Nigerian oil and gas industry has evolved in time and complexity, leading to significant gaps, overlaps, conflicts and confusion. He therefore made a case for the simplification, streamlining and alignment of these legislations to achieve increased production, growth in reserves, reduction in development cycle time, and cost competitiveness. Unfortunately, he said, "*the expected reforms have been stalled for 19 years due to industry resistance and lack of will by the Federal Government and Political Interference. it is important as a country that we get the legal framework sorted out to give confidence to the investment community. The judges play a central role in that. You need to have the laws properly interpreted. Judgment should be delivered in good time. Judges need to understand the industry a lot better and that will help improve the quality of judgments that we get from the courts*".

Mr Anthony Madichie, a lawyer and former Group Legal Adviser/ Company Secretary NNPC delivered the second paper on Petroleum Licenses and Leases. The two instruments that formed the subject matter of his presentation are the Oil Prospecting Licence (OPL) and the Oil Mining Lease (OML). While the OPL is a license granted by the Minister of Petroleum Resources to explore and prospect for petroleum within the contract area, the OML is a lease also granted by the Minister of Petroleum Resources to conduct exploration and production operations.
"*The petroleum Act that is in place is a good document. We are saying that it is the will to implement the Act that has been the problem. In other words, we are saying that even if you have the Petroleum Industry Governance Bill, if the will to implement is not there, it will still be the same thing*".

The Nigerian Oil and Gas Content Development Act 2010 which gave birth to the Nigerian Content Development and Monitoring Board (NCDMB) also came under review in a presentation by

Mr Mohammed Babangida Umar, General Counsel, Federal Capital Territory Development Authority. He began his presentation by drawing attention to the conflicts arising from the application of the Local Content Law.
"*There's also additional provision on the expatriate quota where the board has to give permission before expatriate quota is given. We are saying that this conflicts with the provisions of the immigration act. We also talk about transfer of technology which conflicts with the provisions of NOTAP. Then also is the provision that requires all operators and contractors to use only the services of local financial institutions or organizations. That conflicts with the CBN act and other provisions. Mine is that the Nigerian content law is not just a law but a philosophy, it requires patriotism, love of country. It requires political will on the part of those at the helm of affairs*".
Giving his perspective on the practical application of the Nigerian Content law,

Justice Ibrahim Buba of the Federal High Court Enugu said that competence should not be sacrificed on the altar of local content. According to him, the philosophy behind the local content regime is to give priority to local companies that have the relevant capacity to execute oil and gas related projects and services.
"*Nigerian Companies should be encouraged but there should also be competency. For instance, if you allow a Nigerian construction company without the skills, they end up doing shabby work that can lead to buildings collapsing, there's no point giving them the contract. Give people jobs that are within their capacity to execute, you cannot in the name and philosophy of local content give people jobs that they have no capacity or competence to handle. Local content is good. For instance, is the cabotage law where Nigerians are encouraged to go into shipping. But if they are not competent, we won't allow*

people to go into the high sea and sink"

A paper on Alternative Dispute Resolution in the oil and gas industry was also presented at the workshop by

Prof Mamman Lawan of the faculty of Law, Bayero University Kano. While focusing on arbitration, he said ADR emerged as a result of the inadequacies of litigation which manifest in delays in court proceedings and unnecessary legal technicalities. He enumerated some of the advantages of arbitration in the resolution of oil and gas disputes.

"Because you are running away from the delays, the technicalities and lack of independence in the court system and because in the court you cannot choose your judge, you cannot chose the time within which you do the proceedings, that's why arbitration is often preferred in settling disputes because under arbitration all these are permissible".

However, arbitration, he said, is beginning to take the form of litigation. Some of the weaknesses in arbitration identified by Professor Mamman Lawan include the abuse of provisions that grant parties the opportunity of challenging arbitral awards in regular courts, enforcement of arbitral awards, legalisation of the arbitral process and abuse of the appellate system.

"Let's amend the arbitration laws in Nigeria so that we remove omnibus provisions in the arbitration and conciliation Acts. The vague provisions, the appeal system generally, should be reviewed to avoid abuse. And lets also look at the problem of the legalisation of the arbitral process by involving judges, retired judges and lawyers in the process".

The Prospects of Mid and Downstream Operations: An Overview of domestic Gas Utilisation was the last paper presented at the workshop.

In the presentation, **Mr Joe Nwakwue** gave the sobering reality of Nigeria's oil economy to the effect that Nigeria is not getting the full benefit of her natural resources.

"The country is not getting the benefit that it should ordinarily get from its crude oil production. Nigeria has exported volumes of crude and i do not see the impact on other sectors. If you think of how many people the industry employs, it's very small. Directly less than 60, 000 people get work in the industry in Nigeria. That is not even up to the number of teachers in a state. So, it means that we are not getting the full benefit of this sector".

At the end of the highly rewarding workshop, the participants expressed gratitude to PTDF for the initiative and made useful suggestions on how best to further harness the full benefit of the capacity building workshop for judicial officers.

Justice Cecilia Mojisola Olateregu, Federal High Court, Lagos: *"Even though judges chair some of these workshops, I think it will be nice to have judges deliver papers from the perspective of the bench, so that we will have a more balanced idea regarding what is expected of judges because as a judge you are familiar with how you work, you are familiar with the matters coming before the court and if you present papers, it's equally good. I would like to see judges presenting papers at most of these workshops"*

Justice Mudashiru Oniyangi, Court of Appeal: *"I hope they can involve the National Industrial Court Judges to be part of this because they deal with the aspect of trade dispute in most of the cases they handle"*.

Justice Obinna Nnadi, Chief Judge of Imo State: *"I will advise that more judicial officers and other key sectors or stakeholders in the oil industry be involved so they can cross-fertilize ideas with a view to moving the business of running the oil industry forward"* ■

ENHANCING THE QUALITY OF LEGAL SERVICE IN NIGERIA'S OIL AND GAS INDUSTRY

A PTDF Capacity Building Intervention for Lawyers

The Petroleum Technology Development Fund brought together legal officers/State Counsel from the Federal Ministry of Justice, agencies under the Federal Ministry of Petroleum Resources and other stakeholders in the oil and gas sector for a two-day workshop on "*Enhancing the Quality of Legal Service in the Nigerian Oil and Gas industry*". This is in continuation of its effort at finding solutions to the shortcomings in the jurisprudence of oil and gas matters.

A major weakness in the management of oil and gas matters is the drafting of legislation's governing the operations of the sector. This has become so problematic and of concern to government that the Minister of State, Petroleum Resources, Chief Timipre Sylva called on the legal Officers participating in the workshop to exercise caution in drafting legal instruments by avoiding clauses that create acrimony in the administration of oil and gas cases. He was represented at the occasion by

Engr. Moses Olamide, the Senior Technical Assistant and Chief of Staff. He advised all those involved in the drafting of our laws to be conscious of the implication of ambiguity in their provisions and clauses.

"*It is better we write our laws very clearly. It is better we do all the negotiations possible. It is better we do all the reconciliation and conciliation that is possible before we sign off on our laws. It is going to reduce a lot of acrimonies and fighting in the industry*".

He cited an instance where the omission of an article

led to incalculable harm in the interpretation of a legislation.
"About 5 years ago, only 'if' in the law cost us about six months of haggling and delay… if the production gets to this level renegotiate your compensation, i.e. you renegotiate your interest or loan, but what if that production doesn't get to that level… we did not put it in the law and so it caused a lot of arguments… and you know that production is an act of God. You may say that your reservoir is going to be water driven and you are going to produce so, so amount; what if the water doesn't come. What if energy doesn't come, did you premeditate that in your law? So, it is better we write our laws clearly than going into the law court and be arguing with ourselves".
The expectation of the Minister of State Petroleum Resources is that the workshop will look into major challenges in the administration of justice as it relates to the Nigerian oil and gas industry, and will provide the legal practitioners with new knowledge and skills required to enhance their competences for speedy administration of justice.
"The Nigeria Oil and Gas Industry is a dynamic industry. The Exploration, Production and Contracting Processes are complex and rapidly changing. The need for State Counsel to be up to date with the current happenings of the industry cannot be over emphasised. For many years, the Nigerian Oil and Gas industry has been operating in an agglomeration of legislations and guidelines which sometimes are not in harmony with the current trends in the industry practice globally".
The Attorney – General of the Federation and Minister of Justice, Abubakar Malami (SAN), said the workshop is an effective tool to train and position lawyers in the Ministry to efficiently handle cases in the oil and gas sector. These include prosecution of offences arising from breaches in contractual obligations, arbitration and other means of dispute resolution as well as understanding and applying effectively the various legislations in the industry. He was represented by Alhaji Tahir Hamza, Director, Legal Drafting, Ministry of Justice. He urged the Petroleum Technology Development Fund to sustain the training workshop by making it a yearly event and to extend participation to para-legal officers and private legal practitioners.
"To effectively achieve our function as a Ministry, the need to have trained and informed members of staff cannot be over emphasized. The most efficient ways to handle cases including those related to the Oil and Gas Sector is to train the lawyers and position them to respond to the technological, socio-economic, cultural and political challenges which impact on the growth and development of Nigeria in the 21st Century".

In his welcome address, the **Executive Secretary, Petroleum Technology Development Fund, Dr Bello Aliyu Gusau**, said the Nigerian Oil and Gas Sector has overtime witnessed significant transformations with increasing impact on the National Economy.
The industry, he said is a dynamic one that is governed by a network of legal relationships, and therefore imperative for participants to be kept abreast of important legislations guiding the operations of the oil and gas industry.
"We have just passed a landmark legislation that will have tremendous impact not only on the industry but on the national economy as a whole. I am referring to the Deep Offshore Amendment Act that has been assented to by the President. We have been pursuing this matter in the last 20 years. So, it is kudos to the National Assembly and to the present government that we are able to achieve it within a record time. There are many other key legislations that are also on their way. So, it is important that we understand how these laws are evolving. So that's why PTDF found it expedient to collaborate with the office of the Attorney-General of the Federation to conduct this exercise".
As the petroleum industry is knowledge driven, it is the contention of PTDF in organising the workshop that members of the legal profession need to know more about the dynamics of the industry.

According to the **Manager, Legal and Secretariat Services Department, PTDF, Mr Tanimu Ahmed**, the workshop is the Fund's contribution at strengthening the prosecution of oil and gas offences, the drafting of oil and gas contracts and the application of alternative dispute resolution mechanism to the resolution of oil and gas matters.
"There is a gap in the prosecution of offences in the oil and gas industry. There is a gap in the drafting of oil and gas contracts, there is also a gap in the application of alternative dispute resolution. So, we found a need for PTDF to come together with the Federal Ministry of Justice to develop the capacities and competencies of lawyers in the Ministry of Justice and parastatals under the Ministry of Petroleum Resources".

Emphasizing on the importance of the workshop, the **Assistant Director, Public Prosecutions, Federal Ministry of Justice**,

Moshood Adeyemi said that as lawyers engaged in the prosecution of oil and gas cases, their knowledge on the application of the laws guiding the operations of the sector will be broadened.
"We are lawyers that engage in the prosecution of acts of criminality in the oil and gas industry, and in the course of our assignment, we do

encounter one problem or the other and here is an avenue for each and every one of us to open up to whatever challenges we encounter so as to be well informed on how best to apply the law to achieve the main objective of managing oil and gas matters".

And having brought together lawyers from the different agencies of government, there is a consensus that the initiative by PTDF will to a large extent contribute in improving the productivity of those involved in giving legal advice and vetting of government contracts.

Augustine Uche Kanu, Assistant Director, Office of the Solicitor - General of the Federation, Federal Ministry of Justice is of the view that the workshop, will expose the participants to the intendments of the legislature with respect to legislations affecting the matter they are called upon to deal with.
"Secondly, as my department vets contracts for the Federal Government, you will actually understand the reason(s) behind certain provisions in the contract document and that places you in a very good stead to understand what the federal government intends to gain, and what the agency that is entering into the contract intends to achieve".

Mrs Aramide Adepoju, Assistant Chief State Counsel, Federal Ministry of Justice argues that the case between Nigeria and the Process and Industrial Development Company would not have assumed its current dimension if those who drafted the agreement were exposed to the training offered by PTDF.
"We would have been able to conceptualise the appropriate clauses, know the breaches to the contract and they would have been nipped it in the bud. This would have helped the Federal Government to protect itself from this kind of issue that we are having now. This training has made many things explicit".

Lami Adams, a lawyer said the workshop offers a holistic perspective on oil and gas contracts and how lawyers, as legal draftsmen, can make an impact in defending government interest.
"This is a perfect capacity building opportunity for those that will eventually get posted to either the Ministry of Petroleum Resources or to other oil and gas related agencies. By virtue of this training, we have the understanding of certain terms that ordinarily in the course of our everyday business we don't get exposed to. But from here, you have a background to make meaningful contributions as counsel either in an advisory capacity or negotiating capacity or in reviewing contracts. We know what to look out for, we know the critical areas that we should focus our attention on to ensure that government interest is always protected".

Other participants expect the workshop to open up on areas of the oil and gas industry that have generally been regarded as opaque. These are tax incentives to multinational investors, joint venture arrangements and the relationship of proven reserves to a country's development.

According to **Gbum Terngu Joseph, a legal practitioner**, *"There is limited information available to investors and to people in the industry regarding tax reliefs enjoyed by investors. It draws us to the issue of why investors are shying away from Nigeria. The clear answer is lack of transparency and lack of sufficient information for them to come into the system".*

Mrs Bolanle Oniyangi, Head, Civil Litigation, Federal Inland Revenue Service, expressed the view that Nigeria loses a lot of revenue from taxes as a result of the generous incentives given to operators in Nigeria's Oil and Gas Industry.
"we are losing a lot of taxes to these incentives. When they come, we give them incentive, not only on this one; they have all the costs, they will have to recover it through costing. Then by the time they finish, they will still bring some other expenses that NNPC didn't allow and say that they want to recoup it through cost oil. Why? Because we don't have the technical knowhow, if we have this technical knowhow, we will not be relying on them".

Mrs Eyintola David Kafanchan of the Federal Ministry of Petroleum Resources expects the workshop to also address the recurring issues of relationship between host communities and oil companies operating in their areas.
"Host community issue has been something we've been grappling with in this country

right from the onset of oil drilling and I think it is the right time to address these issues so that we will not have this volatile environment in the Niger Delta areas. If it is addressed, we are going to have a peaceful environment, and there will be no need to keep spending so much on security in that area. It will also lead to an increase in the production of oil by the oil companies which translates to increased revenue and better GDP for the country".

Beyond the opening ceremony featuring policy pronouncements and exhortations by the Minister of State Petroleum Resources, Chief Timipre Sylva, and the Attorney-General of the Federation and Minister of Justice, Abubakar Malami, both of whom were represented at the workshop, there were also incisive presentations by resource persons illuminating the theme of the workshop. These include an overview of Nigerian oil and gas laws by Joe Nwakwue, Chairman Society of Petroleum Engineers, Drafting Strategies for oil and gas contracts by Olukayode Fabunmi; Alternative Dispute Resolution in the oil and gas industry by Professor Mamman Lawan(SAN) and the prosecution of oil and gas offenses by Professor Aminu Kabir.

The common offences within the oil and gas industry according to **Professor Aminu Kabir of Bayero University, Kano**, include oil theft, oil bunkering, sabotage and oil spillages, pipeline vandalism, attacks on oil installations, and operation of illegal refineries. Though these acts constituting offences in the industry have increased in intensity and dimension, the laws governing the prosecution and sentencing of offenders enacted between 35 and 50 years ago have remained unchanged. For instance, the Petroleum Act of 1969 prescribes a fee of N2000 (two thousand) Naira or six-months imprisonment or both for any person who interferes with or obstructs the holder of a license or lease. The Act further prescribes a fine of Two Thousand Naira (N2000) for a person who constructs or operates a refinery in Nigeria without a license; Explores for petroleum without an exploration license; Prospects for petroleum without an oil prospecting license.

Similarly, the Oil Pipeline Act which makes provisions for licenses to be granted for the establishment of pipelines, penalizes any person who violates the provisions by constructing, maintaining or operating an oil pipeline without license, with a term of imprisonment not exceeding two years or a fine not exceeding One Thousand Naira (N1000) or both imprisonment and fine.

The Miscellaneous offences Act 1984 which also deals with offences relating to pipelines such as tampering with oil pipelines has a more stringent penalty of life imprisonment for any person who wilfully or maliciously breaks, damages, disconnects or otherwise tampers with any pipe or pipelines for the transportation of crude oil or refined oil or gas, or obstructs, damages, destroys or otherwise tampers or interferes with the free flow of any crude oil or refined petroleum products through any pipeline.

Other offences under the Miscellaneous Offences Act of 1984 include importation, exportation, selling, offering for sale, distribution of petroleum products without appropriate license, and this also attracts a life sentence in addition to the forfeiture of the means of conveyance of the petroleum products such as vehicles, vessels, and aircraft.

The Attorney-General of the Federation, the Nigerian Security and Civil Defense Corps, the Economic and Financial Crimes Commission are some of the institutions and agencies empowered by the constitution and their enabling laws to investigate and prosecute petroleum related offences at the Federal High Court, which has exclusive jurisdiction over petroleum related offences.

Professor Aminu Kabir who presented the paper on prosecuting oil and gas offences also identified some of the challenges to the prosecution of petroleum related cases to include collusion among various players in the industry, claims of marginalization, spread of militancy, sabotage and disruptions in oil operations.

"Most of the litigations border on civil matters. The criminal prosecution is not as prominent and pervasive as civil matters. People ask why – possible reasons may perhaps include collusion among the various players, maybe because it is a volatile industry, there is reluctance on the side of government to engage in criminal prosecution. What I have seen from the research I conducted is that although we are conscious about the perpetration of these oil and gas crimes, the prosecution efforts are not quite encouraging, perhaps because of political and economic considerations. But the trend from 2015/2016, has been changing. It appears government is now interested in prosecuting these offences and to get the job well done".

In his presentation on *"Overview of Nigerian oil and gas Laws"*

Mr. Joe Nwakwue of Zera Advisory and Consulting, identified the constitution, petroleum laws, petroleum licenses, petroleum regulations, concession system, and service contracts as some of the legal and contractual laws and regulations governing oil and gas transactions. These, he said are made up of 34 Acts, 20 regulations and 20 orders grouped into fiscal, governance, regulation & control, environmental, national content and capacity development.

He concludes by observing that the Nigerian oil and gas laws have evolved over time primarily driven by upstream activities to the detriment of the mid and downstream and gas development which have suffered from neglect. He emphasized the need for clarity and harmonization of regulatory laws especially on environment, while making a case for the strengthening of host community laws, simplification of legislative framework and reduction of discretionary powers in our laws.

"The key highlight for me is to look at all of the laws in the industry today and identify the challenges we have had with them and make recommendations on how we can improve. What it will mean is to revise those laws and consolidate them, so that the interfaces are smooth; so that we don't have all these challenges of overlaps and gaps in our laws. What we have today as legal framework is a bit of a patchwork over time and so we need to harmonise and simplify them so that businesses will know exactly what they are supposed to do. Also, there are instances of over regulation because of the multiplicity of regulatory agencies in the sector. We can simplify that and make life easy for those who do business and the nation will be better off for it".

Mr. Olukayode Fabunmi, Director Business

ES PTDF, Representatives of Minister of State, Petroleum Resources, Attorney-General and Minister of Justice and participants at the workshop

Law Academy examined the impact of stabilization and adaptation clauses in petroleum contracts in his presentation at the workshop. Petroleum agreements, he said include concession agreement, service contract and production sharing contracts.
These involve investors and state entities as parties. Foreign investors he said exercise caution in making investments because of the risks involved and they protect themselves through stabilization and adaptation clauses. In his highly technical paper, Mr. Fabunmi concludes by asserting that parties to a petroleum agreement use stabilization and adaptation clauses to protect their interest.
"*One other key characteristics of these contracts is the tenure, and of course because of the amount of investments involved, you have to have a long tenure of contract*".
In his paper on "*Alternative Dispute Resolution in the Oil and Gas Industry*"

Professor Mamman Lawan (SAN) of the Faculty of law, Bayero University Kano, maintains that as disputes are inevitable in the society, dispute resolution mechanisms are crafted to settle them. These dispute resolution mechanisms he said include litigation and Alternative Dispute Resolution (ADR). Arbitration which is an alternative dispute resolution mechanism has the advantage of party autonomy, speed, less technicality. It is because of these advantages, he said, that the oil and gas industry tend to lean towards arbitration in the settlement of disputes. This is because of the capital-intensive nature of the industry; contract-based relationship, the technicality of subject matter, heterogeneity in the industry and need for long term cordial relationship.
Professor Lawan highlighted some of the challenges in the application of arbitration in resolving oil and gas disputes to include abuse of omnibus and vague provisions of the Act, abuse of the appellate system and the legalization of the arbitral process.
"*Arbitration worldwide are not processes reserved exclusively for lawyers. If you go to international institutions like the NCIA and ICC, you find non lawyer professionals in arbitration. I took part in an arbitration by the London Court of Arbitration presided by an Engineer with non lawyers representing parties. In Nigeria, the reverse is the case, just as we have lawyers exclusively in litigation, it's also similar in arbitration. You find that the representatives will be lawyers and the arbitrators are either retired judges or lawyers*" ■

UPDATE ON PTDF ANNUAL OIL AND GAS RESEARCH GRANT

The prospect for the discovery of oil in commercial quantity in the Sokoto basin came up for validation by the steering committee of PTDF Annual oil and gas research grant competition to pave way for government to invite investors to commence drilling activities in the Sokoto basin. Other research projects under the sponsorship of PTDF that had attained the threshold of being upscaled to pilot plant stage after two years research cycle also came up for assessment by the steering committee at the PTDF office Abuja.

According to **Prof Chukwuemeka Ekweazor, Chair, Steering Committee, PTDF Annual Oil and Gas Research Grant Competition**, *"this particular exercise is part of what we normally do in the chain of events leading to award of research grant to applicants by PTDF. As you know, PTDF is the only government agency as far as I know that invites university people to submit applications on the work they are doing for grants. And when these applications are submitted, we as a screening committee will meet and then we look at these applications based on the criteria. Our committee is broad-based, we have people from the universities, we have people from the private sector especially the oil industry. So, we set criteria, we look at those who meet those criteria, then we call them. This exercise today is to look at the presentations of researchers who were adjudged to have done well at the first stage, they were given a grant and then they did very well, they came back within a stipulated*

time and the committee felt that because they did so well they can be encouraged to go on to a pilot stage in which they will demonstrate that what they have done has a commercial viability. And then when we satisfy ourselves that it is possible looking at their budget, we then recommend them to the PTDF management to be supported".

One of such presentations made to the steering committee was on the status of the research on petroleum prospects of the Sokoto basin by

Professor Umar Faruk Zaki of the Usman Danfodio University, Sokoto. He gave an insight on the preliminary findings of the research on "**geochemical evaluation and mapping of the potential source rock in the Sokoto basin**".
"Initially, we worked on the source of petroleum called the source rock, that is the kind of soil from which petroleum is expected to come out from. So, we proposed to PTDF that Sokoto has the kind of soil from which petroleum is expected but it is not properly investigated, let us investigate if that soil is there. We call it hydrocarbon source rock. So, they gave us money and we undertook the research. We found out that the soil (Source Rock) actually exists and it contained substantial amount of hydrocarbon that may lead to accumulation of petroleum in the form of liquid hydrocarbon, which is petroleum or gas. That is where our research stopped. So, we were asked to come and continue from there to do a further research to find out if all the systems for accumulation of petroleum is there, and that is what we've come to do now. We wrote a further proposal to find out the existence of a reservoir, a kind of well which can keep the petroleum because hydrocarbon is either liquid or gas, if there is not enough or good formation of the soil that can keep it, it will escape; it will go elsewhere. So now, this is our research, to find out if the petroleum systems are present in the Sokoto Basin and that will pave way for inviting investors to come. That means if this phase succeeds, if we are able to establish that apart from the source rock, there is also an enabling environment for accumulation of hydrocarbon, then the government can invite investors to come to start drilling for petroleum in the Sokoto Basin".

Another presentation to the steering committee was on the status of the research on "**evaluation of wax deposition during production of crude oil in identified Niger Delta waxy oil fields**". The researchers have successfully developed a wax allocation factor that helps to determine the volume of crude oil being pumped to the pipeline in the presence of wax.

According to the lead researcher, **Professor Godwin Chukwu of the University of Port Harcourt**, the research finding is ready for patenting.
"My presentation was on Wax deposition in some of the oil fields in the Niger Delta area and the object of that presentation is to prepare what we call a wax envelop that you can use to determine what the wax appearance temperature is at any pressure that you have penetrated. That is the summary of the work. It is a two-step approach, one is experimental, where we go to waxy oil field to collect samples, do laboratory analysis, use those properties we get from the result and then prepare what we call a thermodynamic model that we can now use to prepare the wax envelop. And another purpose is actually to get what we call a data bank, a data repository where people can now go and get data/information relating to those fields and use them in whatever computer modelling they are doing".

> **... if we are able to establish that apart from the source rock, there is also an enabling environment for accumulation of hydrocarbon, then the government can invite investors to come to start drilling for petroleum in the Sokoto Basin.**
>
> **- Prof. Umar Faruk Zaki**

The status of the research on the development of Zeolite catalyst for light alkanes aromatization by the team of researchers led by **Dr Abdulazeez Yusuf Attah of the Ahmadu Bello University, Zaria** also came up for assessment.
"My team which comprises of three other professors have been working for PTDF for the past 4 years and the focus of the work has been on developing a catalyst that will help in converting light hydrocarbon, things like methane, propane, butane to liquid aromatics. That's what we have been doing. We've had successful research result. So, what we are here to do is the second phase of the project which entails scaling up of the research we've been doing in the laboratory. Basically, we are going

to do two things. Based on the previous work we have done; we want to develop an industry ready catalyst that can be used in refining and petrochemicals. At the same time, we are going to have a pilot plant to produce liquid aromatics from light hydrocarbon gas. So, the commitment we are making if we have funding for the second phase is to produce industry ready catalyst and a pilot plant".

Also presented to the committee is the status of the research work on "**design and production of plantain fibers re-enforced with plastics for use in oil and gas facilities**"

by **Professor Christopher Ihueze of the Nnamdi Azikwe University, Awka**.

"I presented a proposal on the integrity testing and modelling of pilot plant for production of oil and gas facilities. This is the second phase of the research. A profitability analysis of the pilot plant was also presented, and we hope that the project will lead to economic development of the nation, create wealth, provide jobs for the teaming youths, and lead to eco-friendly environment. We hope that at the end of this research, oil and gas facility cost will be brought down".

In his presentation on the status report of the research on "**modeling well bore instability by chemical method**"

Professor Joel Ogbonna of the university of Port Harcourt, told members of the steering committee on PTDF Annual oil and gas research grant competition that the research team succeeded in developing a patentable equipment and software. "*In the first phase of the project, we looked at the interaction of the field downhole, and discovered the problem of chemical fluid interaction, you have the one with the rocks, you have the one with heats, internal temperature. This new stage look at the total problem downhole, trying to get a predictive model on the combined effect of the chemical interaction, the geochemical and the thermal, so that downhole, we should have a software that captures these problems and proffer solutions before they occur*".

He said the issue of oil well instability down hole has been a challenge to the oil and gas industry. "*In the first phase we were able to develop an equipment which we hope to patent and after this research, we will be able to come up with a software that will be patented. The equipment which is already being used by students will bring value addition. It will be mass-produced. The software will be used by the oil industry*".

Apart from assessing the status of ongoing researches through technical presentations by the researchers, the steering committee also began the

screening of applications for another research cycle under PTDF Annual oil and gas research grant competition with a view to recommending the best proposals for the grant. Altogether 179 applications were submitted for screening by the steering committee made up of academics, serving and retired oil and gas industry experts and representatives of national and international oil companies.

After the submission of applications, the screening committee meets to screen the applications using the following criteria. First is to determine the merit of the application based on conditions contained in the advertisement.

Professor Ekweazor puts it succinctly "*Do they meet the needs of the country in terms of substitution for something that is already in use? Are they going to be able to provide a new way of doing things that would make that particular area more efficient? Are they going to provide tools to carry out functions in the industry*"

Other considerations for assessment of applications include the feasibility of the idea, the currency of the literature, the benefit accruable from the project and what national significance will come from the project. It has to also conform with the mandate of PTDF.

In summary, the research grant application is reviewed against the relevance of study and value to the oil and gas industry; perceived gaps and motivation for the study as well as the objective and novelty, research plans with time based schedules, key milestones and deliverables, research budget and justification, capacity building component of the research and capacity to enhance productivity in the oil and gas industry.

The areas of research emphasis include petroleum exploration and prospecting of inlands basins, onshore, shallow offshore and deep waters, petroleum production and exploitation, renewable and unconventional energy resources, environmental management and protection.

The objectives of PTDF Annual Oil and Gas Research Grant Competition include to enhance the capacity of locally based researchers to conduct research relating to oil and gas technology development, to promote the retention of such capacity and to encourage its application in the industry. The grant is expected to motivate Nigerians with the capacity to conduct research that will lead to addressing specific industry needs and facilitate technological development of Nigeria's oil and gas sector.

A steering committee made up of academic experts, policy makers and representatives of oil and gas related professional bodies overseas the competition and ensures that high standards are maintained. The Executive Secretary, Petroleum Technology Development Fund, is the chairman.

The research grant competition was established in 2008 as part of PTDF strategy for implementing its capacity building mandate for the oil and gas industry ■

PTDF EX-

« WHERE THEY ARE AN

1973 AWARD RECIPIENT

Engr. Tony Ogbuigwe

When I gained admission to the University of Lagos in 1973, my father paid my fees for the admission, but shortly after coming in, I got the PTDF scholarship and they refunded the money paid by my father. And for the rest of my stay in the university, my education was sponsored entirely by PTDF, and I had the privilege of having a comfortable time through the university, so I thank God for the Petroleum Technology Development Fund.

Q: As a pioneer beneficiary of PTDF Scholarship having been among the first set to be sponsored in 1973, how would you assess PTDF of 46 years ago and now?

A: PTDF has grown beyond that time when it was just providing scholarships simply to university graduates and so on. PTDF has grown; it is supporting initiatives in different sectors. For example, the ES talked about recent initiatives to support production of Zeolite catalyst by ABU Zaria in conjunction with other industry players. PTDF has become a tool to bring together those doing the research on the catalyst as well as those who are going to use the end product. That is a fantastic role that PTDF is playing, so it has grown in its reach. I mentioned the fact that the Centre for gas refining and petrochemical studies in Port Harcourt was also supported by PTDF in its work. The PTDF has really grown and there are a lot of things that are being done.

SCHOLARS

D WHAT THEY ARE DOING »

2005 AWARD RECIPIENT

Professor Mamman Lawan

I applied for the PTDF scholarship in 2005. I was lucky to be considered as one of the successful candidates. I was sponsored to the University of Warwick, United Kingdom. At first, it was part sponsorship and for some reasons I applied for the sponsorship to be full and graciously PTDF upgraded me to full sponsorship. I lived comfortably in UK as a student with my family. I rented a house which was paid by PTDF monthly and I also received my monthly stipends which was very adequate as a student. I lived comfortably and I studied comfortably. I finished my programme in good time; three (3) years and I came back to Nigeria. So, I'm proud of PTDF, I'm one of their loyal children and I will always be grateful to PTDF as an institution for what they are doing, generally for the country and for what they have done for me.

Q: How did the scholarship enhance your career?

A: As a university lecturer, I needed a PhD in order to make progress. In the university you cannot be a senior lecturer without a PhD. PTDF sponsored me to acquire a PhD, I did it, I got promoted immediately I came back to senior lecturer rank. I thank God that I'm now a full professor of Law. So, if not for PTDF, I wouldn't have become a Senior Lecturer, I wouldn't have become an associate professor. Because of the exposure I had in the UK, meeting people from different nationalities, cultures and so on, that got me exposed, it widened my horizon and impacted on the way I teach my students. It is also impacting on the way I supervise my students who are doing research projects with me at both undergraduate and postgraduate levels. So, it really impacted very well on me as an individual and on the institution, I work for, that is Bayero University, Kano, Faculty of Law.

PTDF EX- SCHOLARS

<< WHERE THEY ARE AND WHAT THEY ARE DOING >>

2017 AWARD RECIPIENT

Rabi Abubakar Suleiman

My name is Rabi Abubakar Suleiman, I am from Niger state, I had my first Degree in Accounting and Finance (first class) in a university in Khartoum, Sudan. I came back to Nigeria for my National Service and I served in Lagos. After my youth service I went job hunting. I found my way to the Accountant-General of the Federation whom I submitted my CV. When he looked at it, he said I have an impressive certificate and told me about PTDF Scholarship. I applied, got the scholarship and left early 2017. I studied Strategic Management and Accounting in the University of Dundee Scotland. In my Bachelors' degree, I had the highest score in Strategic Management as part of my course in Accounting and Finance. I had 97% and because of that while trying to study for a Masters' degree, I wanted a course that is quite like strategic management and I found that the only university that offered it is the university of Dundee in Scotland. It offers Strategic Management and Accounting. So, I applied and was admitted.

Q: Could you share with us your achievements in the university?

A: I did my research on market segmentation and profit especially in clothing lines. I focused on shops like Mac Jacob as my case study. I had a different topic in mind but because I had just given birth, I was too stressed and didn't want to do a project that will have to take me out to interview people. So, I was advised by my supervisor to undertake a project that will only need document analysis. At the end, I got a distinction in Strategic Management and Accounting and was given the award for the best student in that programme at my graduation. I was a student ambassador as well.

Q: How did the PTDF Scholarship contribute to your career advancement?

A: Because of the opportunity I got from PTDF, it helped me in getting a job in the strategic department of Nigerian Financial Intelligence Unit. Without PTDF I probably wouldn't have had a Masters' degree and I wouldn't have got the job. I'm in the strategic department working as an important part of the unit because I have a masters. There are other workers that were employed with me who do not have master's degree. So, I'm the one directing them as a higher-level officer in the unit. So that placed me at an advantage. Thanks to PTDF; I don't think I would have been able to achieve that.

PTDF INTERVENTIONS IN THE MILITARY

The Nigeria Defence Academy (NDA), the Air Force Institute of Technology (AFIT) and the Nigeria Navy Ship (NNS) Quorra are some of the military establishments that have benefitted from the Institutional Capacity Building interventions of the Petroleum Technology Development Fund.

This is apart from the many personnel of the armed forces who were sponsored to advanced degree study programmes in top ranked universities abroad under the Fund's Overseas Scholarship Scheme. For example, most of the faculty members of the Air Force Institute of Technology, Kaduna are PTDF ex-scholars who received training up to PhD level under PTDF sponsorship.

Through the efforts of these military personnel turned academics, the Air Force Institute of Technology has been transformed into a leading research institute in the area of unmanned aerial, surface and underwater vehicles.

Air vice Marshal Olabisi Olayinka assumed duty in January 2020 as the 9th Commandant of the Air Force Institute of Technology. On a visit to the Petroleum Technology Development Fund, he informed the Executive Secretary, Dr Bello Aliyu Gusau, that with the upgrade of the Institute to a degree awarding academic institution, it will require an enhanced faculty with special skills to deliver training in aerospace and aeronautic engineering, its areas of specialization. He therefore wants PTDF to assist in training the relevant manpower needed by the institute noting that inadequate capacity among Nigerians has resulted in gross inefficiency in the maintenance of aerospace and other technologically driven infrastructure.

"I want to commend the efforts of the PTDF in capacity building and promoting technological advancement in Nigeria. Even before coming here a number of our officers I know have benefited from sponsorship granted by PTDF. If we look at it today capacity building is a major project that has to be tackled frontally because lack of technological advancement remains the bane of our development in this country. Why our refineries are not working, why is there no stable power supply in the country, why our airplanes are grossly underutilized, it is because of lack of capacity. So, I want to commend the effort of this organization, you are doing a lot to promote technological advancement in Nigeria".

Congratulating Air Vice Marshal Olabisi Olayinka on his appointment, Executive Secretary PTDF, Dr Bello Aliyu Gusau said the Fund

has an existing relationship with the Air Force Institute of Technology in the area of manpower development which formed the basis of a Memorandum of Understanding (MoU). He said the implementation of the MoU will lead to greater interventions by the Fund with the ultimate objective of attracting full accreditation of the Institute's degree programmes by the National Universities Commission.

"*We understand the important national responsibility that has been assigned to you and we will take that into consideration in everything we do. Having said that, I can give you this undertaking that we are going to ensure that our relationship is governed by a Memorandum of Understanding and we will do our possible best to push this process forward*".

The former Commandant of the Institute, Air Vice Marshall Cletus Udeagulu had while in office received the Executive Secretary of PTDF and his management team on a courtesy visit where he gave an insight on the status of the Air Force Institute of Technology as a hybrid institution providing polytechnic and university education. PTDF intervention in the Institute also led to the training and certification of welding engineers, and the designation of the Institute as a regional centre for specialised training in Metal Inert Gas (MIG) welding, Metal Active Gas (MAG) welding, Tungsten Inert Gas (TIG) welding and Oxy – acetylene gas welding.

Dr Bello Aliyu Gusau who inspected the facilities in the Institute said as oil exploration and production activities are shifting from onshore to the deep offshore, there is need for a structured and comprehensive programme of training for pilots to conduct air surveillance of

offshore installations and transportation of operators of the facilities.

He said PTDF is reviewing its Memorandum of Understanding with the Air Force Institute of Technology (AFIT) with a view to sponsoring more officers of the Institute to post graduate studies abroad and to sustain the Institute as a regional welding centre of excellence for modelling and simulation of engineering designs.

While on a reciprocal visit to PTDF, the former Commandment, Air Force Institute of Technology, had made a commitment that the Nigerian Air Force and AFIT will give priority to the training of pilots for the surveillance of oil installations in the country. This, he said can be achieved through the deepening of the Institute's collaboration with the Petroleum Technology Development Fund (PTDF) in enhancing the capacities and competencies of its personnel and infrastructure.

"Our focus has been on research and development under which we pioneered the unmanned vehicle systems. We started the unmanned aerial vehicle way back in 2017, and just recently we unveiled the unmanned operational aerial vehicle named "Segumi". We commenced research on unmanned water vehicle both underwater and surface vehicle. So AFIT is in the forefront of contributing to the oil and gas industry".

Executive Secretary, PTDF, Dr Bello Aliyu Gusau said that the Fund will collaborate with any Nigerian institution involved in building indigenous capacity for the Nigerian oil and gas industry. He described AFIT as one of such institutions with high prospects for collaboration.

"When we visited your institution, it was instantly obvious to me that, there are many opportunities for us to collaborate. I went round your facilities and I say, there's a lot we can do together. I am really interested in some of the research undertakings I noticed at that visit especially the unmanned vehicle system, I can see the utility of that to the oil and gas industry".

Dr Gusau directed the formation of a joint committee that will look at all the areas of collaboration with a view to developing a Memorandum of Understanding (MoU) between the two institutions.

"This is the right time to start the collaboration because increasingly we are refocusing, we are directing our attention essentially back to Nigerian institutions. In (2019), for the first time we awarded about 1400 local scholarships for studies in Nigerian universities, and considering the kind of courses that your school is offering, I see a possibility of many of your students being able to access some of the sponsorship that we grant mainly in mechanical engineering, chemical engineering and other areas".

He urged AFIT to enlighten its staff and students on the PTDF scholarship process to enable them to access the sponsorship that the Fund offers in departments and faculties that offer oil and gas related courses.

Apart from the award of Scholarships, Endowments and Research Grants, PTDF has over the years been involved in the provision of infrastructural facilities in universities and other academic institutions, to enhance their teaching, research and learning of Oil and Gas related courses. This human capital development strategy through institutional capacity building has been implemented by the Fund in 26 academic institutions.

PTDF upgraded Department of Mechanical Engineering, NDA

The Nigerian Defence Academy, Nigeria's military university and premier Institution for the training of officer cadets is also a beneficiary of PTDF institutional capacity development intervention.

PTDF upgraded the department of Mechanical Engineering in 2012 to enhance its capacity to carry out undergraduate and postgraduate training as well as conduct scientific research and development. The components of the upgrade include the construction of a new building complex for the mechanical engineering department, housing lecture theatres, auditorium, offices for teaching and non-teaching staff, workshop and laboratories, a 250KVA generating set, library, ICT facilities, borehole and water treatment facilities.

The Head, Mechanical Engineering Department, Nigerian Defence Academy, Kaduna,

Dr D.K Garba said that the Fund's intervention not only provided adequate space for learning to take place but assisted generally in enhancing teaching and research. "*The PTDF intervention provided us with a building complex which houses all our cadets from 200 level to 400 level, including a lecture theatre, some laboratory and workshop equipment. As a result of that intervention, the productivity of the department has been enhanced in the area of research and development at both undergraduate and postgraduate levels. The intervention has gone a long way in enhancing the quality of teaching and learning in the department and increased our research output.*"

He listed some of the innovations brought about by the laboratory equipment provided under the upgrade by PTDF to include the development of a dismountable water treatment plant used for providing troops in the field with safe and clean drinking water, a smokeless, noiseless and heat free electric vehicle produced by the department, a solar powered fixed wing aerial vehicle among others. "*We have air conditioning and refrigeration units for student training that are functional and are being used. We have*

the thermo fluid lab, we have petrol engines, we have diesel engines that are being utilized for experimentation. In the strength of materials lab, we have material testing equipment like tensile testing machines, impact testing machines and so on."

The Mechatronics and Robotics Research Cluster headed by a PTDF ex-scholar

Major Abubakar Surajo Imam, was given impetus by the upgrade project. Major Surajo Imam whose PhD study was sponsored by PTDF is a Senior Lecturer in the department of Mechanical Engineering, Nigerian Defence Academy. He said some of the equipments provided by PTDF under the upgrade project are applicable to Mechatronics and Robotics Engineering.

"Some of the facilities deployed by PTDF when it intervened are still applicable to mechatronics because mechatronics is a synergy of mechanical engineering, electrical and electronics engineering and tropical engineering. With the number of staff trained in that area and having enough equipment deployed to us by PTDF that can be used in teaching mechatronics, we decided to start the mechatronics department in NDA".

In justifying the extension of PTDF capacity building intervention to the military, Major Abubakar Surajo Imam whose area of specialisation is Unmanned Aerial Vehicles, said the military's contribution to scientific and technological breakthroughs through research and innovations require the support of capacity building institutions like PTDF. He believes that Nigeria needs to have a home-grown learning system where local engineers and technicians can acquire the knowledge and techniques of building these systems rather than relying on imported finished products. This was why he focused his PhD research in developing an autonomous navigation control system for Unmanned Aerial Vehicles for surveillance of oil and gas pipelines.

"Engineering now depends on automation, like the flow station and the refinery itself. A pipeline should tell you where leakage is occurring or where there is vandalism, the flow station should tell you the pressure in each station and we have very brilliant students who have a lot to contribute to solve oil and gas problems".

Engineer B.K Odunola is an Assistant Chief Technologist in the Strength of Materials/ Metallurgy laboratory in the department. She said that the equipments provided by PTDF are for both undergraduate and postgraduates students including those from other universities. *"We have been using these equipments provided by PTDF for our 200 and 300 level cadets as well as our post graduate students and aside from our in-house students and cadets we usually have some students from other universities for PhD research and publication works. They come here to carry out some tests. So, it's very useful".*

Engineer Mary Samuel, a principal technologist in Mechanics and Machine Laboratory said the facility provided by PTDF is the backbone of engineering research in NDA.

She said the equipments afford the cadets the opportunity to understand the practical aspect of their studies, and their areas of application. *"Mechanics and machines are the backbone of engineering. Most of the cadets in the faculty must pass through this lab because of its importance. The intervention of PTDF has really helped us in showing them what really engineering is all about"*

For the Nigerian Navy, the development and hand over of NNS Quorra E-Learning Centre in Lagos sign posts the PTDF intervention in the capacity development of the Navy through providing facilities for basic and advanced ICT knowledge acquisition.

According to the Navy training command, the e-learning Centre will contribute in the computerization of training in the Navy. The E-learning centre houses 100 computer systems connected to an internet network and this assists in the training of officers and men of the Nigerian Navy in coast guard and maritime technologies ■

NNS QUORRA E-Learning Centre provided by PTDF

IMPACT OF PTDF UPGRADE PROJECT

Good education is the passport to a future in the oil and gas industry but where the industry finds the products of Nigerian universities unemployable it becomes a dilemma. Sadly, this was the state of graduates of Nigerian Universities before the PTDF intervention in Nigerian Institutions. Faced with the dilemma of unemployability of Nigerian graduates by the International Oil Companies (IOCs) due to poor study facilities, ill-equipped or outdated laboratories/ workshops, and dilapidated lecture halls, the Petroleum Technology Development Fund focused one of its interventions in upgrading oil and gas related departments of universities across the country. In total 26 oil and gas related departments of Federal and State universities have benefited from the upgrade project. These interventions have provided the ideal academic environment for teaching and learning by students and lectures in the PTDF upgraded universities. The upgrade was carried out in three phases across the six geo-political zones of the country. They are as follows:

SOUTH- EAST		
S/NO	NAME OF UNIVERSITY	UPGRADED DEPARTMENT
1.	University of Nigeria Nsukka	Geology Department
2.	Federal University of Technology Owerri	Petroleum Engineering Department
3.	Enugu State University of Science & Technology Enugu	Metallurgical and Materials Engineering Department
4.	Nnamdi Azikiwe University, Awka	Mechanical and Production Engineering Department
SOUTH-SOUTH		
1.	University of Port Harcourt	Gas Engineering Department
2.	University of Benin	Chemical Engineering Department
3.	University of Calabar	Applied Chemistry Department
4.	University of Uyo	Chemical/Petroleum Engineering Department
5.	Rivers State University of Science and Technology Port-Harcourt	Chemical and Petrochemical Engineering Department
6.	Niger Delta University, Bayelsa State.	Mechanical Engineering Department
NORTH WEST		
1.	Ahmadu Bello University Zaria,	Chemical Engineering Department
2.	Usman Dan Fodio University Sokoto	Petroleum Chemistry Department
3.	Bayero University Kano	Electrical Engineering Department
4.	Umaru Musa Yar'adua University, Kastina, Kastina State	Renewable Energy Centre Department
5.	Nigerian Defence Academy, Kaduna	Mechanical Engineering Department
NORTH EAST		
1.	University of Maiduguri	Geology Department
2.	Abubarkar Tafawa Balewa University Bauchi	Chemical Engineering Department
3.	Federal University of Technology, Yola	Mechanical Engineering Department
NORTH-CENTRAL		
1.	University of Jos	Geology and Mining Department
2.	University of Ilorin	Geology & Mineral Sciences Department
3.	Federal University of Technology Minna	Chemical Engineering Department
4.	Benue State University Makurdi	Chemistry Department
5.	University of Abuja	Physics Department
SOUTH-WEST		
1.	University of Ibadan	Petroleum Engineering Department
2.	Obafemi Awolowo University Ile-Ife	Geology Department
3.	University of Lagos	Chemical Engineering Department

The components of the PTDF upgrade project are uniform across all the institutions. They include the construction and equipping of departmental building, provision of state-of-the-art laboratories and workshop equipment, books and journals, provision of IT hardware and Software, Electricity and water facilities. There are also befitting offices for the faculty and other staff of the department, a 150 sitting capacity lecture theatre and other lecture rooms equipped with modern teaching facilities.
The concept of upgrading the facilities and infrastructure of departments in selected universities with focus on oil and gas related courses is not only to educate Nigerians in specialized areas of the oil and gas industry, but also to ensure that they received the training in local universities that have been upgraded by the Fund.

From universities across the country, the testimonies of the beneficiaries of PTDF university upgrade project are positive and stimulating. They reflect an overwhelming appreciation of the contribution of the Petroleum Technology Development Fund in bridging the huge infrastructure, teaching and research facilities gaps in many universities with oil and gas related departments and faculties.

Some of the beneficiaries have attested to the positive impact of the facilities provided by PTDF to their overall learning, teaching and research in the university.

At the Umaru Musa Yar'Adua University, Katsina, where PTDF developed and equipped a Centre for Renewable Energy,

the **Vice Chancellor, Prof Isa Idris Funtua** admitted that the intervention is having a positive impact on teaching, learning and research. Of importance, according to the Vice Chancellor is that it enabled the university to undertake research in different areas of renewable energy that will benefit the university, the state, and the country. "*PTDF constructed and equipped an elaborate Centre for renewable energy for us. The project started in 2009 and truly we have a fully equipped Centre for research into renewable energy. Our renewable energy research focuses on concentrated solar power, bio-gas research, wind energy, and small hydro*".

The Vice Chancellor, University of Ibadan, Prof. Abel Idowu Olayinka said the upgrade of the Department of Petroleum Engineering and the endowment of a research chair in the university by PTDF contributed significantly in the production of quality manpower for the oil and gas industry by the university. "*The PTDF chair has been quite useful to us as a university in terms of capacity building most especially in supporting our research students for the PhD. From my record at least 5 of our students completed their PhD programmes through the support of the PTDF chair and at least one or two of them are members of our academic team*".

On the 9th of December 2009, the Petroleum Technology Development Fund (PTDF) commissioned the upgraded Department of Geology, Obafemi Awolowo University, ile-ife, Osun State.

The Vice Chancellor, Professor Eyitope O Ogunbodede described the Fund's upgraded department as one that stands out in the faculty.
"*I want to thank PTDF for what they have done for OAU, we all need that support, we need that leverage to be able to attend to our mandate as a university. We also know that the area in which PTDF has assisted us is an area of great need for the OAU and you came at the time we needed you most. You have consistently been supporting us, the building you donated still stands out as one of the best in the faculty of science. You didn't only give us laboratories but office spaces for our members of staff and you also donated equipment and supported us with training*".

Abubakar Tafawa Balewa University, Bauchi, Bauchi state is another institution that benefitted from the PTDF university upgrade project with the upgrade of the department of Petroleum Engineering in the university.

Front view of the fully equipped Mechanical Engineering Department constructed by PTDF at the Abubakar Tafawa Balewa University (ATBU), Bauchi

Side view of the Auditorium and Laboratories provided by PTDF at ATBU, Bauchi

Immediate past Vice Chancellor, Professor Saminu Ibrahim described the Fund as the foremost intervention agency in Nigeria whose efforts significantly assisted the university in its duty of imparting knowledge through teaching and research.
"*The PTDF intervention assisted us in the area of accreditation and our overall objective of teaching and research. The laboratory equipment enables us to conduct research that are useful to the university and the nation*".

Because of the upgrade of the department of Mechanical Engineering, Modibbo Adama University of Technology, Yola, Adamawa State, by PTDF in 2009, the department assumed the status of a Centre of Academic Excellence in the field of Engineering and related fields.

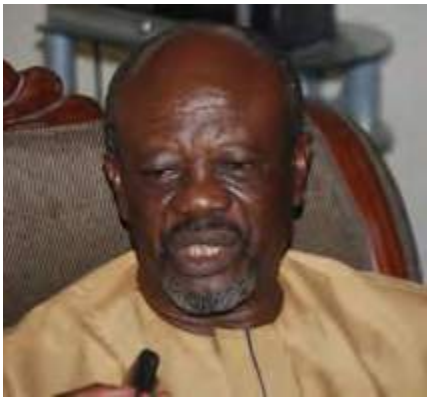
The Vice Chancellor, *Professor Kyari Mohammed* explained the areas of PTDF intervention at the university. "*There are basically two areas in which the PTDF intervened in our university, one is the support to the school of engineering and engineering technology particularly the department of Mechanical Engineering which PTDF equipped with several laboratories and provided ICT support. The other aspect is that several of our academic staff benefitted from the Fund's postgraduate scholarship programs for studies abroad. Some who acquired PhD degrees came back to join the university faculty*".

He said that the equipment provided by PTDF under the upgrade led to the accreditation of Mechanical Engineering courses by the National Universities Commission (NUC) and enabled the upgraded department to compete with its counterpart anywhere in the world.
"*What the Fund has given us are truly cutting-edge equipment all with computer interface, capable of interacting electronically with other universities anywhere in the world. Any of our faculty members or students able to use the facilities in the laboratories can function effectively in any laboratory in the world without going through a refresher training. Our capacity has been substantially increased*".

The Department of Petroleum Engineering Federal University of Technology Owerri (FUTO), Imo State was upgraded by the Fund in 2009 with the commissioning of the building complex.

The Vice Chancellor, Professor Francis Chukwuemeka Eze, said that, the university will continue to utilize the facilities to enhance learning, teaching and research. "*I*

want to thank PTDF for the building that hosted the Petroleum Engineering department, and for other investments in Human Capacity building".



According to the **Dean, School of Engineering of the university Prof G.I Nwandikom**, with the intervention, the department now has the capacity to coordinate Fluid Mechanics, Polymer and Textile engineering. "*PTDF provided us with equipment that have made teaching easier for us in Petroleum Engineering department and the university at large*".

The Head of Department, Petroleum Engineering, Dr Stanley Onwukwe said that, the PTDF intervention also ameliorated the accommodation challenges faced by the departments over a long period of time. "*Before the PTDF intervention we had a building that was occupied by all the engineering departments in the university. Then we had accommodation challenges, with most of the lecturers sharing offices in a very tight environment. We are fortunate that PTDF intervened and built this complex for us and that gave the leverage for our lecturers to have individual offices. There are also classrooms, auditorium, laboratories and workshop equipments. Lecturers now have dedicated offices, and that has improved their productivity. The laboratories improved our ability to conduct research*".

Flow Assurance Laboratory , FUTO

Reservoir Engineering Lab

At the University of Port Harcourt, the Petroleum Technology Development Fund upgraded the Gas Engineering department. The project which is among the departments in the first phase was completed and handed over to the university in 2006.It is still effectively being utilized by students, academic and non-academic staff of the university. The components of the upgrade include the provision of departmental building, workshop and laboratory equipment, information technology and library facilities.

The **former Vice Chancellor Prof. Ndawo Lale** said that the upgrade among other benefits enhanced the quality of graduates produced by the department and equipped the students with the practical skills they require upon graduation. "*PTDF is a very crucial agency, they are very relevant to the development of the universities. So, with their continuous support and presence we have great advancement*". The University of Abuja is among the latest institutions to benefit from the university upgrade project of the Petroleum Technology Development

Fund following the completion of the upgrade of the university's department of physics.
The upgrade project includes the construction and equipping of the building complex with state-of-the-art laboratories, ICT and workshop equipment. There are also befitting offices for the faculty and other staff of the department, a 150 sitting capacity lecture theatre and other lecture rooms equipped with modern teaching facilities. PTDF also provided a library, standby generating set, borehole and ancillary facilities.

The **Dean Faculty of Science, university of Abuja,**

Professor Rebeccah Wusa Ndanu said the intervention by PTDF facilitated the accreditation of the department by the National Universities Commission.
"*With the interactions we had during the last accreditation exercise in November for physics, those that came for the accreditation acknowledged that they don't have what we have in their universities; At the end of the day we got full accreditation for the physics department. Physics had 84% or so in that accreditation exercise and most of the things we used were given to us by PTDF. We are really grateful to PTDF because it came in to solve a lot of problems especially classroom spaces, lecture spaces and lab spaces for the faculty and for science and for physics in particular*".

The **immediate past Dean of the Faculty of Science of the university,**

Professor Abu Mallam said the facility is a source of pride to the university. Professor Abu Mallam as former head of department of physics witnessed the progressive development of the project from conception to completion.

A fully equipped laboratory donated by PTDF to Physics Department, University of Abuja

"One thing I can say is that PTDF has actually bailed us out, for this structure is unique in the entire university. It is a structure that so far has served us very adequately and very well. Our postgraduate students, 400-Level students, 300-Level students and 200-Level students have their dedicated classrooms, all we do is just to walk into the classroom, hold our lectures and we move back to our offices, our comfortable offices. So, I want to thank PTDF for what they have done for us"

The **Acting Head of Physics Department, University of Abuja,**

Dr George Gala said that as a result of the PTDF intervention most of the best graduating students in the university come from the department. *"So far, one of the best graduating students; the last but one convocation, he topped the whole university, he took the vice chancellors' prize. Right now, he's studying for his master's degree in Harvard. In fact, they gave him a concurrent admission to start his MSc and PhD at the same time, and he is a product of this department. The e-library has impacted a lot on the quality of the graduates that we produce. We have a lot of materials that we have downloaded that these students use and the projector there goes a long way in facilitating interaction amongst themselves"*.

Similar testimony came from

Mr. Adeyemi Oluwatobi, a lecturer in the department. He believes that the range of equipment provided under the upgrade of the department exposed both the teachers and the students to practical analysis of issues related to their study programmes. It also enabled them to undertake field trips and conduct experiment in the laboratories.

"Physics department has been wonderful, it's like a pride to the university because there is no department in the university with a building to itself apart from physics department".

The university upgrade project is one of the institutional capacity development initiatives of PTDF to ensure that local training institutions are adequately equipped for the development of the relevant manpower requirement of the oil and gas industry. So far 26 oil and gas related departments in universities across the country have benefited from PTDF upgrade project ■

ADRESSING THE RESOURCE CURSE AND THE DUTCH DISEASE IN THE NIGERIAN OIL AND GAS INDUSTRY: A CASE STUDY OF NORWAY

By **Gbum Terngu Joseph**
NYSC, PTDF 2019/2020

Introduction

Exploration of Oil and Gas activities in Nigeria dates back to 1956 when Shell BP discovered Oil in Oloibiri the present day Bayelsa, South-South Nigeria. Prior to the discovery of Oil, the people of Nigeria were dependent on farming and livestock production to make a living, and there was peace among the people. Agriculture played a Major role in the growth of the Nigerian economy and cash crops generated 35 - 75% of the Nigerian Economic Gross Domestic product as at 1970.

Today, the opposite seems to be the case due to the fact that the Oil and Gas industry has become the major focus of the Nigerian Economy. Although very recently, the crash in Oil prices forced the Nigerian Government to turn to the Agricultural sector.

Nigeria has since been described by both local and international observers as the paradox of plenty operating under the Resource Curse and the Dutch disease due to the fact that she is a country blessed with an abundance of natural resources but has struggled to translate the benefits derived from the proceeds of it's oil exploration, production and sales activities to the development of the nation's economy.

There are several indicators, which go to support this observation, some of which are the poor living standard of the average Nigerian coupled with a high rate of unemployment and an overall low Gross Domestic Product rate. This observation takes into cognizance the fact that Nigeria possesses over 30% proven reserves when compared to other Oil producing countries like Norway, which has an average of 8% proven reserves in comparison to Nigeria.

Norway on the other hand became a petroleum producing country in the 1970's and has since become a major player in the Global Oil and Gas industry. Its petroleum activities contribute about

23% to the country's GDP and 54% of the country's export. The proceeds derived from Oil and Gas activities of Norway, has effectively and efficiently been translated to the development of the country and it has maintained a diversified market economy alongside the Nordic welfare model with universal health centers and comprehensive social systems. Drawing on it's best practices Norway is described as one of the few countries, which avoided the Resource Curse and the Dutch Disease.

This report proffers a way forward for the Nigerian Oil and Gas sector by taking into consideration some of Norway's best practices in a bid to provide workable solutions to the problems of the Resource Curse and the Dutch Disease, which without a doubt has contributed in crippling the Nigerian Economy and discouraged many potential Oil and Gas investors. .

The term **Resource Curse** was coined in 1933 by a man called Richard Auty, while researching on the level of growth and development, which developing countries with abundance of natural resources enjoy when comparing the profits these countries derived from exploration sales and production activities to their level of development and economic progress. The result of his findings established that most developing countries blessed with Natural resources are doomed to stagnation when compared to countries that are without natural resources, most especially Oil and Gas reserves. To this effect, he established that such countries operate under the Resource Curse due to their struggle to translate profits to effective and efficient development of their nations' economies.

The **Dutch Disease** is a term used to describe a situation where the discovery of Oil and Gas reserves in a country leads to the contraction of other sectors of the economy thereby creating a monopolized economy. To this effect the Dutch

disease has been described as one of the contributors of the Resource curse.

Reports from the Lagos Research Department of the Central Bank of Nigeria in 2000 indicate that the Nigerian economy was not stagnant before the discovery of Oil. The Nigerian economy produced an estimated value of 305,000 tons of cocoa, over a million tons of groundnut in export, among others before Oil reserves were discovered.

However, records from the 1970's show that the Nigerian export sector shifted focus from agricultural produce to Oil and Gas. Between the year 1974 – 2003, an average of 95% of Nigeria's total export earnings was derived from the Oil and Gas sector. This caused deindustrialization and contraction of the agricultural and manufacturing sectors of the Nigerian economy and this development placed Nigeria under the Dutch disease syndrome.

Manifestation of the Resource curse and the Dutch disease in the Nigerian Oil and Gas sector

Prior to the commencement of exploration and production of Oil and Gas activities in Nigeria, the Gross Domestic Product (GDP) of Nigeria was US$1,113. However, overtime the economy drastically declined and Nigeria has had to be listed as one of the poorest countries in the World with a huge debt profile. This has depicted Nigeria as a foster child of the Resource curse and the Dutch disease.

The United Nations General Resolution 1803 (XVII) resolved that every country possesses permanent sovereignty over every Natural resource in its territory. To this effect every country possesses control over her natural resources, lands, territorial waters and exclusive economic Zones. This provision is clearly reflected in Section 44(3) of the 1999 Constitution of the Federal Republic of Nigeria as Amended. Through this provision Nigeria possesses the right to deal with its natural resources.

The proceeds accruing to the Nigerian government from downstream Oil and Gas activities till date is estimated to be over US$800 billion. But the irony is that over 60% of the country's population live in abject poverty. The exploration and production of Oil and Gas activities have had both positive and negative impacts on the Nigerian economy, among which are rent seeking, lack of transparency, lack of accountability, corruption, human rights abuse, wasteful spending and violence. Violence is seen to be present in most countries with abundance of natural resources. In Nigeria, this is evident in the several cases of pipeline vandalism which invariably reduces the national income and makes it difficult for the government to adjust to revenue fluctuations.

In contrast, Since the year 2000, the Norwegian government has channeled all revenues from the exploration and production activities into a special fund called the government Pension Fund Global. These funds are strategically invested into stocks, bonds, and property abroad to generate income for the country. On this basis, the International Monetary Fund and World Bank ranks Norway as the fourth highest country in the world with the highest per capital Gross Domestic Product.

The Oil and Gas activities of Norway are managed by Statoil which is a fully state-owned company established to manage the Oil and Gas affairs of the state. This is similar to the Nigerian National Petroleum Corporation (NNPC). The operation of Statoil was divided into state participation interest and state direct financial investment (SDFI) to enhance transparency of the revenue streams, reduce political domination and allow division of power. This enabled Norway to build the world's largest natural sovereign Wealth Funds with a value of well over US$960 Billion. This has aided the country in the area of reducing the issues related with commodity volatility and has also stabilized the Norwegian economy.

This is a practice Nigeria could look into especially because many countries depend on the strength of their natural reserves to enhance international loans. However precautionary steps must be taken to ensure that such reserves are not squandered.

Recommendations

1. Review of Archaic Oil and Gas legislations.
There is a need for Nigeria to shift from a prescriptive legislative framework to an objective based legislative framework. This will allow the institutions to perform optimally and respond to issues facing the industry. The review will solve a lot of the legislative problems because, most of the issues faced by the industry were not anticipated at the time when the legislations were drafted.

2. Increased Stakeholder Dialogue
There is a need for more oil and gas stakeholder dialogue. A good example of such programs is the 2- Day workshop on enhancing the quality of legal service in the Nigerian Oil and Gas industry organized by the Petroleum Technology Development Fund (PTDF) in collaboration with the Ministry of Justice.
The Program created a friendly platform for an open discussion between different stakeholders in the Oil and Gas sector, where ideas, knowledge, challenges and workable solutions were deliberated on in a bid to move the oil and gas sector forward.

3. Strategic Diversification of the Nigerian Economy.
The Oil and Gas sector is volatile. To this effect, diversification of the Nigerian economy will enable sustainable development. This prevents any exposure of shock, which comes with the volatility of oil prices. Norway is seen to have maintained and developed its shipping, fishing and manufacturing activities after the discovery of oil reserves and this helped stabilize the economy and promoted sustainable growth and development of its economy.

The Norwegian economy was selected to draw this comparison because the model is successfully built on key practicable policies, the outcome of which made the International Monetary Fund and the World Bank to rank Norway as the fourth country in the world with the highest per capital Gross Domestic Product.

It is apparent that Nigeria operates under the Resource curse and the Dutch Disease. This behoves on the institutions of state which play a major role in the administration and management of Oil and Gas in Nigeria to take steps in addressing this recurring phenomenon in a bid to attain sustainable growth and development in the Nigerian economy ■

A WORLD OF ENERGY ADDITION NOT SUBTRACTION OR SUBSTITUTION

By **Amadin Edes Kelly**
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Amadin Edes Kelly

Abstract
In a world where energy is the life blood of all human activities, it is imperative that energy is made readily available and easily accessible for mankind. Since the rise of the industrial revolution, fossil fuel has been at the fore front in supplying energy for various uses to several industries. However, in recent times there is a clamor in various quarters for a cleaner form of energy due to the shortcomings of fossil fuel. With the expected growth in world population in years to come fossil fuel will continue to occupy a significant percentage in the energy mix. Though Renewable Energy is evolving rapidly, there are still major issues mitigating its growth which are highlighted in this paper.

Introduction
Energy can be defined simply as the ability or capacity to do work. Work is done when heat is transmitted to our pot while cooking, it is done when we ride from our house to the office every day and all around us work is being done and energy is expended. Energy can be classified into 3 forms, these are:

- Non-Renewable Energy. They are non-renewable because the process that produces them takes millions of years hence their usage and demand outweigh their regeneration. Examples include coal, oil and natural gas.
- Renewable Energy. They are sources that can be used to generate energy without being depleted. In this case their use does not exceed their regeneration. Examples are biomass, charcoal. Uranium.
- Inexhaustible Energy. These are energy sources that are abundant in nature. Examples are wind, hydropower, geo-thermal. These energy sources continue to exist as long as the earth remains.

The industrial revolution

The industrial revolution took place in the latter half of the 18th century which saw the rise of steam powered engines. They originated from Britain and eventually spread to various parts of the world. Prior to this time, renewable energy sources such as wind and hydro were in use but the discovery of coal in abundance in Britain changed the narrative during this era. Coal provided more heat than the previous sources and was therefore made the primary source of energy. Steam power was used in textile industries, for iron works and other activities. As the revolution continued, other sources of energy were needed to meet the rising demand for energy Then came Natural gas and oil with the first oil well drilled in 1859.

Estimation of Fossil fuel Reserve

- **Coal:** Current world reserve is estimated to be about 1.1 trillion tones. Considering its rate of production and available technology, it is predicted to provide the world energy for the next 150years
- **Oil:** Crude oil reserve is estimated to be 1.7 trillion barrels of crude which is enough to last the world for the next 50 years at the current rate of extraction
- **Natural Gas:** As at January 2018, it was estimated that there is about 7.124 trillion cubic feet (tcf) of proven world reserve. With available technology and current rate of production, natural gas can provide the world with energy for the next 52 years.

Problems with fossil fuels
Though fossil fuel is a cheap and readily available source of energy to the world, it has it's shortcomings. Problems like land degradation, water pollution, ocean acidification are associated with fossil fuel but the main clamour of the century has been its harmful emissions which has led to global warming.

Current World Energy mix in brief
Renewable energy sources contribute about 4% to the global energy mix. Hydro energy makes up 7%, nuclear energy 4% while fossil fuels still occupy a chunk of the energy mix with oil taking as much as 34%, coal 28% and Natural gas 23%. These energy sources are mainly used for heat, transportation and power in the ratio of 48%, 32% and 20% respectively.

The Paris Agreement
In 2015, all member countries of the United Nations signed the Paris agreement at the convention on climate change. The agreement seeks to limit rise in temperature to well below 2°c above the pre-

industrial level. For this to be achieved, all member countries must collectively cut down greenhouse gas emissions before the second half of the 21st century.
Though this agreement has been in operation, the 2018 statistics of Energy forecast still reveals that fossil fuel contributed substantially to greenhouse gas emissions. In order to achieve the mission of the Paris agreement, new ways of tackling fossil fuel emissions must be considered.

A World of Energy Addition

There has been an incremental growth in world population in the last century. The 19th century had a global population of 1.6 billion. In the latter half of that century, it rose to 2.5billion and currently world population stands at 7 billion. The United Nations has predicted a growth in world population by 42.85% in 2050. This rise in population will place great demand on energy and in order to meet up with this challenge, there should be diversification of energy resources and not a phasing out of one by another.
It has been observed over time that despite the increase in funding research for renewable energy, it has not necessarily dampened the use of fossil fuel. Renewable energy accounts for only 4% of the global energy mix. This is because of the following limitations:

- Earth Metals. These are rare earth metals that are scarce as there are few countries where they can be found. The technology needed to extract them is still limited.
- Environmental issues- The impact for the extraction processes and the acceptability to the society of these metals is another issue. For example, lithium mining in Chile requires major usage of water, while the region is known to be regularly under water stress.
- Due to the storage capacities of Renewable, there are still challenges using heavy duty and power consuming equipments as they are not able to provide uninterrupted power supply.

There are other issues with fossil fuel not stated on this paper that impedes the growth of Renewable Energy as such one can be objective of the fact that Renewables cannot take the place of fossil fuel (at least not now with its current issues) but Renewables can be added to support fossil fuel and share a portion of the high Energy demand that is bound to occur due to Population increase and other reasons.

What can we do?

Having established the fact that fossil fuel is still going to be around for a long while countries must look for ways to keep up with the Paris agreement hence the way to go is the full implementation of Carbon Capture and Storage (CCS). CCS was first introduced in 1977 by using existing technology in new ways. The captured Co2 can be stored or put into different uses e.g. for the re-injection into Oil wells in a process called Enhanced Oil Recovery.

Recommendations for PTDF

There are lots of research (some have entered into the pilot stage) on CCS technology to mitigate Co2 emissions which takes the major chunk of green house gases. Recently the MIT Engineers developed a new way of recovering Co2 from a stream of air. Scientist at the department of Energy's Oak Ridge National Lab have also formulated a process that removes Co2 from coal-burning power plants emission in a way that is similar to how soda lime works in scuba diving retreaters.
Nigeria still ranking 7th among countries with the highest pollution, PTDF being a giant in funding meaningful research can bring together a team of industry-based researchers to take up projects in these areas of CCS technology be it Post, Oxy or Pre combustion.
PTDF can also facilitate collaboration between local research institutes and those overseas already making waves in the field of CCS to share their ideas on their technology which can still be built upon.

Conclusion

Since Nigeria and major parts of the world are Oil dependent but are still required to meet up with the below 2oc climate rise by 2050, the need to fully implement the CCS technology in industries cannot be overemphasized while taking into consideration the effect of Green house gases on Planet earth. Though funding of research for Renewable Energy should be encouraged, it still will not replace fossil fuel in the near future. ■

PLANTING TREES TO COMBAT CARBON EMISSION: A POSSIBLE SOLUTION TO GLOBAL WARMING

By **HAUWA NASSIR**
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NYSC 2019 BATCH A

When global warming is mentioned, the first thing that comes to mind is climate change; how the weather has turned extreme. That is only one of the effects of global warming. We have melting glaciers, a major cause of rising sea levels that lead to flooding of coastal cities; increasing heat waves and droughts; worsening storms and tornadoes; disease and pest infestations.
This does not augur well for Africa, given how most of the continent is already dry and hot. According to the Intergovernmental Panel on Climate Change, Africa is among the most vulnerable continents to climate change; and will only get hotter if climate change is not mitigated. Now, Nigeria finds herself situated on the equator: meaning we're among the countries that will most likely have the worst of it.

While looking at intensive undertakings like the utilization of renewable energy and the reduction of carbon emission, we could also take a look at something much greener—literally green. **Trees**.

A study published in the journal Science: The Global Tree Restoration Potential (2019), estimated restoring forested lands as a strategy for climate change mitigation. By planting more than 500bn trees, about 25% of the atmospheric carbon can be reduced over time; enough to negate 20 years worth of human-produced carbon. This is, of course, something that should be embarked upon on a global scale—planting 500bn trees is a herculean endeavor, but every country has a part to play and we must start ours now, for we owe it to our future.

While this is not a substitute for decreasing fossil fuel emissions, reforestation can greatly complement carbon emission reduction.

Reforestation efforts of AFR100. Credit: Andrea Borgarello for TerrAfrica/World Bank

There is currently a country-led effort to bring 100 million hectares of land in Africa into restoration by 2030 called the AFR100 (the African Forest Landscape Restoration Initiative), and Nigeria has committed to restore 4 million hectares. A good move, but we still have to incorporate forest restoration into our national strategies, and individuals should contribute as well.

How can individuals contribute? We could plant trees in our homes; educate ourselves on the hazards of deforestation and encourage one another to reduce firewood consumption; integrate tree planting into the activities of our youth clubs as Malawi is currently doing. We could even initiate a movement to make Nigeria greener and cleaner, and name it **Nigeria Mission Green**.

Mkandizi Youth Club members take care of saplings in Malawi's Rumphi District. Source: www.AFR100.org

It's very cheap to plant a tree—most likely the cheapest way of taking CO2 out of the atmosphere. And we do not have to wait for the tree to fully mature to reap the benefits. It is an almost instantaneous process because trees absorb CO2 as an essential nutrient and they give us Oxygen. Trees provide shade which can cool urban areas.

We have absolutely nothing to lose and everything to gain by planting trees ■

WASTE MANAGEMENT: TURNING MUNICIPAL SOLID WASTE INTO A RESOURCE

By **Matilda Chioma Obuh**
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2019 NYSC BATCH A

Inadequate, inconsistent, and improper waste collection and disposal in Nigeria has become a long lasting problem which has not received the required attention it deserves. Presently, we generate more than 32 million tons of solid waste annually and only about 20-30% is collected and disposed (Solid Waste Management in Nigeria by Wale Bakare· April 4, 2019). This environmental problem leads to health hazards, traffic congestions, unsightly, and unpleasant heaps of garbage among others, requiring both the government and citizens to act urgently in finding a sustainable solution to waste management.

In Nigeria, collection of municipal solid waste is carried out communally, block collection or door to door collection. The challenges of climatic change, public attitude, nature of waste and transportation continue to affect the various means of waste collection. Also, majority of citizens are used to dumping refuse indiscriminately in various parts of the town, especially along the roads, not minding the inconvenience it brings. Wastes are currently being disposed in dumpsites or landfills, and waste incineration systems which still have a harmful effect on the environment such as causing pollution with the release of harmful greenhouse gases.

Nyanya-Karu-Jikwoyi road, just after the St. Mary's Catholic Church. Source: https://leadership.ng/2019/02/06/nyanya-karu-jikwoyi-road-dumpsite-evolving-infection-breeding-place/

Turning waste to a resource is simply the re-use of waste and waste products. Globally, a waste-to-energy initiative has been adopted by using waste to generate energy in the form of electricity and heat from the primary treatment of waste. (countries like the United States of America, the United Kingdom and Singapore have adopted the waste-to-energy method and it has helped to solve a great deal of problems of managing waste.

A waste-to-energy plant converts municipal solid wastes into electricity and heat for industrial processing and for distinct heating systems. It is an ecologically sound, cost effective means of energy recovery. Adopting this method will improve our economy as one of the benefits is solving the problem of electricity which we face in Nigeria.

Waste-to-energy plant in the United Kingdom. Source: www.vinci-uk.com

Success is not about the resources we have. It is about how resourceful we are with what we have. Besides advancements in incineration process, innovations such as pyrolysis and recycling of petrochemical materials can be adopted. Investments made on these areas will be very rewarding.

Adopting the best methods of adequate waste collection and disposal may initially be quite expensive, but in the long run, would boost our economy and promote clean environment and better standard of living. Waste in landfills with its associated carbon emission will be reduced, provide an environmental-friendly source of energy and also solve the issue of unemployment in the country especially for citizens living in the community around the set up facilities. At the end of the day, garbage is not garbage at all when utilized well ■

DIGITAL EDUCATION:

Teaching and Learning in the 21st Century

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Digital education is a revolutionary way of teaching, where digital tools and technologies are used through instructional practice, to facilitate learning. The 21st century ushered in a new age, the digital age. Although computers did exist in the latter part of the 20th century, the overall digitisation of most sectors like banking and finance, transportation, journalism, health and fitness, and many others, only really kicked off in the current millennium. As digital apparatus became increasingly relevant and played a major role in the areas aforementioned, school regulatory bodies also found, through what is known as Technology Enhanced Learning (TEL),

that computers especially, and other digital tools can be very effective in the education sector. This piece will explore some of the ways in which computers and other digital tools could be used to improve the Nigerian education system.

Currently a student is not allowed to carry along a phone or a computer to school. The primary reason for adopting this rule, is to avoid the distraction such devices could cause to the students during classes. Schools should perhaps consider the value of smartphones and computers and think of how they could utilize these digital tools to aid learning. The transition from traditional to digital education ought to start with dissociating the stigma attached to technologies (smartphones and computers), and their impediments to learning. While it is quite glaring that phones and computers

can have adverse effects on children's academic performance, public opinion may be missing the crucial point that smartphones, computers and the internet, could be invaluable tools for learning and general self-improvement. Schools should take the lead in sensitizing the public on the potential dangers, and opportunities that are available online. First

time uses of the internet and smartphones, especially children need to be guided on how to stay safe online, as well as important informative websites that can help students with their studies.

In this regard, school regulatory bodies need to adopt a new attitude towards the role of computers in education. As the following points will illustrate, there are numerous advantages to adopting digital education, for the school administration, for teachers, students, parents, and even the environment.

Efficiency

Adopting digital education saves time and energy. Teachers across the country are familiar with the tedious task of having to write notes on the board for students to copy. This is not only an energy draining task, but also; a time-consuming one. Teachers sometimes have to rush their explanations because so much time has already been spent writing on the board. With digital apparatus, the teacher can use PowerPoint to project the notes, diagrams, or charts on slides and send it to the students on their computers even ahead of class. This way, students have a chance to read before the class and come to class much more prepared to participate and are better informed about the topics to be treated. Students also have increased access to information for individual research and learning.
From an administrative standpoint, school records are also better organised and accessible when digitalised. Information about students' medical records, emergency contacts, or grades, could be accessed in a matter of seconds; unlike when such records are kept in hardcopy files. The computer also helps teachers to easily input their students' grades into programs that will quickly calculate the percentages and scores accurately.

Communication

Teachers and school principals often have the need to contact a parent directly. Teachers sometimes want to enquire about a student's absence, sudden change in behaviour, performance, permission for participation on a school trip, and many other issues from a parent. When registering students, principals could request for the parents' email, through which official mails concerning their child would be sent to them. This would avoid the common issues of students not giving their parents letters for one reason or the other. This will also ensure that the letter reaches the parent and there is a digital record for reference.

Computer Literacy

Both teachers and students become comfortable and more competent on the computer because they use it in their day-to-day work. As stated earlier in the introduction, almost all sectors of the economy are gradually moving towards digitisation. For this reason, most employers prioritise a fair level of competence in IT when hiring. Exposing students to computers at an early age will not only enhance their learning, but also increase their employment chances in future.
Moreover, the fields of science, technology, engineering, and math (STEM), seem to fall short in the number of applicants to these programs in the university. This is the case in the United States as in many countries around the world, including Nigeria. Such is the concern, that in the United States, STEM-related programs have earned a status of presidential priority. The Petroleum Technology Development Fund (PTDF) plays a key role in helping promote STEM, by creating events that highlight the enormous opportunities that these fields of study provide. Digital education could further drive such initiatives, by showing young impressionable minds how to solve the worlds ever-growing problems - digitally.

Environmentally Friendly

By moving from traditional to digital education, paper use will be reduced significantly. Globally, the contribution of the pulp, paper and printing industries to the global greenhouse gas inventory is about 1% (Ecofys, 2013). In a world where there is ever growing concern about the catastrophic effects of global warming and climate change, there is a pressing need to cut down greenhouse gas emissions across the globe. Converting to digital education would help keep the global CO2 emissions down to the barest minimum and the school environment clean.
Implementing digital education will be very beneficial to the teaching and learning process. The reason why it has not yet been adopted in Nigeria, can perhaps be attributed to the cost involved. It is a very expensive system to run. However, carrying out trials in a few schools would highlight the overwhelming benefits of adopting such a system. Digital education has both immediate and long-term advantages. Some of the immediate impacts have been observed as efficiency, better communication with parents, and contribution to climate preservation. In the long term, students who have been taught through digital education would have better career prospects, develop better digital consciousness, and the ability to think about solutions to problems through science and technology.

Reference

Ecofys, World GHG Emissions Flow Chart, 2013

WE'RE DEEPENING CAPACITY IN NIGERIA'S PETROLEUM INDUSTRY

- Dr. Bello Aliyu Gusau

Dr Bello Aliyu Gusau, Executive Secretary, Petroleum Technology Development Fund (PTDF) was once described as a round peg in a round hole by an oil and gas analyst. He was right. Dr Gusau's PhD in Political Economy and Development Studies coupled with his stint as Secretary, of the Oil and Gas Sector Reform Implementation Committee (OGIC) and Special Assistant to the inimitable former Minister of Petroleum Resources, late Rilwan Lukman, prepared him well for his current position and assignment, even though he attended the Institute of Energy Studies in Oxford, UK to get fully acclimatized to the oil and gas environment. Without doubt, his days as a lecturer at the Usman Dan Fodio University, Sokoto could only have enhanced his faculty and career.

Since taking charge at the PTDF in October 2016, Dr Gusau has implemented a string of successful initiatives. These include the development of a new charter for the Fund outlining new strategic priorities; the setting up of a Zeolite Catalyst National Working Group and bringing together retired and serving industry experts to Xray current issues and concerns in the industry through PTDF lecture series.
He elaborates on some of these initiatives in this special interview.

How has the Petroleum Technology Development Fund (PTDF) under your leadership been serving as a catalyst for sustainable capacity building and skills acquisition in the oil and gas industry?

The PTDF was established basically for that, and it has been excelling in the training of Nigerians to qualify as graduates, professionals, technicians and craftsmen in Engineering, Geology, Science and Management in the petroleum sector which from every indication, has given Nigeria the edge in Africa when it comes to capacity

building in the petroleum sector.

What we have done since I took the reins as Executive Secretary is deepening some of the programmes and updating them in line with international best practice. This informed the level of partnerships with both local and international institutions to domesticate global ideas to suit our local needs. Our goal is to meet the long-term capacity building requirements of the oil and gas industry through research and training of Nigerians in relevant fields.

Through our Local and Overseas Scholarship Schemes for undergraduate and postgraduate studies in-country and abroad, the beneficiaries are expected upon completion of their studies to fit in directly in the petroleum sector and or the academia to contribute positively to nation building. In the long term, this will help to meet the set targets in attaining the Nigerian Content aspiration with regard to local manpower participation in the industry, and also, make Nigeria the hub of oil and gas personnel development for the West African sub-region and the Gulf of Guinea.

There is also the PTDF industry-based training targeting oil and gas industry practitioners designed to assist participants to acquire new skills and techniques to improve their effectiveness and efficiency in the performance of their jobs.

To what extent has PTDF's strategic framework for capacity building which you unveiled in 2017 ensured that industry players are much more involved in the activities of the Fund?
Our strategic framework for capacity building is impacting positively on the oil and gas sector. In the past two years, it has widened the scope of oil and gas players' involvement in the activities of the Fund. It has also ensured that PTDF is much more integrated into Nigeria's oil and gas industry. Before now, the PTDF was marginally connected to industry players. There was an obvious lack of organic relationship between the Fund and the industry because we did not create linkages with other players.

But through the policy, we have reasserted our relevance in the oil and gas industry by engaging in a very practical manner with the industry. This has created strategic collaborations between the Fund and key players in the Nigerian oil and gas industry as well as international oil companies. Our closer engagement with industry players is facilitating manpower development in the sector. We are developing partnerships on gas training and skills development centres. We are now working together for the common good of making the oil and gas industry in Nigeria more vibrant.

Does PTDF promote cutting-edge research and acquisition of relevant technology geared towards making Nigeria a human resource centre for the West African sub-region?
We have continued to do our best to achieve the vision of the PTDF which is to serve as a vessel for the development of indigenous manpower and technology transfer-cum-acquisition in the oil and gas sector. Our ultimate goal is to make Nigeria a human resource centre for the sector in the West African sub-region. We believe that human resource development is the most important project that drives the growth and development of the sector. This is because rapid advances in artificial intelligence, automation and human-machine interaction have not obscured the primacy of people in the running of oil and gas business. Indeed, the human being is still central to the development, performance and sustainability of resource and tools deployed in the industry. The question then becomes: what are we doing to ensure the development of the critical mass of human resources to satisfy the needs of the oil and gas industry and to then ensure the sustainability of Nigeria's local content aspirations?

As the body statutorily mandated to build human and institutional capacity in the oil and gas industry, the PTDF has been working hard to achieve these goals through interventions in research, development and human capital which run into huge amount annually. The Fund has over the years, concentrated its human capacity programmes on developing skills, competences and capabilities in the upstream segment of the oil and gas industry. However, realizing the critical position of refining, distribution and marketing of petroleum products in the petroleum value chain, the Fund is now investing in training programmes that will enhance the capacity of Nigerians to play more effective roles in the mid and downstream segments of the industry. We are also increasing interest among current employees to sustain existing human resource pool.

How does PTDF ensure that beneficiaries of the Overseas Scholarship Scheme return to the country after their studies?
It is a great injustice if any beneficiary of the scheme fails to come

back home to assist in the task of nation building. There is a truism which says that to whom much is given, much is expected. If after benefitting from this scheme the person fails to return to the country, he or she has breached a vital trust.

As a way of encouraging our OSS beneficiaries to return home, we ensure that only Nigerians desirous of using their knowledge to develop the country are given the opportunity to study overseas. In addition, we also encourage the various multinationals as well as other critical stakeholders in the oil and gas industry in Nigeria to engage their services which further creates local content for our petroleum sector. With a promise of available jobs and competitive pay, our beneficiaries are encouraged to return to contribute their own quota in the course of national development. We usually tell them that it is more rewarding to return home at the completion of their studies overseas because their newly acquired knowledge and skills would be better appreciated in a growing economy like ours.

How have you been able to cope considering the huge funding involved?

Without doubt, the scholarship scheme comes at a great cost to the Fund and requires a lot of painstaking efforts to pull it through. In achieving this noble goal, the Fund has had to confront some challenges such as paucity of fund occasioned by dwindling oil price as well as a spike in our foreign exchange. Today, it costs PTDF more money to train Nigerians abroad than ever before. The volatility in the country's exchange rate has made accurate planning more difficult. In addition, there is a global rise in the cost of education and research which adds more financial burden on us.

However, in spite of the problems, the PTDF continues to devise innovative ways by which Nigerians can benefit from overseas education. Considering the prevailing economic realities, one of the steps we have taken is the domestication of most of our training programmes in-country. This paradigm shift has afforded the Fund the opportunity to impact a large number of people without compromising standards. It is our hope that adequate resources will be available to the Fund in order to continue in this onerous task of nation building. We are also grateful to the Federal Government which has continued to support us with funding and other logistics to deliver on our mandate in PTDF despite the prevailing harsh economic realities.

What are the most important recent assistance packages of the PTDF for oil and gas-related educational institutions?

We have continued to do our best to achieve the vision of the PTDF which is to serve as a vessel for the development of indigenous manpower and technology transfer-cum-acquisition in the oil and gas sector. Our ultimate goal is to make Nigeria a human resource centre for the sector in the West African sub-region.

- Dr Bello Aliyu Gusau,

We have a lot of programmes through which we support educational institutions especially oil and gas related institutions. So far, we have supported the upgrade and development of specialised oil and gas institutions such as the Petroleum Training Institute (PTI) in Warri, the Federal Polytechnic of Oil and Gas Ekowe in Bayelsa State and the Federal Polytechnic Bonny, Rivers State specialising in gas technology and environmental management. Likewise, PTDF has upgraded the infrastructure and faculty of 26 universities through our University Upgrade project while about 214 institutions including universities, colleges of education, polytechnics, the unity schools and others are beneficiaries of our ICT Centre Development Scheme. Some of these institutions have received technical equipment such as generators, solar panels, V-sat and computers. In some others, we have constructed classrooms, laboratories, and dug boreholes.

Interestingly, we have received commendations from some of these institutions. Some tell us that without our support teaching, learning and research activities would have been difficult. For us in PTDF, such stories gladden our heart and it shows we are making a

difference in line with our mission.

Does the Gas Technology Development Division really contribute to the Federal Government's efforts to reduce gas flaring?

Interestingly, Nigeria has more potentials in gas than oil and we have not done enough to capture and utilize gas for national development. The Gas Technology Development Division of PTDF is tasked with providing strategy for domestication of gas training to achieve the human capital needs for the implementation of the national gas policy. It is also to develop partnerships and collaboration with relevant gas associations, government agencies, private organisations and the academia to position PTDF gas training facilities as premier centres for domestic training in gas technology and skills development. It equally facilitates research in collaboration with industry operators and the academia, towards the development of home-grown technology in the Nigerian gas value chain.

Gas flaring has been a challenge to the industry as well as the economy. So, this initiative is to ensure that government policy of ending gas flaring progresses as planned. So far, we are seeing encouraging signs in terms of training the necessary manpower and collaboration between relevant agencies towards ending gas flaring. The Petroleum Technology Development Fund is expected to provide the training needs of personnel involved in the programme and develop the institutional capacity for its implementation. Coincidentally, PTDF is a member of the Joint Implementation Committee on National Gas Flare Commercialisation programme. PTDF will develop a human capacity framework and conduct a gap analysis of the skills required across the gas value chain in Nigeria. It will also identify the technical expertise required and design training programmes for people that will be engaged in the gas flare reduction commercialisation project ■

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- Dr Bello Aliyu Gusau

Congratulations!

Congratuations to **Bello Mustapha**,
Head, Overseas Scholarship Scheme (OSS) Division, PTDF
on his Recognition by Katagum Emirate Council in Bauchi State as the first "*Kogunan Katagum*"

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RESEARCH AND DEVELOPMENT INTERVENTIONS

Promoting Research to solve Oil and Gas Industry problems

PTDF supports Research in various universities by endowing Professorial Chairs in oil and gas related departments as well as award Research Grants to academics for research in identified areas of contemporary significance to the oil and gas industry. Breakthroughs from these are directed at solving oil and gas industry problems and contribute to the oil and gas value chain in Nigeria.

PETROLEUM TECHNOLOGY DEVELOPMENT FUND

PTDF

PETROLEUM TECHNOLOGY DEVELOPMENT FUND

PTDF ...committed to increasing local capacity in the oil and gas industry.

PTDF: ONE STOP CENTRE FOR OIL & GAS EVENTS

With the consistent hosting of major oil and gas events by the Petroleum Technology Development Fund, the agency is not only taking the lead in developing human and institutional capacity for the oil and gas industry but is also providing enlightenment on contemporary issues and concerns about the industry. The PTDF conference centre is now the platform of choice for oil and gas stakeholders to discuss, deliberate and find solutions and new path ways for managing the peculiar demands and challenges of the industry.

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