

## President's Message

In recent months markets have taught us that energy is a cyclical business. After a quite stable upward trend of energy prices we have to recognize that energy prices can also move in the opposite direction. Given the fact that most energy economists like to analyze energy markets from the supply side (which has not fundamentally changed in recent months) rather than from the demand side (which is assumed to be sticky) many of us now must be rather surprised by the deep price collapse.

According to mainstream thinking, there are not many energy models that recognize cyclicity in their mathematical formulations and have been able to anticipate the recent downward shock. Instead most model based forecasts are trend extrapolations. These forecasts usually turn out to be quite good as long as market trends remain stable, but they become dramatically wrong when a turning point occurs.

It is well known that accurate turning point forecasting is most difficult. Ex-post we can always find experts claiming that they were able to anticipate crude price swings. But unfortunately few experts communicate unorthodox forecasts ex-ante, prior to the occurrence of turning points. For example, most oil price forecasts published in the first half of 2008 had indicated a continuing price increase, to levels of 200 dollars per barrel or more.

This may be due to a basic forecasting externality according to which it is wise not to communicate an individual forecast that differs from the consensus view: If the dissenting forecast turns out to be wrong, its ex-ante publication may affect the credibility and reputation of the expert. If, on the other hand, the expert's forecast turns out to outstrip the consensus view, the success may be regarded as luck instead of skill as there will always be a good forecast if the distribution of all forecasts is sufficiently large. As a consequence, the best strategy may be to locate the published forecast close to the consensus view even if this is not the true forecaster's opinion. The usual argument to defend the failure would then be that virtually no serious expert was able to produce an appropriate forecast, and that forecasting is particularly difficult in situations of turbulent markets. This may affect the overall reputation of the energy economist community, but not that of the individual expert.

But then we have to deal with disappointed customers that had based their decisions on a forecast that turns out to perform poorly. The traditional disclaimer of energy consultants not to be responsible for the consequences of their forecasts and actions is necessary to protect the expert from liability claims but no solution to the problem. The usual approach of energy experts is to forecast ranges instead of a single value. In calm and regular markets this range may be small, but under market turbulences the spread will broaden. Again, forecasters may have a problem with their customers. The value of a statement claiming that the average crude price in 2009 will, for example, range from 30 to 120 dollar per barrel is not useful to them. To slightly improve the relevance of forecasts, individual values within the forecasting range are explained by statements like "this would likely happen, if ...". In this case, the individual forecasts become scenarios which can be falsified in the sense of Popper. Unfortunately, it was quite often the case when scenarios had been checked ex-post.

Regarding disappointed customers, forecasters risk credibility and reputation if they cannot improve the accuracy of their predictions. Should energy economists, therefore, stop delivering forecasts in turbulent times when it is in fact difficult, if not impossible, to fulfil customers' expectations? Should experts refrain from making forecasts if these draw a pessimistic picture of the future as is presently the case? Recently some politicians claimed this by stating that in spite of the weak performance of past forecasts, negative statements about the future may impact market psychology and thus reinforce the negative trend (self fulfilling prophecy). Should energy experts consider the impact of pessimistic forecasts or scenarios and draw an optimistic picture of the future even if they don't trust those statements?

*(continued on page 2)*



### CONTENTS

- 1 President's Message
- 5 Impact of Oil Price on Demand
- 8 The Niger Delta: Defusing The Time Bomb
- 13 Militant Attacks in the Niger Delta and Possible Investor-State Arbitration
- 15 The Cost of Electricity in Nigeria
- 20 Nigeria: Gaunt Energy
- 23 Getting Nigeria's Electricity Sector Liberalization Right – Four Important Issues
- 27 Reliable Electricity Supply for Nigeria-What Will it Take?
- 29 Nigeria's Electricity Sector- Electricity and Gas Pricing Barriers
- 43 Calendar

## PRESIDENT'S MESSAGE *(continued from page 1)*

I personally believe that forecasts are required because decision makers need orientations. Our task as energy market experts is to deliver insights as good as we can, as this is our key role in the process of developing orientations. If, in a particular situation like the present one, forecasters cannot reach a clear and reliable assessment of the future, the uncertainties and insecurities should clearly be described and communicated. They will challenge and motivate decision makers to plan for an unclear and perhaps unfavourable future and prepare robust decisions – decisions with potentially favourable outcomes even under adverse market developments. The benefit is that decision makers are prepared for the worst case and thus may suffer less than if it eventually happens.

Perhaps you are interested in discussing these issues and other up-to date energy economics topics at one of our next IAEE conferences. You are always welcome to propose sessions or round table discussions. You are also invited to deepen the debate on the limitations of forecasting in the *IAEE Energy Forum*. I am curious about your ideas and suggestions.

So let me give to you an update on coming IAEE events. Thanks to many engaged IAEE members, including our executive director, delegates have many opportunities in 2009 to attend one of our lively, relevant, and intellectually stimulating conferences:

- March 22-24 in Santiago, Chile: 2<sup>nd</sup> Latin American Conference on Energy Economics: Energy Security, Integration and Development”
- April 23-24 in Abuja, Nigeria: 2<sup>nd</sup> Annual NAE/IAEE International Conference “Energy Industry Restructuring: Interactions between Business, Economics, and Policy”
- June 21-24 in San Francisco, USA: 32<sup>nd</sup> International IAEE Conference “Energy, Economy, and Environment: The Global View”
- September 7-10 in Vienna, Austria: 10<sup>th</sup> IAEE European Conference “Energy, Policies and Technologies for Sustainable Economies”

I hope to welcome many of you at least at one of these coming IAEE conferences. I believe that in turbulent times the exchange with other members and energy economists about economic and political developments is even more important than in quiet periods. You will find links to these conferences at the IAEE website ([www.iaee.org](http://www.iaee.org)). In the name of all IAEE members I thank our voluntary committee members for their valuable involvement.

This is my first message as President of the IAEE. My particular thanks goes to my predecessor, Andrea Bollino, who did a magnificent job for the association and hands over a successful and healthy organization. IAEE membership as well as participation in our conferences is growing. Our flagship publication, *The Energy Journal*, enjoys a top ranking among scientific energy periodicals. We have an improved web appearance with much valuable information, and our finances are healthy. Just before the end of Andrea’s presidency we welcomed the Greek affiliate, the *Hellenic Association for Energy Economics* (HAEE). A particularly warm welcome to all of you!

I am rather impressed by the engagement of so many members that contribute their capacities and knowledge to help accomplish the mission of our non-profit organization. During my presidency I am counting on you. If you have any suggestions for improving the IAEE and its services, please do not hesitate to contact me.

Before finishing, I would like to formulate a wish for 2009: IAEE is a membership organization and thus depends on individuals being or becoming members. I am sure that you know many colleagues and professional friends who, as experts and students, are interested in energy economics but are not

yet members of our association. Given the many benefits of IAEE membership, I wonder if you could not motivate some of these individuals to apply for IAEE membership, either as a direct member or through membership in one of our affiliates. If each of you were to bring at least one new IAEE member in the coming months, the year 2009 would be a wonderful year for our association and all those who are concerned with its strength and future.

## IAEE Mission Statement

The International Association for Energy Economics is an independent, non-profit, global membership organisation for business, government, academic and other professionals concerned with energy and related issues in the international community. We advance the knowledge, understanding and application of economics across all aspects of energy and foster communication amongst energy concerned professionals.

We facilitate:

- Worldwide information flow and exchange of ideas on energy issues
- High quality research
- Development and education of students and energy professionals

We accomplish this through:

- Providing leading edge publications and electronic media
- Organizing international and regional conferences
- Building networks of energy concerned professionals

**Georg Erdmann**

## Editor's Note

**W**e conclude our focus on Nigeria in this issue of the *Forum* with seven articles on a variety of aspects of Nigerian energy; but before considering those, William Edwards examines the impact of the oil price on demand, noting that the entire increase in demand over the past decade has been erased in the past two years and that even if the price stabilizes around the current level, we may see a continuation of the demand decline for another two years. He suggests that the oil price spike may be partly to blame for the worldwide recession.

**J**ean Balouga discusses the Niger Delta situation, and explains the background of the area, noting that 70% of the people in the region live below the poverty line and earn less than \$1 a day. This has contributed to militancy, theft and all kinds of unlawful activity including crude theft and oil spills. He notes the unsuccessful efforts over the years to bring peace to the area. He makes some suggestions on how the situation might be brought under control.

**J**ames Chalker, noting the severity of the militant attacks on oil and gas operations in the Niger Delta, asks the question, 'what options might a foreign oil company have to seek redress from the Nigerian government for these attacks?' He explains that Nigeria has bilateral investment treaties with some of the countries of companies with operations in the Delta and these treaties allow individuals and companies to bring an arbitration claim against the country hosing their investment. The treaties obligate the host country to provide investment protection and security. He discusses the ramifications of these treaties.

**A**desiji Rabiou explores the cost of electricity in Nigeria, noting that it is widely believed that over half the people in the country do not have access to electricity. The country has a current production capacity of less than 3000 MW, well below the estimated minimum of 10000 MW needed. At a minimum, investments of \$20 billion will be needed. He outlines a three phase approach to solving the problem.

**O**lugbenga Adesanya describes the energy, and particularly the energy infrastructure, situation in Nigeria as "gaunt". He urges a reactivation of the Nigerian energy market in an investment friendly fashion with pricing sufficient to recover costs and no subsidization. The challenge, he says, is freeing the investment climate from the shackles of numerous limiting (he lists fourteen of them) factors. There is a clear need to attract massive investment and technology assistance and this is only available through the private sector and off shore business partners.

**A**dekola Oyenuga provides a short historical review of electricity liberalization in other countries and then discusses four important issues that must be gotten right if electricity liberalization is to be successful. He urges that these be considered when implementing liberalization in Nigeria.

**B**ob Grabham notes that the 10<sup>th</sup> largest net gas exporter in the world cannot supply enough gas to its domestic market and then asks the question 'what will it take to ensure reliable electricity supply for the population of Nigeria?' In answer, he lays out a plan leading to a reliable electricity supply for Nigeria.

**P**rasad Tallapragada calls attention to the barriers to electricity and gas pricing in Nigeria. He notes that investments in the power sector over the last three decades have followed an irregular pattern, not keeping up with demand. Though some progress has been made, retail electricity prices have not kept up with inflation. This has caused the sector many problems and resulted in inconvenience to the population. To address this issue a Multi-Year Tariff Order (MYTO) has been developed which is hoped will help the situation.

*DLW*

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## Impact of Oil Price on Demand

By William R. Edwards\*

In reality, we can recognize peaks and valleys only after the fact. For example, looking back we can see the “dot com” bubble, or spike, that occurred in the year 2000. The NASDAQ, currently at 1400, reached a price level of 5000 that will probably not be seen again for decades, if ever. Similarly, due to the recent rapid price decline, we can now look back at the oil price bubble, or spike. Between early 2007 and late 2008 the WTI futures price rose from \$50 to \$150 and then returned to \$50. This brief duration of high prices appears more like a spike than a bubble.

The brief duration of the spike gives us an unusual opportunity to learn something of the lag time that exists between a change in price and the resulting impact on demand. While no rigorous study of the lag time is possible because of the dynamic nature of the various economic factors at work, we can get some sense of this element by comparing the demand data with the price performance. This comparison is shown in the adjacent graph.

Probably the most surprising observation is that the demand curve peaked out in January 2007, about the same time that the price curve started its dramatic upward move. Since prices had risen over the previous three years by a factor of two, it is reasonable to conclude that the drop in demand that began in 2007 was the result of a price increase that began three years earlier. While by no means exact, the assignment of a two-year lag time seems reasonable. Thus the current level of demand, now down 5% year over year, may see another 5% drop as the impact of the 2008 spike makes its impact completely felt. Thus, even if the price stabilizes at the current level, we may see a continuation of demand decline for another two years.

Actually, the demand decline could be even more prolonged and deeper than the suggested 10% since actions that will not be reversed have been taken in anticipation of permanently higher prices. However, this demand decline may be offset to a degree by a further lowering of the price. It is by no means certain that oil prices will stabilize at current levels. In fact, the 25-year price profile suggests that the price may return to the \$10-20 range that existed in the 90's. This would correspond to a \$25-50 range in current dollars. This additional lowering in price suggests that the demand decline could be reversed in a few years, but it is unlikely to turn around quickly.

To put the current fall in demand in perspective, it should be noted that the entire increase in demand over the past decade has been erased in the past two years. The current “conventional wisdom” believes that the price of oil is directly related to demand. Therefore, if demand has returned to the level of the year 2000, should we expect prices to return to the level in 2000, as well, when prices were well below \$20/B?

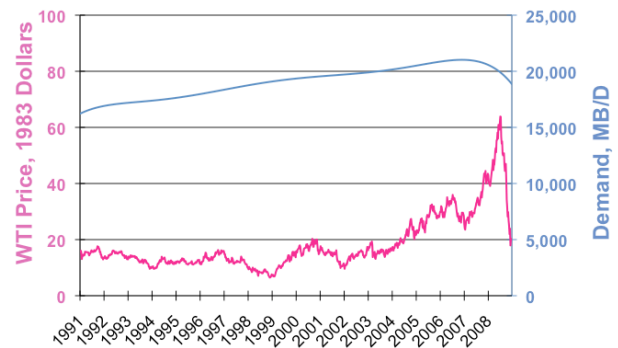
How should OPEC view this disturbing assessment? There is no question that a drop in demand will force upon OPEC a drop in production. Like it or not, supply cannot exceed demand. But will the organization assign reduced quotas so that the pain is spread among all the members, or will most of the burden fall on the Saudis? It does not matter at all when OPEC announces new quota assignments, production will be curtailed by the crude purchasers with or without OPEC's blessing on the cuts. If OPEC delays assigning new quotas, only Saudi Arabia will suffer from the delay. And if the member countries do not abide by the new quotas, only the Saudis will suffer from that lack of cooperation.

Contrary to popular opinion and deep-seated notions, OPEC-announced cuts and quotas have nothing to do with the price. Under the pricing system that OPEC has accepted for the past twenty-three years, the speculative market sets the price. With the speculators' enthusiasm for oil having disappeared, hopes for a return to high prices will disappear as well. Therefore, the only help OPEC will get from the speculators for the foreseeable future is a further downward pressure on the price.

Has the recent oil price spike been a major contributor to the world's current economic problems? It has been claimed by OPEC officials that this is not the case since there was no impact on demand when prices rose. The data presented here suggest that this reasoning was not correct. Demand had suffered, indeed. It was just not recognized. Therefore, it is reasonable to conclude that the oil price spike could, indeed, be partly to blame for the worldwide recession.

This is just another indication of the need for a new pricing system that creates a stable price.

WTI Price (constant dollars) and U.S. Demand



\* William Edwards is president of Edwards Energy Consultants, Katy, TX. This article is reprinted by permission from the MEES newsletter, Vol LI, No. 49, 8 December 2008.

32nd IAEE INTERNATIONAL CONFERENCE | JUNE 21-24, 2009

# Energy, Economy, Environment: The Global View

GRAND HYATT SAN FRANCISCO ON UNION SQUARE

## Conference Objectives

Recent developments in energy markets suggest that we may be entering a new phase, with demand increasing more rapidly than supply, putting continued upward pressure on prices. Although technological advances continue to extend our capabilities, additional constraints – most notably global climate challenge – are complicating the picture and adding to uncertainties. And while low-carbon approaches including renewable energy technologies, biofuels, nuclear energy and carbon capture and sequestration offer significant promise, they also pose new challenges for policymakers.

The 32<sup>nd</sup> Annual IAEE conference will assemble prominent scholars and experts from around the world to explore, discuss and debate the challenges facing the global energy sector and offer solutions. The conference aims to bring into focus a host of topics that are of interest both to energy consumers and producers, be it oil, natural gas, transportation fuels, or electricity.

This timely and topical conference, to be held in **San Francisco 21-24 June 2009**, is designed to bring together energy practitioners, industry professionals, regulators, policymakers, researchers and scholars engaged in all aspects of the energy sector to exchange views, network and collaborate. This conference promises to be as big as its theme, “**Energy, Economy, Environment: The Global View.**”

## Plenary Sessions

The plenary sessions will explore several major issues affecting energy markets today. The question of how energy markets will respond to various climate policies is one of the most important questions currently faced. Climate concerns have spurred rapid developments in renewable energy technologies and nuclear power, each of which has a role in ensuring that growing energy needs can be met without increasing CO<sub>2</sub> emissions while facilitating broader goals of energy security.

Increasing rhetoric on energy security was spurred by the unprecedented heights that oil prices reached in 2008. However, the concept of energy security can mean different things to different countries, which can affect the policy actions taken by both suppliers and demanders. This and its implications for future global energy markets will be addressed.

The various factors responsible for the record oil prices witnessed in 2008, and how those factors may affect the future, will be also discussed. There will also be a discussion of the rapid emergence of unconventional oil and gas resources, which by most accounts could dramatically influence the global energy balance. Ensuring an appropriate level of investment to accomplish adequate energy supply can be a challenge in the face of the economic and political uncertainty inherent in today's energy markets. So, the many dimensions of uncertainty and its effect on investment planning will also be explored.

### HOSTED BY:

**USAAEE** United States Association  
for Energy Economics

## Conference Plenary Sessions

### Climate Change Policy – Views from Academia, Government, and the Corporate Sector

James L. Sweeney (*Presiding*)  
Director Precourt Institution for Energy Efficiency, Stanford University  
Speakers TBA

### BP Statistical Review

Christof Ruehl (*Keynote Speaker*)  
Chief Economist, BP International Ltd.

### Drivers of Oil Price and the Outlook for the Future

Samuel A. Van Vactor (*Presiding*)  
President, Economic Insight Inc  
Jeff Currie  
Head of Commodities Research, Goldman Sachs  
Ivan Sandrea  
Vice President, Strategy for International Exploration & Production, StatoilHydro

### The Future of Renewables

Gary Stern (*Presiding*)  
Director of Market Monitoring and Analysis, Southern California Edison  
Ryan Pletka  
Project Manager, Renewable Technologies, Black & Veatch Corporation  
“*Technology Trends and Integration Requirements for Renewables*”  
Robert M. Margolis  
Senior Energy Analysis, National Renewable Energy Laboratory  
“*Overview of Renewable Energy Technologies*”  
Todd P. Strauss  
Senior Director, Energy Policy, Planning, and Analysis, Pacific Gas and Electric Company  
“*Renewables Policy: A California Perspective*”

### Energy Market Developments in the Pacific Basin

Kenichi Matsui (*Presiding*)  
Councilor Energy Data Modeling Ctr, Institute of Energy Economics  
James P. Dorian  
International Energy Economist  
“*The Energy Market in China*”  
Makoto Takada  
Senior Researcher, Institute of Energy Economics  
“*Nuclear Power Market in Asia*”

### Unconventional Resources: Impacts and Issues

Andre Plourde (*Presiding*)  
Professor, Dept of Economics, University of Alberta  
Speakers TBA

### Energy Markets and Policy: Developments Around The Globe

Kenneth B. Medlock (*Presiding*)  
Energy Fellow, Rice University  
Mark K. Jaccard  
Professor, Simon Fraser University  
Carlo Andrea Bollino  
Chairman, GSE SpA

### Energy Market Integration – Developments in LNG

Glen E. Sweetnam  
Director, International, Economic and Greenhouse Gases Division, U.S. Energy Information Administration  
Christian von Hirschhausen (*Invited*)  
Professor, Technische Universität Dresden

### Betting on the Crystal Ball – Private Energy Investment in Uncertain Times

William J. Kemp (*Presiding*)  
Managing Director, Black & Veatch Corporation  
Rich Munczinski  
Senior Vice President, American Electric Power  
“*Building Bridges to the Low-Carbon Future*”

Mike Schneider  
Treasurer, Sempra  
“*Natural Gas and CO<sub>2</sub> Infrastructure: Meeting Long-Term Needs*”

### International Trends in Nuclear Power

Fereidoon P. Sioshansi (*Presiding*)  
President, Menlo Energy Economics  
Ana Palacio  
Senior Vice President of International Affairs and Marketing, AREVA  
Tom O'Neill  
Vice President, New Plant Development, Exelon Nuclear

### Achieving Energy Security – What it Means for Different Players

Mine K. Yucel (*Presiding*)  
Vice President & Sr Economist, Federal Reserve Bank of Dallas  
Paul Leiby  
Distinguished Research Scientist and Energy Analysis Team Leader, Oak Ridge National Laboratory  
Guy F. Caruso  
Senior Advisor, CSIS Energy and National Security Program  
Jonathan P. Stern – Tentative  
Director of Gas Research, Oxford Institute for Energy Studies

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Visit our conference website at:  
<http://www.usaee.org/usaee2009/>

All of these factors – climate, energy security, and uncertainty – have significant importance for developments both regionally and globally, as well as for growing energy commodity markets such as that for LNG. Accordingly, regional development in the Pacific basin and global perspectives on the direction of energy policy in various regions around the world will be addressed. Finally, recent and expected future developments in global natural gas markets, and how those developments affect the interconnectedness of regional gas markets in the coming years will be addressed.

Please refer to <http://www.usaee.org/usaee2009/program.aspx> for more information on the plenary sessions.

## Student Participation

Students are encouraged to submit papers for consideration of the USAEE Student Paper Awards, which include cash prizes plus waiver of conference registration fee. Students may also inquire about scholarships for conference attendance. Visit <http://www.usaee.org/usaee2009/paperawards.html> for full details.

## Travel Documents

International delegates are urged to contact their respective consulate, embassy or travel agent regarding the necessity of obtaining a visa for entry into the U.S. If you need a letter of invitation to attend the conference, contact USAEE with an email request to usaee@usaee.org. We recommend ample time for processing documents.

## About San Francisco

If you have not been there already, you don't know what you've been missing. For those who have already been to San Francisco, it looks more beautiful than you remember it. With world-class shopping, dining, historical and cultural sights and within easy reach to many top sightseeing spots in California, San Francisco is consistently ranked among the most popular destinations in the US – and the world.

## Conference Venue and Accommodations

The conference venue is the **Grand Hyatt** on Union Square, conveniently located at the heart of the city within short walking distance to wonderful shopping, eating, entertainment and cultural sights. We encourage early reservations as the hotel venue is likely to sell out.

### SPONSORED BY



## How to Get to San Francisco

San Francisco is primarily served by San Francisco International Airport (SFO) offering frequent direct flights to the rest of the US as well as many Asian and European cities. The Oakland (OAK) and San Jose (SJC) Airports also serve the city. San Francisco is served by BART, a mass transit system connecting the SFO airport to downtown and other points of interest.

## Technical Tours

A number of technical tours will be organized and available to conference participants.

## What San Francisco Has to Offer

The beautiful San Francisco Bay, Golden Gate Bridge, the world-renowned wineries of Napa and Sonoma and quaint Monterey Bay are within a short drive. To visit Yosemite National Park, Lake Tahoe and much more, you should allow extra time before and after the conference for a memorable experience.

A number of half-day, full-day and multi-day sightseeing and cultural options are recommended, including the following:

- Full or half day cultural city tour
- Full day tour of Napa/Sonoma Wine country
- Full day tour of Monterey Bay and Carmel-by-the-Sea
- Full day tour of Yosemite National Park
- Full day bay cruise plus lunch and sightseeing in Sausalito
- Half day San Francisco Bay Cruise & Alcatraz Island
- Tour of Hearst Castle, Santa Barbara, Lake Tahoe & regions beyond San Francisco

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## The Niger Delta: Defusing The Time Bomb

By Jean Balougo\*

### Introduction

Nigeria is the largest petroleum producer in Africa and the sixth largest producer of sweet crude oil among OPEC member countries. Nigeria is the most populated African country and its size, together with its oil and gas wealth, provides it with both political and economic clout. The advantages of location and the quality of Nigeria's crudes usually yield price premia. Since Nigeria is at some distance from the Middle East, both geographically and politically, the wars and conflicts there which have caused oil supply interruptions in the past decades have had no impact on its production.

Oil is central to the development of Nigeria and constitutes the backbone of the economy. In the early 1990's petroleum production accounted for 25% of GDP, oil exports accounted for over 95% of its total export earnings, and about 75% of government revenue. Petroleum production in fact provides the only immediate hope for the development of the rest of the economy. And while the oil industry received much attention from successive Nigerian governments, and foreign oil companies received the necessary incentives to ensure their continued presence, the land from where the oil was (and still is) prospected and exploited and her people were neglected by successive governments (Khan, 1994:1) and so with reckless abandon.

The Niger Delta region is Nigeria's largest wetland, and the third largest wetland in the world. With a steadily growing population now put at over 40 million people as of 2006, it accounts for more than 23% of Nigeria's total population of over 140 million (National Population Commission, 2006). The Niger Delta has one of the highest population densities in the world, with 265 people per square kilometre. The area, which measures over 2000 square miles, covering nine states in Nigeria's federation, has the highest crude oil resources in the Gulf of Guinea countries. Oil was first discovered in commercial quantity in 1956 at Oloibiri now in Bayelsa State.

But despite these huge resource potentials, it is said that 70% of the people of the Niger Delta region live below the poverty line, less than \$1 a day with a clear absence of the basic amenities. Although well endowed with intelligent human resources as well, the region is also said to have the largest illiteracy and unemployment rates in Nigeria, and one of the largest in the world. A survey revealed that 73% of the households have five or more dependents without a job. Its educational system has been continually collapsing over the years; while the infrastructure vital for quality education is grossly lacking leading to high school dropout rates. The result of this is low skills and un-employability of the region's people. Social life has also been generally low in the region, with lack of health facilities and social amenities. Many years of oil production in the Niger Delta has led to environmental degradation. Gas flaring has seriously affected its ecosystem with human and aquatic life seriously at risk.

Under infrastructural challenges, the region has epileptic or non-existent utilities: there are no roads and potable water is absent. Environmental challenges include coastal erosion and rising sea level, which has led to large portions of the landmass being eroded. Oil and gas production has caused farming and fishing outputs to be on the decline, due to widespread pollution. Pollution of the ground water for instance portends danger both to the present and future generations. Acid rain resulting from gas flaring damages roofs and causes respiratory and other medical problems. There has been a poor impact assessment procedure; increased deforestation and biodiversity loss as well as losses in sewage and municipal solid wastes has occurred in parts of the region.

On the socio-political challenges, the Niger Delta has experienced weak governance; poor service delivery by successive governments at both state and local government levels; lack of transparency, which contributed to making a limited impact on the people's welfare, despite substantial receipts from the federal government. There is also the exclusion of civil society groups, communities and ordinary citizens of the region in the government process. As a result the people have developed mistrust on government's intentions thereby leading to rising impatience with agencies of development. The big issue is lack of co-operation and partnerships between the states of the region and the various agencies of development. For instance many major projects cannot be undertaken by any one state or Local Government Area (LGA) without collaboration among the stakeholders. This wastage through project duplications has depleted funds and made efforts at development inadequate over the years.

\*Jean Balougo is a Research Student in the Department of Economics at the University of Lagos.

### Consequences

Many of Nigeria's problems can be traced to the advent of oil production



half a century ago. The prize of capturing the flood of dollars accruing to the state turned politics into a no-holds-barred contest that fostered coups and a secessionist civil war in the 1960s. Oil encouraged a culture where political connections rather than business acumen were the key to overnight riches.

Nigerian history shows the passion that oil can ignite. Until recently, the news of attack on petroleum pipelines had been restricted to that of refined petroleum products as some Nigerians try to gain access into the pipelines to steal petroleum products. In the last three years however, crude oil theft and illegal bunkering have become a recurring decimal in oil operations in the Niger Delta. Shell Petroleum Development Company, SPDC, first drew the attention of Nigerians to this ugly development in November, 2000, when it suddenly discovered a shortfall of a staggering 30,000 barrels per day (bpd) in crude oil being pumped from its oil fields to the Bonny terminal. The power of those engaged in this business could be traced to the support they get from the top constituting a powerful ring. Crude spills due to theft in 2007 were 242, but human error caused a mere six incidents while equipment failure was responsible for 32, according to SPDC records. The resort to sabotage and hostage-taking is causing a huge toll on the economy of the country. Sources say sabotage has caused 98 per cent or 35,000 bpd of spills in 2008, compared to about 19,000 bpd in 2007.

Shell has lost count of its woes in terms of cost and revenue loss but the Nigerian government latest worry is what huge funds coming into the coffers of the gangs mean to security and national stability. It is believed that the profit from this illegal oil business is attracting criminals from the West Coast of Africa with a larger network and sophistication, people who have no care for life and safety of Nigerians. In taking oil by force, the gangsters put more money in the hands of arms dealers, open avenues for enemies of Nigeria in disguise, and import evil men who may never go away, even if the local grievances are resolved. Organized crimes are taking root and terrorists may not be far from joining the fray. This is the disaster waiting to happen.

Experts say many factors aid bunkering especially “lax enforcement of law and order”. There have been allegations of compromise and charges of security personnel becoming rich after a posting to police crude.

Attacks on installations, and the general insecurity in the region coupled with the Federal Government’s inability to adequately finance its commitment to joint venture with international oil companies, was causing a drastic reduction in the flow of new investments for upstream projects. If the lack of new investments continued, it could lead to a dramatic decline in the level of upstream activity and reduce Nigerian production by as much as a third within the next seven years.

As of now, Shell is recording a production shut-in of about 200,000 bpd in its western base. When the violent attacks escalated in the western base in 2006, the company lost production of 447,000 bpd. It was forced to shutdown production from its fields in the western Niger Delta while crude loading from the Forcados terminal was suspended. This year, the crisis has forced Shell to declare force majeure on its crude exports from Nigeria twice within two months.

Central Bank figures indicate that the country lost some 600,000 bpd to militant insurgency in 2006, while the Federal Ministry of Finance estimates that Nigeria lost almost US\$ 14.4 billion in tax and royalty income that year. The situation in terms of loss of production and revenue has not changed much this year.

It is said that insecurity in the Niger Delta has led to an astronomical increase in the cost of production. In 1986, the technical cost per barrel of oil was US \$1.80 in Nigeria. Currently, it ranges between US\$8 and US\$10 per barrel.

Reports that at least 3,500 workers would be laid off in the on-going re-organization in SPDC is the latest poignant indication that the continuing instability in the Niger Delta, with incessant attacks on oil installations, is having profound, adverse effects on the Nigerian oil industry.

These developments have led to fears of Nigeria losing its credibility as a steady and reliable supplier of crude oil. Prior to the escalation of the violent campaign of militants in the Niger Delta, Nigeria produced about 2.6 million bpd (mbpd) of oil. But in 2006, the nation lost an estimated N570 billion in revenue as crude oil sales fell by 3.2 percent below the projected target, while petroleum profit tax fell by 10.9 percent. Production capacity saw a drop of 600,000 bpd.

The earliest signals that the campaign of violence in the Niger Delta was beginning to adversely affect the industry emerged in late 2006 when industry reports noted reluctance on the part of some companies in the oil field service sub-sector to continue working in Nigeria. Some oil service companies notably from the United States and Britain were reported to have rejected contracts to do with exploration of oil and gas resources in Nigeria as a result of the incessant kidnapping of expatriate workers in the Niger Delta. Asian companies whose workers were also victims of hostage taking by militants and other

elements in the region were becoming increasingly reticent about accepting contracts from producing companies in the Nigeria upstream sector.

The Nigerian government's gas development and utilization targets are threatened by the problem of insecurity with Shell tying progress of the company's various domestic gas projects to the availability of funds and peace in the region. But with the insecurity which has dogged the Niger Delta this decade, the resultant intermittent loss in production and the gradual loss of confidence of upstream players in the region, its desire to raise the country's realization of that projection appears far from feasible. The situation in the region also frustrates government's desire to raise the country's reserves to 40 billion barrels and producibility to 4 million barrels daily.

It is believed that the Niger Delta issue which is fundamentally political must first be successfully addressed, if security and stability are to be restored in the region. If this is assured, attention could then be directed to the issue of increasing Nigerian assets in terms of oil and gas reserves.

#### **Efforts Made So Far**

In the pre-independence era the colonial government tried out some palliatives to address the Niger Delta problems. Some of them were the Willinks Commission of 1958, which proclaimed the Niger Delta as "Special Area" in 1959; and subsequently the Niger Delta Development Board of 1959, the post-independence governments set up the Niger Delta Basin Development Authority (NDBDA) in 1976; the Special Fund for Oil Producing Areas by the Revenue Act of 1981; the Presidential Task Force for the Development of Oil Producing Areas (which approved 1.5% Special Fund for the region).

This was followed with the Oil Mineral Producing Areas Development Commission (OMPADEC) which received 3% oil derivation revenue in 1992. Perhaps the greatest effort was the 13% derivation fund in 2000. There was also a committee under Alexander Ogomudia in 2002, which recommended 50% oil derivation for oil producing states; but this was strongly opposed by elements from the northern states, who saw it as giving too much to the oil communities.

Also, in 2006, the Federal Government raised a committee under Goodluck Jonathan to empower the people of the Niger Delta. There was the Nigerian National Petroleum Corporation (NNPC) emphasis on Local Content Development Initiative in the oil industry. The bill to provide a legal framework for this is still pending at the National Assembly. By far the last gasp to remedy the myriad of the problems in the Niger Delta was the Niger Delta Development Commission (NDDC) established by an Act in 2000. The NDDC was established by former president, Olusegun Obasanjo, with the mandate to develop the oil-rich Niger-Delta region through carrying out projects designed to improve the worsening social and environmental conditions of the region.

On their part, oil companies operating in Nigeria have given scholarships to students in secondary and tertiary institutions, in addition to carrying out projects within their operational environments.

But evidence abounds that these efforts have generally failed to solve the Niger Delta multifarious problems for a number of reasons, some of which are poor crisis management approaches to project conception and delivery, discontinuity in government and policies / programmes inconsistency; grossly inadequate funding; white elephant projects syndrome and duplications; official recklessness and saddening corruption; lack of political commitment; minimal partnering and non-engagement of civil society groups; weak coordination and, therefore, low synergy between tiers of government and development agencies. Up till now there has been lack of a coherent and integrated master plan for a holistic, all-inclusive development of the Niger Delta.

By far, the failure by governments in the country to adequately attend to the Niger Delta problems, coupled with a despoiled environment and traditional livelihoods have combined to throw up varied reactions from the people. The youths mainly have been formed to vehemently agitate for a share in the oil profit. In the last couple of years groups such as the Movement for the Emancipation of the Niger Delta (MEND), Niger Delta People's Volunteer Force (NDPVF), Martyrs Brigade, Coalition of Militant Action in the Niger Delta, Niger Delta People's Salvation Front, Joint Revolutionary Council and Militant Camps Across the Niger Delta, among many others, have carried out violent activities against companies, destroying their facilities and installations. The official response has been the deployment of troops and police. For instance, since 2004 the Joint Military Task Force (JTF) was deployed to states like Rivers, Bayelsa and Delta combating militancy, whose activities have combined to cause Nigeria's crude oil output of drop from 2.4mbpd to about 1.8mbpd since the second quarter of 2008, thereby moving Nigeria's crude oil production into second position in Africa after Angola.

### The Way Forward

The heightened violence in the Niger Delta, the widespread and telling damage to oil and gas installations; the resultant negative (local and international) economic impact as well as the continued life of deprivation that the people of the region are undergoing, demand an urgent and definitive solution to the crisis.

There was optimism at the outset of the Musa Yar'Adua administration that the constructive engagement strategy announced by the President would succeed. It failed. It is now time to explore other options outside the basic Yar'Adua peace strategy. New ideas are emerging from concerned quarters for an all-time resolution of the crisis. The ideas relate to the charting of a path for sustained development and the implementation of projects and programmes that will redress the abuses of the past and have positive impact on the quality of life of the people and the environment.

Promoters of the ideas believe existing structures such as the Niger Delta Development Commission, the Niger Delta Peace and Security Strategy and the Niger Delta Coastal State Council could be utilized to implement workable strategies with the Niger Delta Master Plan providing a good framework. They, however, point out that for any strategies and solutions to work they must take account of the causes of degradation and insecurity in the region. They must also appreciate the major features of the existing reality in the region and the economic consequences of the prolonged state of crisis. The strategies must be such that attack root causes of disenchantment while promoting programmes and projects that empower the people to have a meaningful life.

Within the framework of Jacoby's (1973) social environmental model which explains corporate behaviour as a response to both market and non-market forces that influence costs, revenues and profits, corporate concern with social responsibility is viewed as consistent with enlightened self interest. However, profit seeking corporations cannot be expected to absorb all the costs to society that are incidental to their production activities unless government regulations or fiscal policies encourage them to do so.

### References

- Green, M. (2008): "Crude Realities"; BusinessDay, 1 September 2008; pp.47-48
- Ike-Okoh, C. (2008): "Guiding Niger Delta Entrepreneurs into legitimate operation"; BusinessDay, 18 August, 2008, p.12
- Ignatius Chukwu (2008): "Oil communities bubble with skills and new competences", BusinessDay, 21 July, 2008, pp.42-43.
- Jacoby, N.H. (1973): *Corporate Power and Social Responsibility*; MacMillan Publishing Co. Inc., New York, USA.
- Khan, S.A. (1994): Nigeria: *The Political Economy of Oil*; Oxford University Press, Oxford; pp. 1-2.
- Obasa, R. (2007): "Fresh Ideas Emerge for Niger Delta"; Nigeria's Oil and Gas Monthly, Vol.13 (12), pp.24-27.
- Obasa, R. (2008): "Time to Halt the Decline"; Nigeria's Oil and Gas Monthly, May, 2008; pp.24-27.
- Obasa, R. (2008): "Niger Delta Crisis: Out-of-the-box Solutions"; Nigeria's Oil and Gas Monthly, June, 2008; pp.17-19.
- Ogunfuyi, R. and L. Adefioye (2005): "Crude oil theft: Who's fooling who?" Nigeria's Oil and Gas Monthly, Vol.11(2); pp.24-27.
- (2008): "Consequences of blowing up oil pipelines in the Niger Delta" BusinessDay, 25 July, 2008, p.59.
- (2008): "Challenges of providing social and environmental solutions in Niger Delta"; BusinessDay, 21 July, 2008, pp.58-59.
- (2005): "Niger Delta: The Search for Peace"; Nigeria's Oil and Gas Monthly, Vol.11 (2); pp.22-23.
- (2008): "SPDC's discreet survival strategy in the Niger Delta"; BusinessDay, 26 August, 2008, p.41.

**2<sup>nd</sup> LATIN AMERICAN MEETING ON  
ENERGY ECONOMICS  
ENERGY SECURITY, INTEGRATION  
AND DEVELOPMENT  
IN LATIN AMERICA**

March 22 to 24, 2009  
Sheraton Santiago Hotel and  
Convention Center  
Santiago, Chile  
[www.elaee.org](http://www.elaee.org)

**Dear Colleagues**

We invite you to join us in the Second Latin American Meeting on Energy Economics, to be held in Santiago de Chile on March 22-24, 2009. In this second Latin American meeting we have organized an interesting program around the main theme of the conference “Energy Security, Integration, and Development in Latin America”, We have combined invited plenary sessions and concurrent sessions with speakers from 30 countries in the two days of presentations.

This conference will take place in a period where the climate invites you to visit the city and places of great scenic, archaeological and architectural enhancement in Chile.

We look forward to see you in Santiago.

**Ricardo Raineri**  
**President of the Conference**

**Conference Program**

**Sunday, March 22**

14:00 – 18:00 IAEE Strategy Meeting (Invitation Only)  
18:00 – 20:00 Welcome reception

**Monday, March 23**

08:00 - 20:00 Registration  
08:30 - 10:00 Welcome speech and Inauguration of the Conference  
- **Marcelo Tokman**  
Energy Minister  
Government of Chile  
- **Georg Erdmann: “Energy Nationalism from an Energy Economic Point of View”**  
Elected President IAEE and  
Professor Technical University of Berlin, Germany  
10:00 - 13:00 Inaugural Session Conferences  
- **Conference I (10:00 – 11:20)**  
**Fatih Birol: “World Energy Outlook”**  
Chief Economist  
International Energy Agency  
Coffee Break (11:20 - 11:40)  
- **Conference II (11:40 – 13:00)**  
**Philippe Benoit: “Energy Security, Integration and Development in Latin America”.**  
Sector Manager, Energy  
Sustainable Development Department  
Latin America and the Caribbean Region  
World Bank  
13:00 - 15:00 Lunch, Plenary Session I  
**Fereidoon P. Sioshansi: “Future of Electricity in a Carbon Constrained World”**  
Editor and publisher  
EEnergy Informer  
15:00 - 16:30 Concurrent Sessions I

16:30 - 16:50 Coffee Break  
16:50 - 18:20 Concurrent Sessions II  
20:00 - 23:00 Dinner: Plenary Session II

**Tuesday, March 24**

08:00 - 18:00 Registration  
08:20 – 09:50 Concurrent Sessions III  
09:50 - 11:20 Concurrent Sessions IV  
11:20 – 11:40 Coffee Break  
11:40 - 13:00 Plenary Session III  
**Hugo Altomonte: “Latin America and the Caribbean in front of the International Energy Situation: Opportunities for a New Policy Agenda”.**  
Chief Natural Resources and Energy Unit  
Natural Resources and Infrastructure Division  
ECLAC - United Nations  
13:00 - 15:00 Lunch, Plenary Session IV  
**Einar Hope: “Hydro Power and Market Power in the Nordic Power Market”**  
Economic Professor  
Norwegian School of Economics and Business Administration  
Norway  
15:00 - 16:20 Plenary Session V  
**Reinhard Haas: “Promoting Renewables Efficient and Effectively - Lessons Learned from European Policies”.**  
Professor in Energy Economics at the Institute of Power Systems and Energy Economics  
Vienna University of Technology  
16:20 - 16:40 Coffee Break  
16:40 - 18:30 Round Table  
**“Contracts and Development of an Integrated Energy Market for Latin America”**  
18:30 Closure

## Militant Attacks in the Niger Delta and Possible Investor-State Arbitration

By James Chalker\*

Attacks against oil and gas installations, government forces and foreign workers in the Niger Delta have proven a continuing source of frustration to international oil companies.<sup>1</sup> While for many years attacks were often dismissed as petty criminality, they have been growing in firepower and sophistication, and there has been little evidence that the Nigerian authorities can halt the attacks and make the Delta a stable place for extracting hydrocarbons. Hopes that off-shore production would prove safer were dashed this summer when militants launched an attack against Shell's Bonga oil facility, far from the coast.<sup>2</sup> These attacks have caused Shell and other oil producers in the region to periodically shut down production reaching hundreds of thousands of barrels of oil per day.

Foreign oil companies operating in Nigeria include Shell, ExxonMobil and Chevron, along with other smaller international operators, including Total and Agip. Typically oil and gas projects are undertaken as joint ventures between the Nigerian National Petroleum Corporation and one or more foreign oil companies. What options might a foreign oil company have to seek redress from the Nigerian government for attacks upon its operations?

At least some international operators may be able to turn to international arbitration to secure financial compensation for their losses. Nigeria has bilateral investment treaties (BITs) with the United Kingdom, the Netherlands, France and Italy, but not the United States. BITs allow nationals, both real persons and legal persons (i.e., companies) whose home country is one of the parties to the treaty to bring an arbitration claim against the country hosting their investment. Both the UK and Netherlands BITs<sup>3</sup> contain provisions obligating the country hosting the investment, in this case Nigeria, to provide protection and security.<sup>4</sup>

Looking to a past investor-state arbitration, *American Manufacturing & Trading Company v. Zaire* (AMT), interpreting a protection-and-security clause can help one evaluate the potential for a similar claim involving the Nigerian petroleum sector. Near the end of the Mobutu Sese Seko regime in Zaire some unpaid and hungry troops went on periodic looting rampages in which they destroyed businesses, including a factory and warehouse belonging to the American Manufacturing & Trading Company (AMT). AMT brought a claim under the US-Zaire BIT arguing the attacks violated Zaire's obligation to afford its investment protection and security. Zaire, which was collapsing into civil war and anarchy, barely participated in the arbitration process but the arbitral tribunal ruled on AMT's claim, finding that its rights to protection and security had been violated and awarding the investor \$9 million in damages.

The tribunal's decision interpreted the protection and security obligation very favorably for an investor. It decided that this BIT provision constituted an obligation of vigilance, requiring the host state to take all measures necessary to ensure that the investment received full protection and security. Even though the destruction in this case was caused by uniformed soldiers, the tribunal did not consider this a necessary component of Zaire's responsibility to provide protection and security. Zaire would have been responsible for the damage caused to AMT's investment even if the looting and destruction had been done by "any burglar whatsoever." Finally, unlike many BIT provisions the standard for host-state responsibility, unlike some BIT provisions, is not based on discrimination. According to this tribunal, it is not enough for a state hosting an investment to argue that its own nationals or nationals from a third state also had their property destroyed or its own nationals or third-state nationals also received no compensation for the destruction. In other words, the obligation to provide protection and security is not based on a national-treatment or most-favored-nation standard.

Does this mean that international oil companies, which can bring themselves under the protection of a BIT, will automatically be able to make a successful arbitration claim? Not necessarily. There are some things for such companies to consider before filing an arbitration request. Zaire's participation in the arbitration process was abortive at best. There are several arguments that a skilled attorney could make to both attack the reasoning of the AMT tribunal and to differentiate the situation during Zaire's descent into turmoil and Nigeria today. International arbitration does not operate like a common-law system; tribunals are not obligated to interpret similar treaty provisions the same way that previous tribunals have interpreted those provisions. Zaire's treatment of its soldiers arguably precipitated their looting sprees and the government did nothing to reign in its soldiers once the attacks started. Nigeria's national and state governments have attempted to stop militant attacks in the Niger Delta, even if without

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much success. A tribunal reviewing the situation would have to decide first as a matter of law that the protection-and-security obligation was one of vigilance, and if it agreed with the standard recited by the AMT tribunal, whether Nigeria, as a factual matter, had met that standard. As a business matter, a foreign oil company would have to consider the implications for engaging in future hydrocarbon extraction in Nigeria, if it decided to file an arbitration claim.<sup>5</sup> If a time comes, though, when a foreign oil company decides that the violence in the Delta is such that its investment in the region has lost all value, one could expect that company to pursue a protection-and-security claim in international arbitration.

As far as Nigeria and other African states with energy resources, the AMT decision should serve as a warning for them when they contemplate entering into new BITs or extending current BITs. They might take all reasonable efforts to prevent attacks on foreign energy assets and still be held liable for the damage suffered by foreign investors. Militant attacks in the Niger Delta could serve as a model for disaffected groups throughout Nigeria and beyond. African states need to be realistic in their appraisal to prevent or control such attacks. Countries hosting foreign energy investors might want to weigh the potential for BITs to increase the attractiveness of the investment climate against the potential liability they may suffer as a result of militant attacks. Given the current value of hydrocarbons, oil companies ever-pressing need to book more reserves, and increased competition from Asian investors, it has to be wondered just how valuable a BIT is in making an energy investment in an African country more attractive than it already is.

## Careers, Energy Education and Scholarships Online Databases

IAEE is pleased to highlight our online careers database, with special focus on graduate positions. Please visit [http://www.iaee.org/en/students/student\\_careers.asp](http://www.iaee.org/en/students/student_careers.asp) for a listing of employment opportunities.

Employers are invited to use this database, at no cost, to advertise their graduate, senior graduate or seasoned professional positions to the IAEE membership and visitors to the IAEE website seeking employment assistance.

The IAEE is also pleased to highlight the Energy Economics Education database available at <http://www.iaee.org/en/students/eee.aspx>. Members from academia are kindly invited to list, at no cost, graduate, postgraduate and research programs as well as their university and research centers in this online database. For students and interested individuals looking to enhance their knowledge within the field of energy and economics, this is a valuable database to reference.

Further, IAEE has also launched a Scholarship Database, open at no cost to different grants and scholarship providers in Energy Economics and related fields. This is available at <http://www.iaee.org/en/students/List-Scholarships.aspx>

We look forward to your participation in these new initiatives.

### Footnotes

<sup>1</sup> <http://allafrica.com/> is a good source for information about events in the Niger Delta. Untapped: the Scramble for Africa's Oil, John Ghazvinian, Harcourt Books, 2007, Chapter 1 provides an informative account of the situation in the area, especially regarding the Movement for the Emancipation of the Niger Delta (MEND).

<sup>2</sup> "Nigeria attack shuts Shell offshore oilfield," Financial Times, 19 June 2008.

<sup>3</sup> These two treaties are selected, as the most likely sources of an arbitration claim. Note that it is possible that a company which one might associate with a non-BIT country, like the United States, might through incorporating a subsidiary be protected by another country's BITs. The Netherlands is often an attractive place for incorporating subsidiaries for both tax reasons and BIT protection.

<sup>4</sup> This term is used generally here, the language in each treaty varies somewhat.

<sup>5</sup> It should be noted in this regard that Shell filed an arbitration request regarding the awarding of a concession over a year ago. This would appear to not relate to the protection and security obligation. To date Shell has not pursued the appointment of a tribunal, suggesting that for now, this arbitration request is more of a negotiating strategy than a litigation strategy.

## The Cost of Electricity in Nigeria

By Adesiji Rabi\*<sup>\*</sup>

This article explores the cost of electricity in Nigeria, a developing nation with 140 million inhabitants and an epileptic supply of electricity. It reviews the current state and future state of electricity in Nigeria. In addition, it reviews the existing gaps between these states and in conclusion, it proffers some recommendations regarding moving forward and resolving the current electricity impasse in the country.

The Director General of Debt Management Office (DMO), Nigeria, Abraham Nwankwo, identified four infrastructure areas in which Nigeria must invest over \$100 billion to revive her economy. These, according to him, are power (\$18-20 billion), rail tracks (\$8-17 billion), roads (\$14 billion) and oil and gas (\$60 billion).<sup>1</sup>

This current state is well understood, accepted and shared by many. For the past three decades, inadequate quantity, quality and access to electricity service has been a regular feature in Nigeria, a country with a majority living on less than US\$2 a day.<sup>2</sup> Generally, it is widely believed that over half of the Nigerian population does not have access to electricity. Many articles and newspapers quote and estimate that Nigeria requires a minimum of 10,000 MW of electricity; this is a far cry from the current production capacity of below 3,000 MW. Although the installed capacity of electricity is much greater than 3,000 MW, infrastructure utilization has been very poor and power supply has been epileptic as result of a lack of maintenance and unscheduled outages.

Presently, Nigeria has a retrogressing economy; the education and the health care systems are in shambles; industries are collapsing; joblessness and crimes are multiplying astronomically, etc. Typically, people store electricity-generating plants that utilize petrol directly inside their homes. As a result of this hazardous practice, property and lives have been lost because of fire accidents, and in some cases, suffocation of occupants from smoke and CO<sub>2</sub>. In addition to this unenviable economic clime, the political and business climates have been unstable and unpredictable; many of these ills are attributable to inefficient leadership, which is largely responsible for the inadequacy of quantitative and qualitative access to electricity. Consumer demand has been reduced artificially and forcefully causing the need for infrastructure development to appear inconsequential!

The cost of electricity in Nigeria is apparently far greater than the \$20 billion estimate suggested by the Director General of Debt Management Office. It is opined that the actual cost of electricity in Nigeria will include, inter alia, the cost of creating employment; reviving distressed businesses and industries; rebuilding lost property due to fire accidents; creating stable and 'investable' political and business climate; fighting crime and educating over 50% of her population; and the cost of addressing other risks and contingencies.

Like the current state, the future or desired state is well understood, accepted and shared by many. From informal conversations with friends residing in Nigeria, it is common to find people who spend the equivalent of US\$1,000 on petroleum per month to generate electricity for their personal use at home. They claim this is not conducive for their respective family members, because it involves storing petroleum and diesel, for the generators, at home. They also indicated that they would pay whatever amount to have public or investor-owned electricity transmitted to their homes. A few rural people I discussed this with last April, during my visit to Nigeria, reported they have had electricity transmitted to their homes for less than two weeks since January 2008. They have been in the dark, perpetually, and when there is electricity supply, it is epileptic and voltage is either too high or too low, sometimes resulting in expensive damages to electrical devices and appliances. They said if they could afford it, they would pay the right amount to have consistent supply of electricity. In addition, in an article titled "Poor electricity supply bane of Nigeria's SMEs –Manufacturers" posted in *Businessday*, a Nigerian newspaper, on August 21 2008, Duro Kuteyi, chairperson of Lagos State Chapter of Nigeria Association of Small Scale Industrialists (NASSI) said "I spend an average of N400,000 (US\$3,300) on diesel every month just to remain in business. I still pay my bills in spite of the erratic power supply, and PHCN still disconnects companies."<sup>3</sup> In the same article, Mojisola Abbas, managing director, Lydin Pure Water, said "I spend over N120,000 (US\$1,000) weekly on diesel to meet the demand of customers. It seems the PHCN does not want us to survive."

Generally, there is consensus about the future state. The expected future or desired state envisioned is a situation where electricity is available to everyone, in both urban and rural areas, at just and reasonable rates. In the desired

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See footnotes at end of text.

state, there will be adequate electricity for Nigerians, and perhaps some exportation of electricity to its neighboring countries, including Benin Republic, Cameroon, Niger, Togo and Ghana; her education, health care and industries will be up and running; and there will be jobs for the majority of the population. This would result in a reduced crime rate since more people would be gainfully employed and foster stable political and business climates that will attract foreign direct investments. The result will be a buoyant economy and a healthy nation.

The future, or desired, state of Nigeria is known; her leadership is aware there is huge infrastructure deficit in generation, transmission and distribution (GTD). Unfortunately, ineffective decisions have been made to correct the situation and almost all incentives have been denied to potential investors. PHCN is supposed to have the authority to govern the use of electricity in Nigeria; and the Ministry of Energy (power) is supposed to ensure there is adequate GTD. However, it appears it is unclear who makes the decisions pertaining to GTD. Who is the regulator of electricity? How is the Nigerian electricity market operated? Where are the bottlenecks? Can the citizens afford electricity without government subsidy? What incentives are in place to attract investment in the electricity market? These are some of the key questions to consider when developing solutions to the current electricity issues in Nigeria.

In the province of Alberta, Canada, for example, the Alberta Utilities Commission (AUC) regulates investor-owned natural gas, electric, and water utilities and certain municipally owned electric utilities to ensure that customers receive safe and reliable service at just and reasonable rates [[www.auc.ab.ca](http://www.auc.ab.ca)].

Building power plants and generating electricity involves large capital and long-term investments. The Nigerian government needs to decide now how much it wants to partake in resolving electricity problems. For example, in my opinion, because the vast majority of Nigerians are unemployed and those employed are not buoyant enough to afford the electricity, it will be impossible to attract foreign investments in GTD without government subsidy and incentives.

Energy issues are global; the sources of electrical energy, or the energy mix, including choice of Solar-, Hydro-, Coal-, Biomass-, coal gasification-, and wind-generated electricity, which are ideal for a country, are largely influenced by the region in which the country is located and the resources readily available. For example, about 70% of France's electricity supply is generated by Nuclear Power Plants because coal and natural gas are scarce. About 80% of Alberta's electricity is generated by coal-fired and natural gas power plants because coal and natural gas are in abundance in the province. Good energy policies provide economic incentives and drivers that ensure stability and security of supply, and affordability of clean energy solutions. Moving forward, today must mark the turning point for Nigeria. The journey of a thousand miles begins with a single step. The level of awareness, understanding and acceptance of the Nigerian electricity issues are at a peak; and the magnitude of associated challenges can no longer be misconstrued. Implementing solutions can begin today; in single steps, decisions and positive actions can begin now.

Given the current state, future state and existing gaps outlined above, I think a good approach to solution should include the following steps:

***Phase 1:***

Do first things first. The government, leadership, must make a real decision to resolve the problem. This would involve committing to positive actions, including:

- reviving dilapidated and ill-maintained electricity infrastructures (GTD)
- defining and strengthening institutional and regulatory jurisdictions
- Providing a required subsidy to those who need it

There are speculations there is agreement expressing convergence of will between the Nigerian and German governments "to facilitate the supply of 6,500 megawatts of electricity between now and 2020 by Germany through the execution of various power supply projects, expansion of existing dams, rehabilitation of substations and construction of new power plants in different parts of the country." [August 21, 2008, [www.allafrica.com](http://www.allafrica.com)]. This is a positive move in the right direction although negligible compared to what Nigeria should set as target in a 12-year (2008 – 2020) timeframe.

***Phase 2:***

Next, decisions must be made to identify generation options that are in line with National Energy Strategy. Because of its geographical location and resources, suitable options for Nigeria include solar-, natural gas- and wind-generated electricity. In addition, firm decision must be made to continue to bundle, or to unbundle Generation, Transmission and Distribution.



**Phase 3:**

Finally, once phases 1 and 2 have been implemented in the near-term, the next steps must include actions and policies to further strengthen her National Energy Strategy in the long-term, such as:

- Creating incentives that would encourage the development of investor owned generation, transmission and distribution
- Forming alliances and partnerships with local and foreign power generation and transmission companies

A precise estimation of the amount of electricity required by Nigeria is a difficult endeavor; neither is the task as simple as computing the amount singularly by her population. Other factors, such as the level of development, the number of industries, current skills sets of her work force, current demand and climate are key parameters to consider in determining or extrapolating how much electricity the country requires today or in the future.

**Conclusion**

What is most important is to say YES to development in rural and urban communities; to COMMIT resources to repair existing infrastructure and develop a maintenance culture; to develop realistic National Energy Strategy and policies; and decide on the right energy mix.

Providing electricity in Nigeria is a huge challenge. Monetarily, it is much more than the \$20 billion estimate provided; it will also call for lots of person-hours, planning, goodwill and management of other contending issues and risks.

**Footnotes**

<sup>1</sup> David Agba, "Nigeria Needs \$100b Investment In Four Infrastructure Areas", INDEPENDENT, August 8, 2008

<sup>2</sup> Dr. Akin Iwayemi, "Investment in Electricity Generation and Transmission in Nigeria: Issues and Options", The Energy Journal, First Quarter 2008, Page 37

<sup>3</sup> The Power Holding Company of Nigeria (PHCN) governs the use of electricity in Nigeria. It was formerly named the National Electric Power Authority (NEPA)



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The 10<sup>th</sup>

# IAEE European Conference

AAEE  
Austrian Association  
for Energy Economics

7-10 September 2009  
Hofburg Congress Center  
Vienna, Austria

at times of high  
energy prices

## Energy, Policies and Technologies for Sustainable Economies

### Call For Papers

We are pleased to announce the Call for Papers for the 10<sup>th</sup> IAEE European Conference entitled *Energy, Policies and Technologies for Sustainable Economies*. The conference, hosted by the Austrian Association for Energy Economics and IAEE, is scheduled for 7-10 September 2009 at the Hofburg Congress Center, Vienna, Austria.

The core objective of this conference is to bring together young and senior scientists, policy makers, energy sector professionals, and representatives of governmental and non-governmental organisations from across Europe (and beyond) to present and discuss economic research, industrial developments, and policy issues in the energy arena, primarily as they relate to Europe.

Papers are invited on a wide variety of topics and not limited to those listed in this flyer. Please submit abstracts of up to two pages in length, comprising: **1. Overview 2. Methods 3. Results 4. Conclusions**

### Conference Themes and Topics

The conference will cover the main issues which are likely to be topical in 2009. A highlight of topics includes:

- Scenarios for global and local paths towards sustainable energy systems
- Efficient exploitation and use of renewable and exhaustible energy sources
- Review of national and international energy and climate policy strategies
- Adaptation technologies for climate change
- Technological learning and innovations
- Strategies towards increased energy supply security
- Demand-side efficiency and demand-side conservation strategies in households, industry, transport and commercial buildings
- Energy markets: Price developments, market power, trading issues, re-regulation of energy markets, ownership structure

### Format

- Prepare abstracts in Microsoft Word using the abstract template provided on <http://www.aee.at/2009-IAEE/>
- Attach a short CV
- The lead author submitting the abstract must provide complete contact details: affiliation, mailing address, phone, fax and e-mail. At least one author of an accepted paper must pay the registration fee and attend the conference.

# AEE

## Austrian Association for Energy Economics

### Submissions

Abstracts, CVs and contact details should be submitted through the conference website:

<http://www.aee.at/2009-IAEE/abstractupload.php>

While multiple submissions by individuals or groups of authors are welcome, the abstract selection process will seek to ensure as broad participation as possible: each speaker is to deliver only one presentation in the conference. If multiple submissions are accepted, then for each submission a different co-author will be required to pay the registration fee and present the paper.

### Abstract Submission Deadline: 3 April 2009

Authors will be notified by 8 May 2009 of their paper status. Accepted abstracts will be published in the printed abstract volume. Related documents are available on the conference website:

<http://www.aee.at/2009-IAEE/>

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### About Vienna

Vienna is located in the very heart of Europe - this is of benefit to all participants, who will be able to reach Vienna easily either by plane or train. But not only travelling to Vienna is easy - the Viennese public transport offers good connections and easy accessibility within the whole city. With this service our delegates will also be able to explore Vienna. In Vienna, tradition is not only on exhibit in museums but is a pulsing part of every-day life. Delegates to our meeting as well as accompanying persons will not be bored while exploring the city aside the conference.

### Conference Venue

Hofburg Congress Center, located in the very centre of Vienna, offers a unique ambience for hosting the 10th IAEE European Conference. The Hofburg Palace complex was built between the 13th - 20th centuries. The different wings of the former imperial residence of the Habsburgs portray the architectural periods of Gothic, Renaissance, and Baroque up to Classicism.

Until 1918 the Hofburg Palace was the seat of the Habsburg dynasty. The conference will be held in the same halls where the Emperors held their audiences, gala dinners and royal balls, or where Empress Maria Theresia was baptised on 15 May 1717.

The Hofburg's historical chambers have maintained their original character, and are furnished with modern technical equipment and offer a stunning backdrop for an exceptional IAEE European Conference.

### Accommodation

The organising committee has contacted a few hotels near the Hofburg Congress Center (covering different categories) offering favourable accommodations. A corresponding list for the delegates can be found on the conference website.



We are looking forward to seeing you in Vienna!

Prof. Dr. Reinhard Haas  
Programme Committee Chair

Dr. Hans Auer  
General Conference Chair

[iaeeu2009@eeg.tuwien.ac.at](mailto:iaeeu2009@eeg.tuwien.ac.at)  
<http://www.aee.at/2009-IAEE/>

## Nigeria: Gaunt Energy

By Olugbenga Adesanya\*

Nigeria, a net importer of fuel products, a global leader in gas flaring, distributing 3,200 megawatt of electricity through a superannuated transmission network to 40% of 138,283,240 citizens, has to climb rapidly from a factor, to an efficiency driven economy in less than twelve years before attempting transiting into an innovation driven economic class presently occupied by thirty one nations including the G8 countries whose stage of economic development makes Nigeria a pedestrian economy yet to overcome political and executive meddlesomeness. The least case rescue scenario recommends an annual energy sector investment level of US \$20 billion until 2030, addition of 25,000 mw of electricity yearly, economic pricing of energy products and services, full privatisation of the energy sector and an innovative industrial policy that transcends those of the BRIC countries i.e Brazil, Russian Federation, India and China. Gaunt energy infrastructure remains a major impediment to growth in a country where 1% of the population benefit from 80% of hydrocarbon revenue, 70% of inhabitants are below the thick poverty line, fuel subsidy consumed N74 billion or 1.42 % GDP in 2003 rising to N450 billion or 3% of GDP at the end of 2007, gross fixed investment standing at 24.9% of GDP (2007), a public debt representing 14.5% of GDP and a current account balance of US \$1.205 billion (2007). Fifteen developing countries including Nigeria are more vulnerable to oil price increases as the terms of trade effects of the joint food and energy price hikes since January 2007 are beyond 10% of GDP thus limiting macroeconomic flexibility. The country's status as the eleventh largest producer of crude oil in the world, numero uno in Africa and a valuable member of the Organisation of Petroleum Exporting Countries (OPEC), has not translated into an emerging and efficiency driven economy, a prerequisite for a higher quality of living.

**Global Competitiveness:** The UNDP ranking of 159 out of 177 economies and a global competitiveness 2007 ranking of Nigeria as 102 out of 128 scoring 3.5 on a scale of 1-7 should press home the need for economic leapfrogging in our march through the leading economy in Africa, surpassing 45<sup>th</sup> placed South Africa out of 128 economies and transforming into a full fledge industrial innovation driven economy by acquitting our dear nation, Nigeria, on the four factor driven economy basic requirements of institutions, infrastructure, macroeconomic stability and health/primary education by 2012 thus paving the way for an aggressive transition that would focus strongly on the six key efficiency driven enhancers namely, human capital development, goods and services market efficiency, labour market efficiency, enabling financial markets, appropriate technology and market development from 2012 till 2020 to compete favourably with Mexico, South Africa, and the BRIC economies.

**Millennium Development Goals:** Growing and unpredictable food and fuel prices would definitely take inflation to intolerable limits in real terms and cut down on fiscal expenditures for Nigerians living under the poverty datum. This development would hinder global economic stability and growth and could threaten the MDG of cutting poverty by 50% by 2015, as growth achieved in Nigeria as a result of a decade of reforms could get erased.

This is worrisome as the fast growth of the global economy in the past five years has handcuffed oil market capacity pressurising the market to ride on the crescent of price increases. From 2001, oil price moved to \$140 from \$20 per barrel within six years making oil prices higher in real terms than any period in the 21<sup>st</sup> century. Market tightness could persist in the nation due to a crawling supply response scenario.

Against this backdrop, Nigeria should reactivate her energy market along the lines of investment friendliness, parity pricing to recover cost, zero subsidy program spread over three years till 2012 that would prove more sustainable than the Multi-Year Tariff Order proposed to take off in January, 2008 with a huge subsidy mandate that appears more socialist than Gasprom gas supply within the Russian federation, to ensure efficient and disciplined exploitation of her hydrocarbon resource endowments, full private sector ownership, and a huge renewable energy development program for the key shift towards energy security and sustainability needed to power and fire an industrial economy. An ambitious renewable energy program that transcends buying ethanol technology approaches from the likes of Brazil should be put in place by 2010 while future energy researches covering in part, Fuel Cells technologies, Hydrogen economy and even Hydrates development possibilities should be flagged off on the journey to future energy supply security.

Gaunt energy infrastructure: Nigeria's modern energy products and services

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consumption mix has oil at 58%, natural gas at 34% and hydro power at 8%. Coal, largely bituminous, nuclear and other renewable sources are yet to contribute to the mix. As of January 2007, proven oil reserves stood at 36.2 billion barrels with plans to expand to 40 billion barrels come 2010. Most of the reserves occur within the restive Niger Delta and offshore in the Bight of Benin, Gulf of Guinea and Bight of Bonny. Nigeria's production capacity (ignoring shut ins) of three million barrels daily is split as two million onshore and the balance of one million offshore. Of the 22 private refinery licences issued, none has come on stream, whilst the hindered and ill managed four government owned refineries cannot satisfy 35% of local fuel needs. Natural gas utilisation projects should be encouraged in addition to liquefied natural gas and other planned ventures. The time is ripe for fast tracking the Lagos – Algiers Gas pipeline project expected to supply homes and industries in Europe, a vertical colleague of the Chevron led West African Gas pipelines whose combination should ensure regional/continental market development as well as tackling gas flaring. Darkness almost took over as the nation battles to share, at the worst of times, 800 mw of electricity, forcing debilitating own power generation by industrialists, the informal private sector businesses, and households fuelled by out of reach diesel oil which by global standards should be cheaper than premium motor spirits (PMS). Power outages and system collapses are regular features of the electricity landscape. With total installed electricity capacity of 5.9 gigawatts, 19 billion kilowatt-hours optimal consumption and a production level of 23 billion kilowatt-hours, the power generation fuel source mix should expand to include nuclear capabilities, solar, geothermal, wind and a coordinated small hydro revolution as opposed to the existing twin sources of interruptible thermal and highly inefficient hydro power installation. By its own admission, to raise earnings from natural gas exports to 50% of oil revenues by 2010 excluding the existing and planned LNG ventures, an estimated \$15 billion private sector investments should be injected into an economy classified as one of the most difficult territories for doing business.

**Limiting Factors:** The challenge is in freeing the investment climate of Nigeria from the shackles of fourteen most limiting investment factors which include access to finance, inadequate infrastructure, corruption, policy instability, inflation, crime and theft, bossy and inefficient bureaucracy, unresponsive governance, poor labour work ethics, clumsy foreign currency regulations, inadequately educated workforce, multiple taxation, tax regulations and restrictive labour regulations.

**Encumbrances:** Pipeline vandalism, kidnappings, and sustained militant occupation and blowing up of oil facilities resulted in about 587,000 bbl/d crude oil shut-in with 115,000 bbl/d happening offshore. Since December 2005, an estimated \$22.5 billion export revenue has been lost to shut-in oil production; handy money that could have been injected into industrialising the largely agrarian economy. Militancy in February 2006, made Nigeria's domestic refinery capacity prostrate, forcing a near total reliance on imported fuels for mobility, industrial and household consumption. The virulent militant attacks should become one of the major investment risk factors to be considered by the international oil corporations and other corporate existences in the troubled hydrocarbon fields of the Niger Delta.

**Starting Blocks:** The proposed reforms in both the oil/gas and power sectors should be reviewed to avoid a hapless situation in which direct state control in the commercialisation plans for the National Oil Company and the reversed Power Holding Company of Nigeria would yield so little dividends that would not match the aspirations of a leadership that hopes to belong to the big economy league globally. What is needed is not state control of the economy but liberalisation whose aim should be to increase net state revenue through transparent asset sales and divestitures of fiscally failing state companies. A three year delay of privatisation of energy infrastructure as announced recently should be reworked as it could send wrong signals to the international business community in terms of policy consistency. The route to an E20 economy in 2020 requires a well articulated sustainable energy development program that is aggressive, ambitious and symbiotic enough to attract massive investment and technology achievable only through private sector led local and offshore business partnerships, This is the avenue for prosperity and wealth creation for Nigeria on the critical path of rediscovery and undiluted resolve to grow her economy on the wheels of modern energy products and services supply security and sustainable energy infrastructure able to induce a consistent two digit annual growth rate. E-branding might not be enough, perspective planning and globally tenable strategies backed with appropriate political will would ensure Nigeria births on the shores of competitive economies as adequate energy resources are exploited and the ensuring products and services are available and accessible via a robust, largely private sector run energy infrastructure.



The 11<sup>th</sup> IAAE European Conference “Energy Economy, Policies and Supply Security: after the Price Shock” will provide excellent opportunity to present and discuss the results of newest studies performed in conditions of dramatic changes in energy, economy and environment. The conference will bring together wide spectrum of scientists, policy makers, professionals from all energy sectors, governmental and public institutions. This conference for the first time will take place in Vilnius – the capital of Lithuania, at the year when Lithuania will celebrate 20<sup>th</sup> anniversary of regained independence.

That opens good opportunity for participants of the conference to learn more about the specifics and problems of energy sector’s development in the Baltic States and the wider region around them. The problems of the integration of that region to the future PanEuropean energy market should be one of most important topics of Vilnius conference.

We are looking forward seeing you in Vilnius.

**Prof. Jurgis VILEMAS**  
General Conference Chair  
[vilemas@mail.lei.lt](mailto:vilemas@mail.lei.lt)



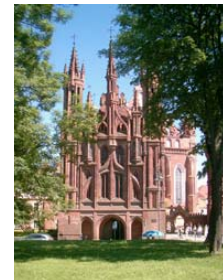
### The topics of 11th IAAE European Conference

- Energy supply security (political, economical and technical)
- Sustainability of energy systems
- Role of renewable energy sources and biofuels
- Energy demand forecasting
- Energy sector analysis and modelling
- Energy policymaking
- Geopolitics of global energy supply (gas, oil, nuclear and etc.)
- Road map for energy efficiency
- Market integration and liberalization
- Energy sector risk analysis
- Mitigation of climate change
- Specific energy sector problems of CEE countries
- Nuclear energy: hopes and realities
- Environment

More information will be available at <http://www.iaee2010.org>

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### Organizing by:



# Getting Nigeria's Electricity Sector Liberalization Right – Four Important Issues

By Adekola Oyenuga\*

Successful liberalization relies on getting a number of key issues right, and it would be immensely beneficial to examine what this would entail, more so within the Nigerian context. This article provides a short historical backdrop for electricity sector liberalization implemented in different countries, and then presents four important issues, which are – Ensuring reliable power supplies through timely capacity expansions; The alternative development and implementation of demand management schemes; Diligently protecting consumers' interests, and finally, Preserving competitive structural conditions. It concludes by asserting that an in-depth consideration of these issues is essential to give the long-awaited liberalization a decent chance of success.

## The Historical Backdrop

Liberalization connotes the introduction of fundamental change to the manner in which an industry or supply chain is organized. It also connotes the devolution of decision making from a centralized entity having full information about an entire system, to individual and incompletely informed actors, who would have to depend on price signals when making business decisions.

In the context of traditional natural monopoly and network industries such as electricity, liberalization is reminiscent of the unbundling of vertically integrated utilities into smaller, independent entities operating at different levels of the supply chain. In most cases, such unbundling would be accompanied by the introduction of market mechanisms and competition at the wholesale and retail stages, while the network dependent stages (i.e., transmission and distribution) would retain their status quo as regulated natural monopolies.

The global trend towards electricity market liberalization, that took hold in the late 1980s and early 1990s, was significantly motivated by visible and disturbing levels of inefficiency in the organization of the electricity sector, excess capacity conditions, and the near absence of competition. These problems also resulted in unduly high prices and plunging levels of service innovation.

Chile set the pace by being the first country to liberalize its electricity sector in 1982. It was then followed by England and Wales in 1990. Although a system for the wholesale trading of electricity had existed on the Norwegian market as far back as the 1970s, actual liberalization did not come until 1991 when the Norwegian Energy Act was introduced.

Norway's lead was followed by the other Nordic states: Sweden, Finland and Denmark in the late 1990s, and the combined arrangements came to be known as the Nordic electricity market or Nord-Pool. In far away Australia, liberalization came to the Victoria and New South Wales market in 1994, while the National Electricity Market (NEM) followed suit in 1998, although New Zealand had liberalized its electricity market a little earlier in 1996.

In the United States, liberalization was introduced to the Pennsylvania, New Jersey and Maryland (PJM) market in the 1990s, and in the same year, to the New England and the New York markets. In 2001, electricity market liberalization was also introduced to Texas in the U.S. and Alberta in Canada.

## What Liberalization Entails

In Nigeria, as in the other examples, successful liberalization is primarily about splitting up the power supply chain into two parts - firstly, those parts to which market mechanisms and the use of price signals, which may be the outcome of a competitive process, may be introduced to direct the allocation of resources, and secondly, those parts that are not readily adaptable to the introduction of market mechanisms and so must be maintained as regulated natural monopolies.

The generation and wholesale market segments of the supply chain are a natural choice for the introduction of markets and competition. This is because operations at both stages would easily permit the use of price signals to coordinate the simultaneous (and independent) production and trading decisions of multiple players on the supply and demand sides. Conversely, the bulk transmission and distribution sections of the supply chain would not readily support market liberalization and competition; hence both stages would most appropriately continue to be organized as regulated natural monopolies.

## Getting Liberalization Right

Successful liberalization relies on getting a number of key issues right, and it

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would be immensely beneficial to examine what this would entail, moreso within the Nigerian context.

#### *Ensuring Reliable Power Supplies Through Timely Capacity Expansions*

First of all, successful liberalization does not only call for structural re-organization and in-phasing of competition into the supply chain, but it also requires that the security of supplies within the power system be consistently maintained. The uniqueness of electricity as commodity is significantly adducible to its non-storability, an implication of which is that maintaining an undisturbed flow of power requires that supply be always balanced with demand. In the absence of such balancing, the system runs the risk of experiencing an operational failure.

With an expanding demand, maintaining reliable power supplies over the medium to the longer term would require a commensurate expansion of the existing supply capacity. This is a particularly important problem in the Nigerian context, where perennial under-investment in expanding the existent supply capacity means that the power system in the post-liberalization era would, if such a problem goes unchecked, be prone to experiencing grave operational instabilities that may cost the society millions of precious dollars.

#### *The Alternative Development and Implementation of Demand Management Schemes*

But a commensurate effect to expanding the existing supply capacity, would also be attainable by managing the system's demand effectively. To be successful, therefore, liberalization should allow for increased participation on the demand side, with consumers being exposed to a consumption rate that is as close to the actual system rate as possible (adjusted, of course, to ensure that the service provider is profitable). Liberalization should also afford consumers the means to vary their demand in response to changes in the system rate. This would lead to a reduction in the pressure on the system's supply capacity, and a reduction in the need to expand such capacity over the medium to longer-term.

In the Nigerian context, exposing consumers to the actual system rates would require an upgrade of the current metering and billing systems to reflect real-time variations in the consumption rates. Where the infrastructure for real-time pricing of services delivered to final consumers is unavailable (as is likely to be the case), then a variable tariff billing system that would closely reflect each consumer's time-of-use, would be a considerable improvement over the use of fixed consumption tariffs.

#### *Protecting Consumers' Interests*

Thirdly, liberalization raises questions related to how well the retail consumers, particularly those in the domestic and lower income classes, will fare under the new dispensation. Seeing to it that such consumer welfare prevails, would often be the responsibility of a market regulator or ombudsman, and would entail monitoring the existing service arrangements or contracts between the service provider (particularly when the provider is a monopolist) and consumers, to ensure that the service provided achieves some acceptable value benchmark.

The approach adopted by the electricity sector regulator post-liberalization, may entail setting constraints on a service provider's freedom to raise retail prices, or in giving clear instructions concerning how the service price and other relevant contract parameters should be set. An innovative and moderately sophisticated approach to regulation could be to introduce a default service contract that would be implemented, if and only if, it is preferred by consumers to the service provider's contracts. Structured in this manner, the default service contract would serve to define a minimal or benchmark payoff value for consumers, and would consequently have to be improved upon by the service provider's contracts, in order to ensure that consumers participate.

#### *Preserving Competitive Structural Conditions*

Fourthly, liberalization and the introduction of markets raises questions about the electricity sector's structural conditions, and how changes in such conditions may impact the overall level of competitiveness and welfare. Within a vertically structured supply chain, these concerns would be reflected in the effects of changing vertical relationships (for instance when vertical integration replaces vertical separation) on prices, competition and welfare, or when the number of horizontal subdivisions or segments within a market, e.g., at the retail level of the industry, is altered. As a result, corporate consolidations that may significantly affect the structure of the vertical chain must first be subjected to diligent scrutiny by the market regulator, prior to any approvals being given.

#### **Conclusion**

Conclusively, the liberalization of Nigeria's electricity sector, as with any other real sector, raises a



number of important issues concerning the efficient management of the power system over the short, medium and longer-terms. These include: maintaining reliable power supplies through capacity expansions, coupled with the alternative development and implementation of demand management schemes. Other challenges following from liberalization require that competitiveness be promoted through proper supervision of the evolution of the sector's structural conditions (this may influence which corporate consolidations should be approved or revoked), and the monitoring of any retail service agreements or contracts between a service utility (often a monopolist) and retail consumers, in order to ensure that consumers' interests are well protected. It is essential that the relevant authorities take these four issues into proper consideration, in order to give the long-awaited liberalization a decent chance of success.

### **SPECIAL IAEE SUPPORT FUND FOR STUDENTS FROM DEVELOPING COUNTRIES**

IAEE is pleased to announce the continuation of a special program which offers support to students from developing countries to participate in two of the Association's conferences in 2009. The support will consist of a cash stipend of up to \$1500.00 plus waiver of conference registration fees for a limited number of eligible students, who are citizens of developing countries (who can be registered as full-time students in programs of study anywhere in the world), to attend either the 32<sup>nd</sup> IAEE International Conference in San Francisco, California, USA, June 21-24, 2009, or the 10<sup>th</sup> IAEE European Conference in Vienna, Austria, September 7-10, 2009.

Application deadlines for these conferences are as follows: San Francisco Conference – application cut-off date, April 7, 2009; Vienna Conference – application cut-off date, June 23, 2009.

Please submit the following information electronically to [iaee@iaee.org](mailto:iaee@iaee.org) to have your request for support considered. Make the subject line of your email read "Application to IAEE Support Fund."

- Full name, mailing address, phone/fax/email, country of origin and educational degree pursuing.
- A letter stating you are a full-time graduate/college student, a brief description of your coursework and energy interests, and the professional benefit you anticipate from attending the conference. The letter should also provide the name and contact information of your main faculty supervisor or your department chair, and should include a copy of your student identification card.
- A letter from your academic faculty, preferably your faculty supervisor, recommending you for this support and highlighting some of your academic research and achievements, and your academic progress.
- A cost estimate of your travel/lodging expenses to participate in one of the above conferences.

Please note that students may apply for this support at only one of the above conferences. Multiple requests will not be considered. Further note that you must be a student member of IAEE to be considered for this support. Membership information can be found by visiting <https://www.iaee.org/en/membership/application.aspx>

Applicants will be notified whether their application has been approved approximately 14 days past the application cut-off date above. After the applicant has received IAEE approval, it will be their responsibility to make their own travel (air/ground, etc.) and hotel accommodations, etc. to participate in the conference. Reimbursement up to \$1500.00 will be made upon receipt of itemized expenses.

For further information regarding the IAEE support fund for students from developing countries to participate in our conferences in 2009, please do not hesitate to contact David Williams at 216-464-5365 or via e-mail at: [iaee@iaee.org](mailto:iaee@iaee.org)



**WWW.IAEE.ORG/NAEE**

**2<sup>ND</sup> ANNUAL NAEE/IAEE INTERNATIONAL CONFERENCE, April 23-24, 2009**  
**Sheraton and Towers, Abuja, Nigeria**

**ENERGY INDUSTRY RESTRUCTURING—INTERACTIONS BETWEEN BUSINESS,  
ECONOMICS, AND POLICY**

*General Conference Chairman: Professor Akin Iwayemi*  
*Conference Program Chairman: Dr. Adeola Adenikinju*

The global energy industry has been undergoing fundamental restructuring. The reforms, which started in the western industrial countries, have now spread to Africa. The African continent continues to witness the unbundling of state energy monopolies, establishment of regulatory institutions, enactment of sector legislations, among other reforms. While the pace, intensity and diversity of reforms vary across the continent, the primary objectives of the reform are to develop an energy sector that is effective, efficient and to make certain that the discipline of the market is brought into the allocation of resources within the energy sector. There is, however, no consensus yet as to the right energy sector reform model as well as to the speed, timing, and structure of reforms.

#### **Conference Objectives:**

Some of the questions and issues the 2<sup>nd</sup> NAEE/IAEE conference intends to address are: what should be the model for the African energy market post reform? What should be the speed of reforms? And what should be the appropriate role of the state and business in the energy sector? The Conference will further look into what policies and what institutions should be established to promote efficient market restructuring? What are the lessons from reforms experiences across the world? What role should the renewable energy market play and what should be the place of environment in the new milieu? The Conference will bring together policy makers, industry experts, academia and other stakeholders in addressing all of these issues.

#### **Conference Structure:**

The Conference will feature plenary sessions and Roundtable discussions on key issues relating to the theme of the Conference. The following sub-themes and topics will be covered during the 2-day International Conference:

- Oil and Gas industry reforms and regulation
- Electric power industry restructuring
- Petroleum Products: Deregulation Challenges
- Energy, Environment and the Economy
- Energy Security Fundamentals.
- Regulatory Processes in electricity markets
- Human capital Resource Challenges and Prospects
- Energy and Economic Growth.
- Regional Energy Cooperation

### **HOTEL RESERVATION & TRAVEL INFORMATION**

Sheraton & Towers, the venue of the Conference is located at a very strategic place in Abuja. Telephone: 234-9-461-2100; Fax: 234-9-523-1571.

**Travel Documents:** All International Delegates outside the ECOWAS sub region are urged to contact their consulate, embassy or travel agents regarding the necessity of obtaining a visa for entry into Nigeria. If you need a letter of invitation to attend the conference, contact NAEE with an email request to Dr. Adeola Adenikinju [adeolaadenikinju@yahoo.com](mailto:adeolaadenikinju@yahoo.com).

## Reliable Electricity Supply for Nigeria-What Will it Take?

By Bob Grabham\*

**A**fter 18 years working for an oil company, followed by 18 years as an energy economics consultant, in April 2008 I made my first visit to Nigeria – to attend the first annual NAEE/IAEE Conference in Abuja.

From the conference, three things made a big impression on me. First, the warmth of the welcome I received. Second, the knowledge and enthusiasm of the NAEE student members. Third, that there is a whole generation of Nigerian school children trying to do their homework in a computer age with no electricity<sup>1</sup> - because the 10<sup>th</sup> largest net gas exporter in the world cannot supply enough gas to its domestic market. This final point has spurred me to write this article.

What will it take to ensure reliable electricity supply for the population of Nigeria? Some of the answers are physical – reliable gas supply, investment in gas infrastructure, investment in generation and other electricity infrastructure. These physical requirements were described in detail in the May 2008 Nigeria Gas Master Plan Roadshow<sup>2</sup>. However, the Gas Master Plan is long on analysis and short on solutions.

In my view, to deliver these physical solutions first requires some difficult policy decisions – followed by demonstrated examples of successful policy implementation to win the confidence of the population.

Possibly the biggest policy decision is to accept that Nigeria is part of a global energy market and therefore, at some point, gas prices in the domestic market must reflect the netback price from international gas markets. Perhaps this is easier answered as two questions: when should gas prices in the domestic market reach the equivalent of the netback price from international gas markets? And what are the yearly steps in order to make the transition in gas prices from the current level to the netback equivalent?

These questions are best addressed through an iterative process of analysis and negotiation with gas producers. I am sure NNPC, the NERC and other Government agencies have the necessary models to calculate gas prices and resulting electricity prices for alternative average and marginal gas prices and for different levels of gas and electricity sector investment.

When it comes to negotiating with gas producers, maybe the second big policy decision is to accept that the State negotiators of the original exploration and production licenses and production sharing contracts (PSC's) failed to provide for domestic gas. Imposing a domestic market obligation (DMO) retroactively is unlikely to succeed because the international oil company (IOC) gas producers probably feel they have enough Nigeria risk without investing more to produce additional gas for the domestic market – especially low-price gas. In these circumstances, State coercion is unlikely to increase the amount of gas available for the domestic market – negotiation is the only way forward.

Both NNPC and the gas producers are understood to have engaged consultants to show the cost of producing additional gas for the domestic market. Not surprisingly, the producers claim incremental gas production costs are higher than those presented by NNPC and its consultants. As incremental investment and operating costs will be different for every field, the only solution would seem to be for NNPC, supported by respected independent technical specialists, to negotiate a Gas Supply Contract for incremental gas production from each field individually.

Gas producers are also likely to be concerned about credit risk and to want the option (but not the obligation) to sell to a State-guaranteed Single Buyer. A Single Buyer with transparent accounts would fulfil the aggregator role described in the Gas Master Plan, operate with a regulated margin to cover costs and ensure that any sector-specific Government subsidies are measurable and transparent.

Any Government subsidies should phase out over a pre-determined transition period. But what is the source of any subsidy? Some of the funds will come from tax revenues delivered under the Natural Gas Fiscal Reform Act (NAGFRA) – the rate and base for which must necessarily come from a collective negotiating process with gas producers. Any balance must come from other Government sources – and only the Government can decide how much it is prepared to invest. However, the social and economic benefits from electricity supply are immeasurable – the Government should just get on with that investment.

The end-result of what will inevitably be an iterative process of negotiation and analysis should be a gas price transition formula that can be fixed in legis-

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\*Bob Grabham works independently and as a NERA Special Consultant. He has extensive experience of energy sector reform in Central and Eastern Europe and in Asia. The views expressed in this article are his independent opinion.

See footnotes at end of text.

lation to provide certainty to investors and consumers alike. Projected gas and electricity prices should be published – as in the Multi-Year Tariff Order<sup>3</sup>.

The Multi-Year Tariff Order (July 2008 – June 2013) is a small step in the right direction – in that it is multi-year. However, the delivered gas prices on which the tariffs are based<sup>4</sup> do not cover average gas costs – much less the marginal costs presented in NNPC’s own analysis<sup>5</sup>. Also, the MYTO provides for discretionary changes to generation tariffs in response to changes in inflation, exchange rates and delivered gas prices – when it should include an indexation formula that automatically changes the tariffs in response to changes in each of these parameters with a clear definition of how delivered gas prices are measured.

Perhaps the biggest challenge of all is to convince the population of Nigeria that if they pay more for electricity, supply really will become more reliable. The expression “seeing is believing” comes to mind.

There is a need for an integrated resource planning process to determine how the gas and electricity infrastructure (and potentially other fuels such as coal) should be developed in order to maximise security of electricity supply for each State or region. The objective should be to ensure that if/when the electricity supply fails in one region the impact in the rest of country is minimal. Such integrated resource planning with security of supply as its objective is unlikely to result in the cheapest option for energy sector development – but defining energy regions and demonstrating improved security of supply is essential to convince a sceptical population that increased electricity prices really do lead to a better electricity service.

The Government is not in a position to fund the required investment in energy infrastructure – only the private sector can mobilise investment of this scale. The Government launched the Nigeria Gas Master Plan Roadshow in order to attract private investors for gas sector development. Yet the Government seems surprised at the lack of interest by investors, when it is so obviously attempting to coerce the one group of private investors who have invested in Nigeria – the international oil and gas companies.

Potential investors in generation and gas and electricity infrastructure who, unlike the IOC’s, do not have an export option will need to be assured that their investment is safe and that they will achieve a rate of return commensurate with the risks. For the resulting costs to be acceptable to the Government, it must minimise the investment risks. This means offering initial contracts (PPA’s for generators; Ship or Pay contracts for gas and electricity transmission; franchises for distribution) and making sure that, when these initial contracts come to an end, effective wholesale electricity market arrangements are in place supported by a fair regulatory system for monopoly activities which balances the interests of investors and consumers.

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My message to the policy-makers in Abuja is to get the best advice you can on the issues raised in this article – from the World Bank and from leading independent experts. These are complex issues, there is no “quick fix” – but decisive action is required. Set a timetable for developing a clear, workable policy. Then, tell the people of Nigeria what you intend to do, with defined objectives and detailed steps – and keep them informed of progress during implementation.

### Footnotes

<sup>1</sup> Footnote for electricity economists – in these circumstances, what is the Value of Lost Load?

<sup>2</sup> See [www.ngmproadshow.org](http://www.ngmproadshow.org)

<sup>3</sup> NERC/GL059

<sup>4</sup> US\$0.50/mmbtu in 2008 rising to US\$0.70/mmbtu by 2012

<sup>5</sup> The Nigerian Gas Master-Plan, Gas Stakeholders Forum, Abuja, November 26<sup>th</sup>, 2007 - Slide 36

## Nigeria's Electricity Sector- Electricity and Gas Pricing Barriers

By Prasad V.S.N. Tallapragada\*

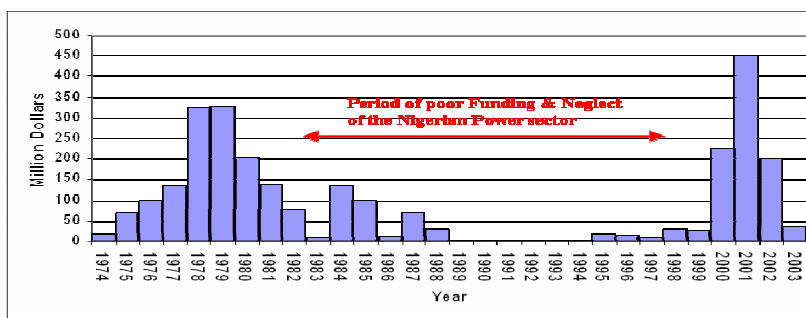
Nigeria has tremendous energy resources in the form of abundant gas, water and mineral resources. Yet, it is highly energy deficient. Per-capita electricity consumption is only 136 KWh compared to other neighboring West African countries, such as Ghana and Ivory Coast, which are not endowed with such resources, with per-capita electricity consumption of 309 KWh and 174 KWh respectively. It is ironic and unfortunate that Nigerians have to face severe petrol and diesel shortages and are subjected to frequent long queues at the gas stations, when their country contributes a significant share of the World's oil production<sup>1</sup>. That the people of Nigeria are not able to harness the benefits of their country's rich energy wealth is a classic developmental paradox. This situation poses a complex challenge for the Nigerian Government and raises important questions on relevant economic policies in play. While several factors including weak governance, poor institutional capacities, inadequate investments account for this situation, this paper will confine to a brief analysis of the electricity and gas sectors with an emphasis on pricing issues which are proving to be key economic barriers. The relevance of appropriate energy pricing is more pronounced against the backdrop of Nigeria's rich oil and gas wealth. The Nigerian case emphasizes the importance of cost reflective market based energy pricing even in the case of resource rich countries.

### Nigeria's Electricity Sector

With only 3800 MW against an estimated demand of 10,000 MW, Nigeria has considerable suppressed and unmet demand. About 40% of Nigeria's population has access to electricity<sup>2</sup> with the rest of around 90 million people living in the dark. The country faced a long bout of underinvestment and poor planning in electricity infrastructure from 1981-99. Only 19 out of 79 generation units were operational in 1999, and the average daily generation was only 1,750 MW. No new infrastructure was built in the country for over a decade (1989-99), and the youngest power plant built was in 1990. Less than 2% of the Transmission Development Plan (1995 – 2005) was implemented, with the last transmission line built in 1987<sup>3</sup>. As a result, the existing power infrastructure is mostly in a dysfunctional state.

In its response to this grim situation, the administration, in 1999 embarked on an ambitious program to improve the generation, transmission and distribution capacity in the country. The salient features of this program were as follows:

- Increase in generation capacity, through the rehabilitation of existing plants and building of new plants (new PHCN<sup>4</sup> or NIPP<sup>5</sup> plant, or third-party licensed IPPs).
- Reinforcement of transmission network, through the rehabilitation of existing system and building of new grid stations and transmission lines.
- Rehabilitation and extension of the distribution system, initiation of pilot demonstration projects and expanding rural electrification schemes.
- Initiation of sector reforms, including inter alia enactment of enabling legislation, restructuring of the monolithic utility NEPA, establishment of the independent regulator, and solicitation of private-sector investments.



Source: PHCN

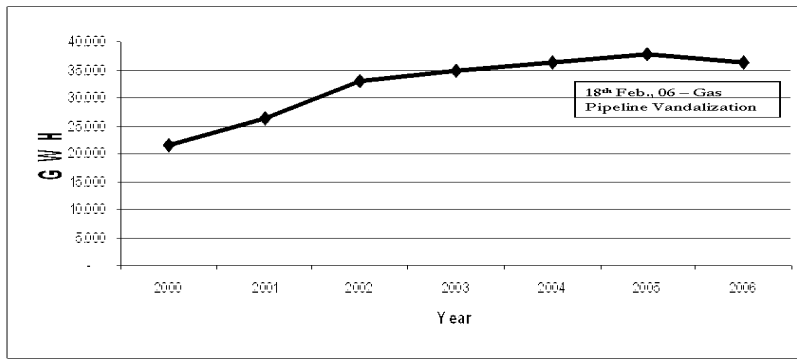
Figure-1: Investments in the Power Sector

Hence, investments in the power sector over the last three decades have followed an irregular pattern.

While substantial investments were made in the years following the oil price shocks of the seventies, there was a period of neglect which resulted in a crisis-like situation in the nineties. It has been only in the last five or six years that the power sector has received growing attention from FGN, even though the bulk of the results are yet to materialize (Figure-1).

Modest but steady improvements witnessed during 2000-2005 could not be

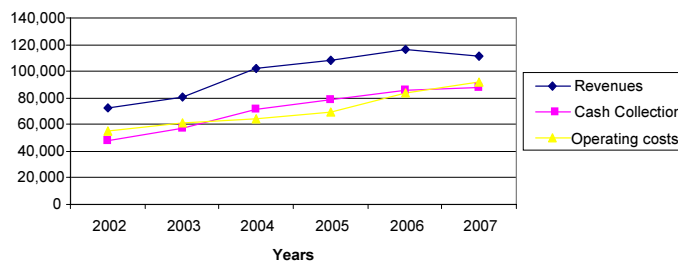
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See footnotes at end of text.



Source: PHCN

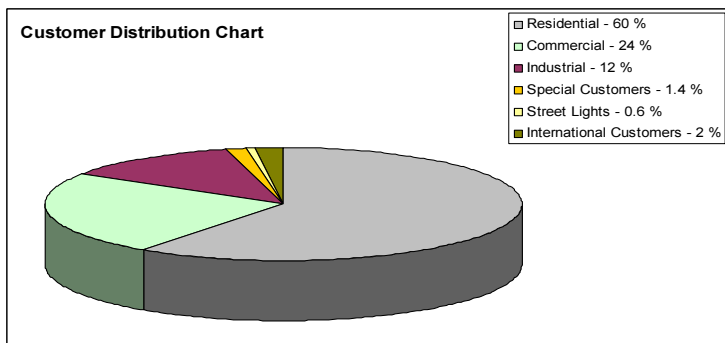
Figure-2: Energy Generation, 2000-2006

ing Company of Nigeria (PHCN) into 18 companies (6 generating, 1 transmission, and 11 distribution companies). As a result of some of the initiatives, modest improvements were witnessed in the sector. The revenue growth in the sector has been substantial, from about N80 billion in 2003 to about N110 billion in 2007. This has mostly been because of collection improvement and also due to capacity addition. Both distribution and transmission losses have steadily declined over the last few years, with investment in advanced technology. However, retail electricity prices have not traditionally kept pace with inflation in



Source: PHCN

Figure 3: Operating Cash Flows in the Electricity Sector  
Electricity tariffs



Source: NERC

Figure 4: Electricity Customer Distribution in Nigeria

sustained for a variety of reasons (Figure-2). The vandalization of gas pipelines feeding major power plants brought a major reduction in overall electricity generation. The situation was not helped by the low rainfall and near-drought conditions affecting seriously the hydro-generation capacity in Nigeria. Some of the Government owned plants need urgent refurbishment to operate at a higher capacity. Other plants face irregularity of gas supply and operate much below their potential supply capacity.

Reforms in the power sector, since the new Electric Power Sector Reform legislation in 2005, resulted in unbundling of the Power Holding Company of Nigeria (PHCN) into 18 companies (6 generating, 1 transmission, and 11 distribution companies). As a result of some of the initiatives, modest improvements were witnessed in the sector. The revenue growth in the sector has been substantial, from about N80 billion in 2003 to about N110 billion in 2007. This has mostly been because of collection improvement and also due to capacity addition. Both distribution and transmission losses have steadily declined over the last few years, with investment in advanced technology. However, retail electricity prices have not traditionally kept pace with inflation in Nigeria and were last adjusted in 2002. As a result, the Nigerian electricity sector is going through a financial crisis which is causing great inconvenience to the population.

The chart below provides a snapshot of the state of affairs in the sector.

The retail electricity tariff in Nigeria consists of 3 elements. (a) Energy Charge - for variable costs recovery, (b) Demand Charge - for applied pressure (load amount) on the system and (c) Fixed Charge -for capital costs recovery. Electricity consumers in Nigeria are divided into 6 categories, namely, residential, commercial, industrial, street lighting, customers on special tariff, and International Customers. Each of the groups is sub- divided into classes resulting in 19 classes of customers as depicted in the figure below.

The residential share of the customer base is about 60% of the total revenue share, as seen in the chart above. However, in terms of revenue collected, the share of residential customers is not proportionately as high due to two reasons. First, there is a differential tariff structure for commercial and residential customers and residential customers have a lower tariff level. Second and more importantly, a large part of residential customer supply is unmetered, and is only billed on the basis of average consumption<sup>6</sup>. In the absence of proper metering, therefore, the amount billed is, at best, an estimation. Unpaid bills are substantial as evident from the high accounts receivable (595 days of

sales equivalent) in FY07. These accounts receivable are accumulated year after year, with no effective policy on them and bad debt handling. About two-third of the receivable is from the private consumers category that includes residential consumers<sup>7</sup>.

As of today, the tariff for the Nigerian electricity market is one of the lowest in the world. The current average tariff level in Nigeria is about N6.31/KWh or \$4.3 US cents/KWh, which has remained constant since 2002. With increasing costs, the current tariff level has not been sufficient to meet operating or capital investment costs of the unbundled companies along with the gas supply payment and the IPP payments. Other major reasons for this deficiency are the high technical loss levels and low collection efficiencies. These two factors together, account for almost 50% of the potential revenue loss. As a

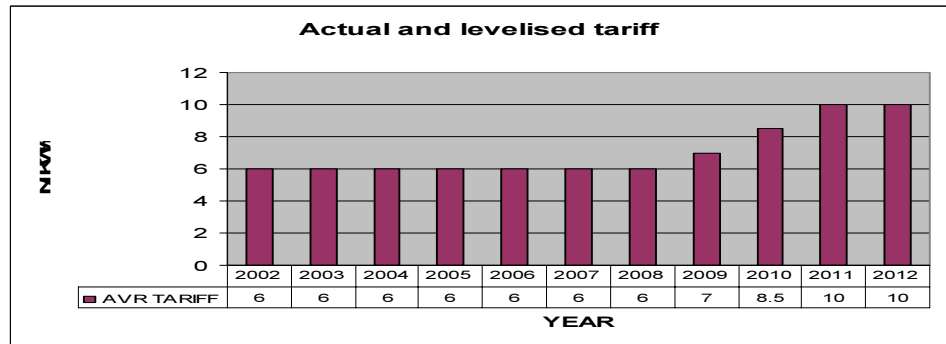
result, there is a yearly revenue gap, which has been historically met by the Government through ad hoc transfers. The recent multi-year tariff order by the regulator is an attempt to remedy the situation, where the gap is sought to be plugged by a mix of government subsidy and tariff increases.

**Multi-Year Tariff Order**

To address this issue, the Nigerian regulator has developed a Multi-Year Tariff Order, (MYTO), which is based on the principle of operational cost recovery, return on investment for new capital investment and replacement capital investment. The MYTO implementation will lead to an increase in tariff over the next 4 years starting in July 2009, and reaching a cost reflective tariff level of N10/Kwh by 2011. In arriving at this figure, the MYTO assumes that the generation availability will be around 10,000MW by 2010. It also assumes that the combined technical, non-technical and collection losses will drop from 45% to 30% by 2009. The improvements are expected to be a result of investments in transmission, distribution technology and collection efficiency improvements.

The MYTO is developed for each functional component of the Electricity Industry (Generation, Transmission, Distribution and Retail) each year for 15 years, with a provision for 5 yearly reviews. The MYTO is based on the principles that:

- Every unit of the supply chain should be allowed to recover its efficient costs, including a reasonable rate of return on capital.
- Prices should encourage efficient level of investment in the industry.
- Prices should be predictable and stability should be guaranteed to encourage private investments.
- Tariff structure should be transparent, easy to understand and not costly to implement.
- Price structure should give incentives for operating cost reductions, efficiency and service quality improvements.
- Prices should be affordable by the various classes of the society and should support Uniform National Tariff.



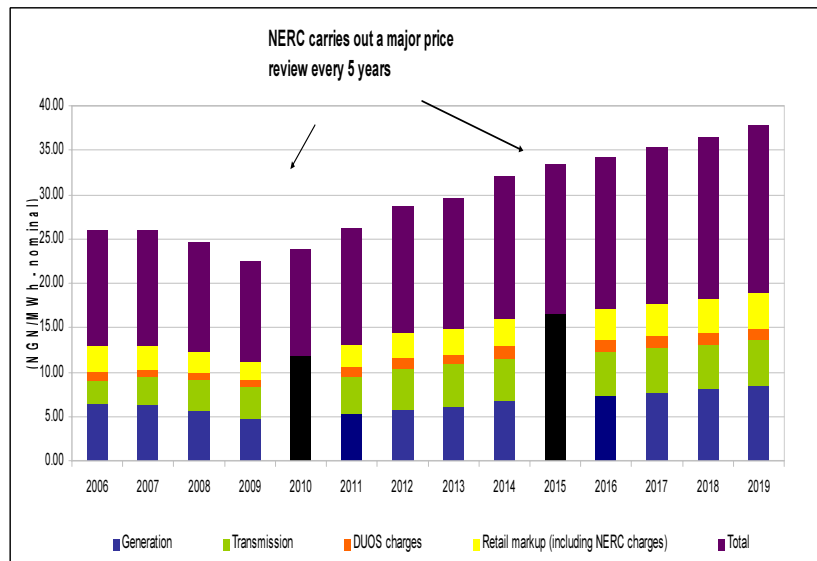
Source: NERC

Figure 5: Tariff Trajectory

**Implementation of MYTO**

To increase the capacity available in the sector, new investments in generation and loss reduction are envisaged. NERC has also proposed a gradual introduction of cost reflective tariffs such that tariffs gradually increase to cost reflectivity over 3 years, with no tariff increases in the first year (12 months) of the period, till July 2009. The tariff levels are expected to increase to N10/KWh by 2012.

The proposed tariff re-alignment requires Government support to meet the shortfalls between the required revenue and the collected revenue, with the subsidy being sunset over 3 years; 1st Year N64.84 billion<sup>8</sup>, 2nd Year N77.31 billion, 3rd Year N35.80 billion through a tariff equalization fund. The Government of Nigeria approved the implementation of MYTO and agreed to provide N177.95 billion over a three-year period to finance the Electricity Equalization Fund. The subsidy levels and tariffs are based upon a cost plus analysis. The following graph provides an idea of the Generation, distribution and transmission costs plus a return on



Source: NERC

Figure 6: Functional Breakup of Tariff Components

generation, distribution and transmission costs plus a return on

capital that form the basis of the tariff increase and subsidy level.

### **Tariff Design**

The next challenge for the Nigerian Electricity Regulatory Commission (NERC) is to design a tariff structure that will take into account these cost reflective levels and target subsidies efficiently for the poor. It will have to take into account willingness to pay as well as affordability issues while doing so. A significant portion of the Nigerian population resorts to expensive captive generation using diesel or other costlier fuels. It is estimated that as much as 4000 MWs<sup>9</sup> of self generation exists in the system (more than the 3800 MW available in the grid). It is estimated that it costs around 30 U.S. cents to generate a KWh using stand alone generators. Hence a significant consumer surplus exists in the system allowing a good elbow room for the regulator to reach an across the board tariff of 10 U.S. cents per KWh in order to reach cost reflective levels as per MYTO.

### **Gas Pricing**

The pricing of gas is a major issue in Nigeria and is very central to electricity generation, availability and retail prices. About one half of the current generation mix in Nigeria is thermal and this proportion is set to go up with a limitation on utilization of hydro capacity (further exploitation of hydro resources is difficult due to capital barriers, even though the Government has plans that are still at a conceptual stage, to develop large hydro facility at Mambilla in the north). Gas is the logical choice for power generation in Nigeria, both in terms of gas availability and capital requirements.

Nigeria has the 7<sup>th</sup> largest proven gas reserves in the world, with 182 TCF of high grade gas. It faces significant demand boom, which will alter its industrial and economic development potential. However supply significantly lags demand, threatening economic growth. Utilization of gas resources is a challenge on account of various factors such as the violent situation in Niger delta and the environmental and social issues surrounding it. Nigerian gas, though abundant, is rich gas with several chemical impurities requiring substantial processing before it can be used for electricity generation. Gas is available, both as associated gas and as dry gas in stand alone gas fields. The original contracts between the oil companies and the Government were production sharing arrangements for oil but do not cover gas. Oil companies, which are the primary producers of associated gas, want a commercial price for gas supplied to the domestic market that matches international prices. The Government, arguing that this gas is a national asset, wants the gas to be priced low, especially for the power sector in an attempt to keep the retail electricity prices low. Since the international LNG prices are more attractive, the oil companies have an incentive to divert gas to international export markets as much as they could and since they do not have an incentive to supply for the domestic market, flare the rest of the gas. The result is a terrible gas flaring situation in Nigeria. Also, consequently, the local gas processing and transmission infrastructure did not develop at all.

Inadequate and erratic availability of gas, resulting from lack of investments in infrastructure, poor planning and sabotage of pipelines, has also been a major cause of poor utilization of existing power generation capacity. The commissioning of new plants and planning of new power generation capacity is also held back due to the problems of gas supply.

In February 2008, the Government approved a package of measures to improve the medium- to long-term development of the gas sector that included a new gas pricing policy, introduction of a Strategic Aggregator, rolling out of a Gas Master Plan that identifies the future gas infrastructure network to be built by the potential investors, and an obligation for gas producers to serve the domestic market. The Government's policy mandates all oil and gas operators to set aside a pre-determined amount of gas for the domestic sector. The policy sets a penalty for default at \$3.5/mcf of obligation that is under-supplied and otherwise flared, and is also not tax deductible. An environmental surcharge of 0.5 C /mcf is levied over this. The policy also stipulates that the relatively cheaper Nigerian gas will be directed to the domestic market first. The gas policy mandates a sector based pricing to match 3 categories, (a) Cost + for strategic domestic sector; (b) Netback for the strategic industrial sector; (c) Alternative fuels pricing for commercial users. Lastly, it introduces the concept of strategic aggregator, who will be responsible for the volume and price of the gas supply.

The Government's policy introduces a floor price of US\$0.40/MMBtu at power plants based on a price of US\$0.10/MMBtu at the well head and a transmission charge of US \$ 0.30/MMBtu. The price of gas to non-power consumers is expected to cross subsidize the price to power plants resulting in a pooled price of US \$ 0.80/ MMBtu to the gas producers. This arrangement of a pooled price is expected to be managed through the proposed institutional arrangement of a gas aggregator. The proposed "Gas Aggregator" will manage the gas supply portfolio and payment for gas to the domestic sector. The Gas Aggre-



gator will be the first contact point for the gas trade and will issue Gas Purchase Orders after due diligence of Sellers. Sellers make gas available to the Buyer at the Delivery Point agreed with the Buyer.

However, the price of gas for power generation is set to go up to US \$ 1.00/MMBtu by 2013, by which time the cross subsidy is expected to be phased out. The Government also introduced a securitization framework to assure investment in gas supply for the power sector. Both of these steps will provide a much needed boost to gas supply to the power sector.

The short/medium term gas supply plan projects a rise in domestic gas supply from current 710mmcf/d to 2605mmcf/d by 2012. Specifically, it expects to double capacity to 1400mmcf/d by end 2008 and triple capacity to 2042mmcf/d by 2009. If successful, the supply plan will enable gas-fired generating capacity to grow to 4651MW within 12 months and further grow to 6158MW by end of 2009. It will also triple the gas supply to domestic industries from 179mmcf/d to 435mmcf/d by end 2009<sup>10</sup>.

#### *Gas Infrastructure Development Plans*

As part of the broader policy initiative, the Nigerian Infrastructure Blue Print was also developed. The highlights of the proposal are as follows:

- Proposed structure planned for significant increase in capacity to 5bcf/d with scope for rapid expansion.
- Extends infrastructure to Katsina with future plans to other areas in the north.
- Significant increase in network to meet demand growth in South East.
- Open linkages between East, West and North.
- Allows for all the IOCs to align their infrastructure with the national grid.
- Harmonizes gas infrastructure into one national grid, which is critical for flexibility of supply.
- Minimizes concentration of infrastructure in one region. Primarily allows for processing of natural gas, removal of LPG and condensates for export.

Source NNPC

Future investments in gas development could be affected by concerns relating to security, securitization package, and gas price. While the latest package of measures announced signals the Government's urgency and interest in resolving the critical gas issues, a number of concerns have been raised by stake holders. In particular, the concerns regarding the security situation and the not yet agreed securitization packages for gas supply to the power sector, the main customer in Nigeria, could inhibit investors<sup>11</sup>. Gas producers demand payment security apart from what they perceive as adequate prices to commit investments in gas supply to power plants, or in the case of Joint Venture power generation plants supplying their own gas, for the sale of electricity. It is also a concern whether the new gas pricing policy will be sufficient incentive for operators to develop non-associated gas reserves.

#### **Conclusion**

Even though Nigeria is abundantly rich in energy resources, it is clear that unless appropriate pricing is adopted both for electricity and gas, its energy sector growth will not be sustainable. However, these pricing measures will not yield the desired results unless complementary governance measures are adopted to make them sustainable.

Now that the MYTO principle has been accepted, NERC should give consideration to some possible refinements. For example, in most countries (e.g., Peru, Brazil, Romania and Pakistan) where the MYTO approach has been implemented, the norm is for MYTO prices to be calculated on an enterprise by enterprise basis to take account of significant differences in customer mix, overall load profiles, and the physical characteristics of different service territories. A uniform national tariff, which is taken as a given in NERC's current MYTO proposal, is neither sustainable nor desirable over the long term<sup>12</sup>. Various stakeholders have been consulted on the approach of MYTO, but the underlying assumptions and the financial model need to be tested in public domain. NERC would benefit from making having key sector stakeholders take a close look at both the assumptions and calculations underlying the MYTO model<sup>13</sup>. A workable subsidy mechanism needs to be designed and agreed in the short-term, and certain basic implementation questions have to be addressed. Specifically, further clarity is needed about the recipient entities of the subsidy, the periodicity of these transfers, the day-to-day administration of the transfers, and so on<sup>14</sup>.

Regular monitoring of gas supply and enforcement of domestic gas supply obligation can improve

gas supply in particular to power plants. It is necessary to implement the necessary institutional and contractual arrangements to make this obligation work and establish the necessary infrastructure. The Downstream Gas Law needs be finalized to create a legal and regulatory framework for private investments in gas pipelines and modify/reduce role of the Nigeria Gas Company, which is the state owned company entrusted with building and maintaining gas transmission infrastructure. The law is meant to abolish the Nigerian Gas Company or privatize it and thus reduce its role as a de facto monopoly for gas pipelines and allow others to build them to introduce competition, efficiency and reliability in gas transmission infrastructure.

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### Footnotes

<sup>1</sup> This paper, however, is not intended for a discussion on the oil sector.

<sup>2</sup> Gnansounou, 2008

<sup>3</sup> Tallapragada and Adebusuyi, 2007.

<sup>4</sup> PHCN: The public sector power Holding Corporation of Nigeria- the state power utility after the new reform legislation has been passed

<sup>5</sup> NIPP: The National Integrated Power Project- a major publicly funded government power infrastructure program

<sup>6</sup> The number of customer connections (registered customer population) is reported to be 4.50 million out of which the number of metered customers at 3.04 million (source: Corporate Performance Management department of Power Holding Company of Nigeria). Based on these figures, more than 30% customers are currently un-metered. However, the actual number of customer connections was hard to obtain as the data on customer connections are no longer recorded and monitored centrally. There exists conflicting numbers with regard to customer connections raising doubts about the accuracy of the number.

<sup>7</sup> Sachdeva and Goswami, 2008

<sup>8</sup> Will translate roughly into US \$ 550 million in the first year as per current exchange rates

<sup>9</sup> Several studies point this out including one conducted by Shell through it's Nigerian subsidiary SPDC

<sup>10</sup> Svensson, 2008

<sup>11</sup> Goddard, 2007

<sup>12</sup> Tenenbaum, 2007

<sup>13</sup> Tenenbaum, 2007

<sup>14</sup> Goddard, 2008

### References

1. Gnansounou. E., 2008, Boosting the Electricity Sector In West Africa : An Integrative Vision , IAEE Energy Forum, 3<sup>rd</sup> Quarter, 2008

2. [http://www.iea.org/Textbase/country/11\\_country.asp](http://www.iea.org/Textbase/country/11_country.asp) : International Energy Agency- country statistics

3. Tallapragada and Adebusuyi, 2007, Economic policy options for a prosperous Nigeria, Palgrave Mcmillan, Collier, Soludo, Patillo, Eds.

4. Tenenbaum, 2007, Sachdeva, Goswami, Goddard, Haider, 2008, World Bank-Energy Sector Country Briefs,

5. Iwayemi, 2008, Investments in Electricity Generation and Transmission in Nigeria: Issues and Options, IAEE Energy Forum, 1st Quarter, 2008

6. Adenikinju, 2005, Analysis of the cost of infrastructure failures in a developing economy

7. Adeyeye, 2008, Energy pricing policy and problems in Nigeria, OPEC review, Vol.15, Issue 3

8. Ikeme and Ebohon, 2005; Nigeria's electric power sector reform: what should form the key objectives?

## Dennis J. O'Brien USAEE/IAEE Best Student Paper Award

USAEE and IAEE are pleased to continue the Dennis J. O'Brien USAEE/IAEE Student Paper Award program for student papers on energy economics.

### Description

Up to 10 Student Paper Awards may be given, each consisting of a \$500 cash prize plus a waiver of conference registration fees (a value of \$355) for the 32nd IAEE International Conference, June 21-24, 2009.

Four of these award recipients will also be invited to present their papers at the Best Student Paper Competition on the first day of the conference. These four students will receive an additional \$250 cash prize, for a total of \$750. A panel of judges at the student paper session will select one of the four papers to receive the Best Student Paper Award.

The winner of the Best Student Paper Award will receive a further \$250 cash prize, for a total of \$1,000. An award ceremony later in the conference will recognize all recipients of a Student Paper Award.

### Application Guidelines

To be eligible for consideration, the applicant must

- be a full-time student as of the application deadline (or have completed degree within the past 12 months and not be employed full-time);
- be a member of IAEE in good standing. Membership information may be found at <https://www.iaee.org/en/membership/application.aspx>

The paper must

- be original work completed by the student;
- not be co-authored by a faculty member or other non-student (papers co-authored by students are ok).

### Application materials consist of

- Paper abstract;
- Paper – double-spaced; 8.5 by 11 inch page setup; 30 pages maximum (any paper that exceeds the page limitation will be subject to disqualification);
- Letter from applicant stating that applicant meets qualifications listed above (include photocopy of student ID);
- Letter from applicant's advisor or another faculty member familiar with applicant's research confirming that paper meets qualifications listed above and recommending it for consideration.

The application deadline is March 21, 2009. Please submit all materials electronically in pdf format to [iaee@iaee.org](mailto:iaee@iaee.org), with "Submission for Best Student Paper Award" in the subject line.

### Additional Information

Please note: in order to receive the award, students must attend the conference and present their papers (award recipients who are not part of the special session will be assigned to other conference sessions based on paper topic). All travel and accommodation costs associated with attending the conference are the responsibility of the award recipients.

For further questions regarding the USAEE/IAEE Student Paper Award, please contact David Williams at [iaee@iaee.org](mailto:iaee@iaee.org)

### Acknowledgements

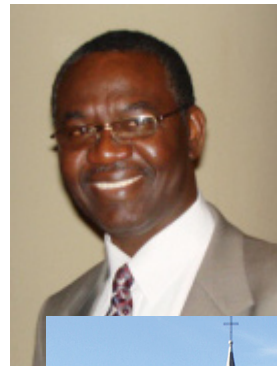
Dennis J. O'Brien co-founded the US Association of Energy Economics as a chapter of the IAEE in the early 1990s. From 1994-95, he was President of the US chapter. In 1997, he was elected President of the International Association. Those who knew him remember him as being very dedicated to helping students and energy economists in the early stages of their career. He passed away in 2005 on his return from an IAEE Conference.



# Scenes from the 28th USAEE/IAEE North American Conference

December 3-5, 2008 – New Orleans, Louisiana, USA





## Welcome New Members!

The following individuals joined IAEE from 10/1/08 to 12/31/09

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### San Francisco International Conference Registration Fee Scholarships

The San Francisco conference organizers are offering a limited number of registration fee scholarships to offset the conference registration costs for students (\$355 value). All travel and accommodation costs associated with attending the conference are the responsibility of the recipient.

Fee scholarships are awarded on a rolling basis (first-come, first-served) until funds run out, so early applications are encouraged. No applications will be accepted after May 22, 2009.

To be eligible for consideration, you must:

- be a full-time student as of the application deadline (or have completed degree within the past 6 months and not be employed full-time);
- be a member of IAEE in good standing. Membership information may be found at <https://www.iaee.org/en/membership/application.aspx>

Application materials consist of

- Letter from applicant (see details below);
- Letter from applicant's advisor or another faculty member familiar with your research (see details below).

The letter from applicant should

- state that you meet qualifications listed above (include photocopy of student ID);
- briefly describe your energy interests and what you hope to accomplish by attending the conference;
- provide the name and contact information for the faculty member who will be writing a letter on your behalf.

The letter from applicant's advisor or another faculty member familiar with your research should

- briefly describe your research interests, the nature of your academic program, and your academic progress;
- state whether he or she recommends that you be awarded the conference fee scholarship.

Please submit all materials electronically in pdf format to [iaee@iaee.org](mailto:iaee@iaee.org), with "Application for Registration Fee Scholarship" in the subject line.

Students who do not wish to apply for a fee scholarship may still attend the conference at the reduced student registration rate. In order to qualify for the student rate, please submit a letter stating that you are a full-time student and are not employed full-time. The letter should provide the name and contact information for your main faculty advisor or your department chair and a copy of your student identification card. IAEE reserves the right to verify student status.

For further questions regarding the Registration Fee Scholarship, please contact David Williams at [iaee@iaee.org](mailto:iaee@iaee.org)

For information regarding our Best Student Paper Award program, please visit <http://www.usaee.org/usaee2009/paperawards.html>



## Recommendations for 2009 IAEE Awards Requested

IAEE is now receiving recommendations for its *Outstanding Contributions to the Profession Award* and its *Journalism Award*. To view past award recipients please visit <http://www.iaee.org/en/inside/awards.aspx>. Following is a brief description of these awards.

### Outstanding Contributions to the Profession Award

This award, given annually since 1981, is given to an individual for outstanding contributions to the field of energy economics and its literature. Winners of this award are invited to publish a paper in *The Energy Journal*. The Award is typically given at an IAEE International Conference and the winner is asked to address the audience for 5-8 minutes. The address usually becomes the basis of a paper in *The Energy Journal*.

### Journalism Award

Awarded since 1983 to an individual for excellence in written journalism on topics related to international energy economics. There is a \$1,000 stipend with this award. The Award is typically given at an IAEE International Conference and the winner is asked to address the audience with a few brief remarks, sometimes anecdotal.

The IAEE Awards Committee welcomes recommendations from the IAEE membership for consideration of these awards. Please address your recommendations to:

Andrea Bollino, Chair IAEE Awards Committee  
carloandrea.bollino@gssel.it

## PROFESSOR ASSOCIATE OR FULL

The Paul H. Nitze School of Advanced International Studies (SAIS) of the Johns Hopkins University is seeking to fill a tenured position at the level of associate or full professor of international energy and/or environmental policy studies. The ideal candidate will have a record of outstanding academic research and excellence in teaching, and a PhD in an appropriate field. Preference will be given to applicants with an interest in traditional and alternative energy technologies, the geopolitics of energy, or the environment. The successful candidate will direct a program in energy, environment, and other related areas at SAIS.

We offer competitive salaries, excellent benefits and talented professional colleagues in a drug- and smoke-free work place. Applicants should submit their curriculum vitae to: Dr. David Lampton, Paul H. Nitze School of Advanced International Studies, 1740 Massachusetts Ave., Washington, DC 20036. The application review period will begin on February 1, 2009 and will remain open until the position is filled.

We are an affirmative action/equal opportunity employer and educator encouraging applications from women and minorities.

JOHNS HOPKINS  
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Shuddhasattwa Rafiq from the Curtin Business School, Perth, Australia, won the Perth IAEE Student Best Paper Award. Rafiq, above, receives the award from Past President Tony Owen.

# Broaden Your Professional Horizons



## Join the

International Association for Energy Economics

In today's economy you need to keep up-to-date on energy policy and developments. To be ahead of the others, you need timely, relevant material on current energy thought and comment, on data, trends and key policy issues. You need a network of professional individuals that specialize in the field of energy economics so that you may have access to their valuable ideas, opinions and services. Membership in the IAEE does just this, keeps you abreast of current energy related issues and broadens your professional outlook.

The IAEE currently meets the professional needs of over 3400 energy economists in many areas: private industry, non-profit and trade organizations, consulting, government and academe. Below is a listing of the publications and services the Association offers its membership.

• **Professional Journal:** *The Energy Journal* is the Association's distinguished quarterly publication published by the Energy Economics Education Foundation, the IAEE's educational affiliate. The journal contains articles on a wide range of energy economic issues, as well as book reviews, notes and special notices to members. Topics regularly addressed include the following:

Alternative Transportation Fuels	Hydrocarbons Issues
Conservation of Energy	International Energy Issues
Electricity and Coal	Markets for Crude Oil
Energy & Economic Development	Natural Gas Topics
Energy Management	Nuclear Power Issues
Energy Policy Issues	Renewable Energy Issues
Environmental Issues & Concerns	Forecasting Techniques

• **Newsletter:** The IAEE *Energy Forum*, published four times a year, contains articles dealing with applied energy economics throughout the world. The Newsletter also contains announcements of coming events, such as conferences and workshops; gives detail of IAEE international affiliate activities; and provides special reports and information of international interest.

• **Directory:** The Online Membership Directory lists members around the world, their affiliation, areas of specialization, address and telephone/fax numbers. A most valuable networking resource.

• **Conferences:** IAEE Conferences attract delegates who represent some of the most influential government, corporate and academic energy decision-making institutions. Conference programs address critical issues of vital concern and importance to governments and industry and provide a forum where policy issues can be presented, considered and discussed at both formal sessions and informal social functions. Major conferences held each year include the North American, European and Asian Conferences and the International Conference. IAEE members attend a reduced rates.

• **Proceedings:** IAEE Conferences generate valuable proceedings which are available to members at reduced rates.

To join the IAEE and avail yourself of our outstanding publications and services please clip and complete the application below and send it with your check, payable to the IAEE, in U.S. dollars, drawn on a U.S. bank to: International Association for Energy Economics, 28790 Chagrin Blvd., Suite 350, Cleveland, OH 44122. Phone: 216-464-5365.

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 **Yes**, I wish to become a member of the International Association for Energy Economics. My check for \$80.00 (U.S. members \$100—includes USAEE membership) is enclosed to cover regular individual membership for twelve months from the end of the month in which my payment is received. I understand that I will receive all of the above publications and announcements to all IAEE sponsored meetings.

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## Publications

**U.S. Energy Independence: A Plan for Energy Independence by 2020.** Walter R. May (2008). 168 pages. Price: US\$20.00. Contact: SFA International, Inc., 6143 Sienna Arbor Lane, Houston, TX, 77041, USA. URL: [www.SFAInternational.com](http://www.SFAInternational.com)

**Confessions of an Energy Price Forecaster: A 12-Step Program to Enlightenment.** John Tobin (2008). 162 pages. Contact: Outskirts Press, Inc. URL: [www.outskirtspress.com](http://www.outskirtspress.com)

**World Development Report: Reshaping Economic Geography.** World Bank Publications (2008). 380 pages. Price: US\$50.00/US\$26.00 for Hardcover/Paperback. Contact: World Bank Publications, PO Box 960, Herndon, VA 20172-0960, USA. Phone: 1-703-661-1580. Fax: 1-703-661-1501. Email: [books@worldbank.org](mailto:books@worldbank.org) URL: [www.worldbank.org/publications](http://www.worldbank.org/publications)

## Calendar

**18-20 February 2009, Midstream Gas Assets - Acquisition & Divestiture Summit at Houston, TX.** Contact: Robert Gallander, Conference Secretariat, Infocast Inc Email: [registration@infocastinc.com](mailto:registration@infocastinc.com) URL: <http://www.infocastinc.com/index.php/conference/140>

**20-23 February 2009, NanoBusiness Summit: "Big Capital Meets Small Tech" at Egypt.** Contact: Neveen Samy, SabryCorp Ltd. for Science and Development., 4 Al-Sabbagh St., El Korba, Cairo, Egypt. Phone: +20 2 2414 6493. Fax: +20 2 2415 0992 Email: [neveen.samy@sabrycorp.com](mailto:neveen.samy@sabrycorp.com) URL: [www.nanobus.sabrycorp.com](http://www.nanobus.sabrycorp.com)

**24-25 February 2009, HSE, Risk Management and Process Safety at Marcliffe Hotel, Aberdeen.** Contact: Kristy Sadler, Marketing Executive, IQPC. Phone: 44 (0) 207 368 9300 Email: [enquire@iqpc.co.uk](mailto:enquire@iqpc.co.uk) URL: <http://www.iqpc.com/uk/hse/ediary>

**16-20 March 2009, Underground Gas Storage Course at Groningen.** Contact: [sanders@energydelta.nl](mailto:sanders@energydelta.nl), Study Advisor, Energy Delta Institute, Laan Corpus den Hoorn 300, Groningen, Groningen, 9728 JT, Netherlands. Phone: +31 50 524 83 32 Email: [sanders@energydelta.nl](mailto:sanders@energydelta.nl) URL: <http://www.energydelta.nl/index.cfm?pid=200>

**17-19 March 2009, Transmission & Distribution Europe 2009 at GL events CCIB, SL, , Barcelona.** Contact: myrthe@synergy-events.com, Transmission & Distribution Europe 2009, Synergy, Rambla Prim, 1-17, 08019, Barcelona, 08019, Spain. Phone: +31 346 290783. Fax: +31 346 590601 Email: [myrthe@synergy-events.com](mailto:myrthe@synergy-events.com) URL: [www.td-europe.eu](http://www.td-europe.eu)

**22-24 March 2009, 2nd Latin American Meeting on Energy Economics: Energy Security, Integration and Development in Latin America at Santiago, Chile.** Contact: Conference Coordinator, ELAEE, Vicuña Mackenna 4860, Macul, Santiago, Chile. Phone: 56 2 3541411. Fax: 56 2 5521608 Email: [info@elaee.org](mailto:info@elaee.org) URL: [www.elaee.org](http://www.elaee.org)

**March 23, 2009 - April 3, 2009, Oil & Gas Mini MBA at London, UK.** Contact: Kim Adams, Marketing Assistant, CWC School for Energy, 16-18 Lombard Road, London, SW11 3RB, United Kingdom. Phone: +44 79780042 Email: [kadams@thecwcgroup.com](mailto:kadams@thecwcgroup.com) URL: [http://www.thecwcgroup.com/train\\_detail\\_home.asp?TID=33](http://www.thecwcgroup.com/train_detail_home.asp?TID=33)

**23-25 March 2009, 5th Global Education & Training Event: Exploration & Production at London, UK.** Contact: Distribution Dept, LatinPetroleum, PO Box 940775, Houston, TX, 77094, USA.

Phone: 713-344-1723 Email: [office@getenergyevent.com](mailto:office@getenergyevent.com) URL: [www.latinpetroleum.com](http://www.latinpetroleum.com)

**24-26 March 2009, Infrastructure Partnerships for African Development (iPAD) Angola 2009 at Hotel Tropico, Luanda.** Contact: Sean Intiomale, Senior Marketing Specialist - English and Francophone regions, Spintelligent, Spintelligent House, 31 Bell Crescent, Tokai, PO Box 321, Steenberg, South Africa, Tokai, Western Cape, 7947, South Africa. Phone: +27 700 3543. Fax: +27 700 3501 Email: [sean.intiomale@spintelligent.com](mailto:sean.intiomale@spintelligent.com) URL: [www.spintelligent.com](http://www.spintelligent.com)

**25-26 March 2009, BioPower Generation Asia at Singapore.** Contact: Matthew Proben, Marketing Manager, Green Power Conferences. Phone: 44 (0) 207 099 0600 Email: [annie.ellis@greenpowerconferences.com](mailto:annie.ellis@greenpowerconferences.com) URL: [www.greenpowerconferences.com/biofuelsmarkets/biopower\\_asia.html](http://www.greenpowerconferences.com/biofuelsmarkets/biopower_asia.html)

**March 29, 2009 - April 2, 2009, Nanotech Insight: "Because Small Matter is no Small Matter" at Spain.** Contact: Neveen Samy, SabryCorp Ltd. for Science and Development., 4 Al-Sabbagh St., El Korba, Cairo, Egypt. Phone: +20 2 2414 6493. Fax: +20 2 2415 0992 Email: [neveen.samy@sabrycorp.com](mailto:neveen.samy@sabrycorp.com) URL: [www.nanoinsight.sabrycorp.com](http://www.nanoinsight.sabrycorp.com)

**March 31, 2009 - April 2, 2009, MCE Deepwater Development 2009 at Copenhagen, Denmark.** Contact: Sandra Gregory, Corp Support Svc Mgr, Quest Offshore, 1600 Hwy 6, Ste 300, Sugar Land, TX, 77478, USA. Phone: 281-491-5900. Fax: 281-491-5902 Email: [sandra.gregory@questoffshore.com](mailto:sandra.gregory@questoffshore.com) URL: [www.questoffshore.com](http://www.questoffshore.com)

**7-8 April 2009, Carbon TradeEx America at Washington DC.** Contact: Darrin Stern, Show Manager, Koelnmesse Inc., 8700 West Bryn Mawr Ave., Suite 640, Chicago, IL, 60631. Phone: 773-326-9925. Fax: 773-714-0063 Email: [d.stern@koelnmesse.com](mailto:d.stern@koelnmesse.com) URL: [www.carbontradeexamerica.com](http://www.carbontradeexamerica.com)

**14-17 April 2009, 5th European Conference on Economics and Management of Energy in Industry at Vilamoura, Algarve, Portugal.** Contact: Conference Administrator, ECEMEI URL: [www.cenertec.pt/ecemei/](http://www.cenertec.pt/ecemei/)

**19-21 April 2009, 17th Middle East Petroleum and Gas Conference at Dubai, UAE.** Contact: Conference Secretariat, The Conference Connection Inc, PO Box 1736, Raffles City, 911758, Singapore. Phone: 65 6338 0064. Fax: 65 6338 4090 Email: [info@ccgroupconferences.com](mailto:info@ccgroupconferences.com) URL: <http://www.cconnection.com/MPGCHome.htm>

**23-24 April 2009, 2nd Annual NAEI/IAEE Intl Conference: Energy Industry Restructuring: Interactions Between Business, Economics & Policy at Abuja, Nigeria.** Contact: Adeola Adenikinju, Conference Organiser, University of Ibadan, Ibadan, OY, Nigeria. Phone: 2348023440018 Email: [adeolaadenikinju@yahoo.com](mailto:adeolaadenikinju@yahoo.com)

**11-15 May 2009, Achema 2009 at Frankfurt, Germany.** Contact: Conference Coordinator, Dechema e.V., PO Box 15 01 04, Frankfurt am Main, 60061, Germany. Phone: 49-0-69-7564-0. Fax: 49-0-69-7564-201 Email: [achema@dechema.de](mailto:achema@dechema.de) URL: [www.achema.de](http://www.achema.de)

**12-14 May 2009, Electric Power: Unmatched Buying Power at Rosemont, IL.** Contact: Conference Coordinator, TradeFair Group. Phone: 832-242-1969. Fax: 832-242-1971 Email: [info@electricpowerexpo.com](mailto:info@electricpowerexpo.com) URL: [www.electricpowerexpo.com](http://www.electricpowerexpo.com)

**9-10 June 2009, 3rd International Symposium on Natural Gas at Istanbul, Turkey.** Contact: Gurkan Kubaroglu, Chair, International Program Committee, Bogazici University, Turkey Email: [gurkank@boun.edu.tr](mailto:gurkank@boun.edu.tr) URL: [www.ingas2009.com](http://www.ingas2009.com)



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