Plenary Address 3: Climate Change and Energy Markets

•Yinka Omorogbe

ABSTRACT

The paper discusses the impact of climate change on energy markets, from a developing country perspective, with emphasis on African countries, particularly those in the sub-Sahara. The questions are; is climate change in fact making a difference to energy use? And should it, considering the current statistics on domestic energy use and practical realities, from the perspective of the residents of developing countries? It emphasizes the necessity for growth, considers various efforts to increase the use of renewable and non-renewable energy in selected countries, and discusses what the author believes should be the approach to achieving sustainable energy, that is, meeting energy needs without adverse climate change effects on the environment. Again, it considers the impact of policy, and the critical part that the law plays as a stimulant or inhibitor of positive actions which promote the seemingly potentially conflicting necessities of sustainable development and growth in domestic energy consumption.

"… a North-South split over climate change is the single greatest threat to progress."

Yvo de Boer[1]

"Christian Teriete, a spokesman for the World Wide Fund for Nature (WWF), said the African continent emits around 40 billion cubic metres of carbon every year, which he says is "negligible" when compared to Europe, Asia and the US.
"It doesn't make sense for Nigeria and South Africa to reduce their emissions while the industrialised nations [which] are largely responsible for climate change do not make any efforts to reduce theirs," Teriete said."[2]

"Emissions reductions should not be used as a ploy to create obstacles on our [Nigeria's] way to development. The developed countries should help us with low-carbon technology."[3]

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[1] Statement credited to Yvo de Boer, Executive Secretary of the United Nations Framework Convention on Climate Change (UNFCCC) in Michael Fleshman, "Africa Seeks Fair Share of Global Climate's 'green' cash," A*frica Renewal*, Vol. 22, No 2, at page 3. Available at www.un.org/ecosoc/geninfo/ofrec/ar2/prevar.htm
[2] "Nigeria: Should Stopping Gas Flaring be a Priority?" News item for September 3 2008, Accra Ghana, available at www.alertnet.org/thenews
[3] Ibid.

INTRODUCTION

This paper is about climate change and energy markets, and is written from a developing country perspective. In reality it is about development as will be apparent later in the paper. Since I am an African writing from a developing country perspective, my primary focus is on Africa's many countries, most of whom are classified as poor. From the onset I would like to apologise in advance for some generalizations or assumptions that have guided the contents of the paper. I have made these assumptions or generalized for the purpose of making what I believe to be vital points that I hope will cumulatively assist in aiding the understanding a developing country angle to climate change and energy markets. First, I assume that I am speaking to a mixed audience composed primarily of persons that are extremely knowledgeable about climate energy issues, albeit from different perspectives. In addition I have made two other assumptions, which may or may not be totally correct. The first is that hardly any of the non-Africans here have been to any country in Africa. This assumption is borne out of the fact that practically all the western academics that I have interacted with have not been to any African country, apart from possibly South Africa. The Africans here, especially those from the sub-Sahara, will know that if you have only been to South Africa, you do not actually know much about the continent. The second assumption is more controversial and would be considered politically incorrect were I not a black African. This is that, for many of you who have never been to any country in Africa, 'Africa' is one amorphous expanse of land full of starving pot-bellied children living in a drought-ridden environment. In fact, Africa is nothing like that that negative stereotype. Such perceptions of Africa are like the proverbial men who touched different parts of the elephant's body and then proceeded to describe it in its entirety. Africa is composed of 53 countries with a wide variety of climates, terrain, and people. For example, my country, Nigeria, has about 140 million people, and more than 250 ethnic groups, each with their own separate languages.[4] Even though it is just by the Equator, it not only has tropical forests, but also deserts, and savannah grasslands. It also has many poor people, and many refugees, but it has a lot more than that. Like the other countries of Africa, it is a country of great contrasts, primarily because of the great disparities in income distribution.[5] Interestingly, most countries, rich and poor, have these great inequalities. However, the difference between the developed and the underdeveloped countries seems to be more the existence of a substantial middle class than the absence of the abjectly poor.[6]

Since the western media focuses on starving Africans in refugee camps, most people do not realize that not every African is starving. In fact, very many are not. Again, to use Nigeria as an example, seventy per cent of the population is said to live under the poverty line of $1.25 a day. That leaves 42 million who are not extremely poor. Of 140 million Nigerians, 13.5% or nearly 20 million people are

[4] Information about Nigeria may be found on the official website of the Federal Republic of Nigeria www.nigeria.gov.ng. See also 'CIA: The World Factbook- Nigeria' available at www.cia.gov

[5] !!

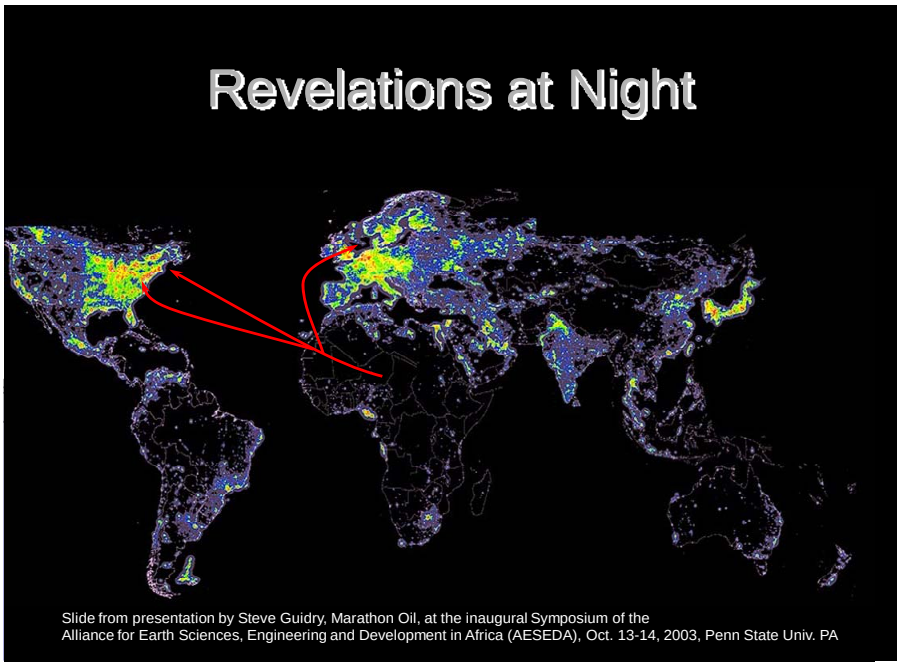
[6] I would like to challenge readers to check up statistics of the percentage of persons living below the poverty line in various countries. For example, according to www.cia.org 12% of the population, and 14% of the population live below the poverty line in the U.S.A. and the U.K. respectively. The are still many poor people and they are found all over the world.

middle to upper middle class by world standards,[7] amounting to a population four times larger than Denmark,[8] Norway,[9] or New Zealand,[10] . You are therefore dealing with large numbers of people who are not poor and who do not have the problems of the poor. The same holds true for many other developing countries, with the disparities being more significant in those with larger populations. The domestic energy markets in developing countries, which are the concern of this presentation, is thus greatly varied. There are many very poor people, often resident in the rural areas and often in areas that are inaccessible and off the existing electricity grid. At the other end of the spectrum are the more affluent whose energy problems centre round instability of energy, infrequent supplies, constant outages, and the expense of generating energy to meet their own needs. The challenge is to satisfy the energy needs of the various people with greatly differing incomes and requirements, in a way that is compatible with sustainable development and the preservation of the environment, and in a way that ensures that the energy markets without causing further destruction to the environment.

AFRICAN ENERGY[11]

Africa merits special attention as the following figure graphically illustrates.

FIGURE 1: THE WORLD AT NIGHT



[7] See *The Middle Class in Nigeria 2007,* a report of the National Bureau of Statistics, which is a study of the 2004 and 2006 Nigerian populations; available at www.nigeriastat.gov.ng . This percentage refers to the upper middle class to upper class (from income and other economic perspectives.)
[8] 5,484,723 (July 2008 estimates) according to www.cia.gov.
[9] Norway has a July 2007 population estimate of 4,627,927 according to www.cia.gov. See also www.norway.org.
[10] 4,115,771 (July 2007 estimates) according to www.cia.gov.
[11] I have used it on a few occasions, e.g. Yinka Omorogbe "Energy Security in Africa: The One Thing that Matters Most" Conference of the Section on Energy Law of the International Bar Association, 9th- 12th May 2004, San Francisco, U.S.A ; Yinka Omorogbe *Why We Have No Energy,* (2008) University of Ibadan Press, at .

This composite image of the world at night is already well known. Nevertheless it still remains an extremely graphic illustration of energy wastage, climate devastation, and poverty in the midst of plenty. The picture, taken over a 24 hour period shows the lights of the world, with the continent of Africa being mainly dark, with the exception of the Niger Delta, where the flares light up the sky. By contrast, in other parts of the world, (with the major exception of Russia, which also has terrible flaring rates,)[12] the lights in this image are lights of conventional energy. In other words, the bright spots in the Niger Delta of are the lights of environmental degradation, the lights of gas flares, right in the midst of environmentally devastated and underdeveloped people with no conventional energy. The pictures speak for themselves and need no commentaries. They show what living next to gas flares looks like

FIGURE 2: LIVING WITH FLARES IN THE NIGER DELTA (1)

[12] Official statistics have Russia flaring about 25% of what it produces. See “Russia: Natural Gas” at www.eia.doe.gov

FIGURE 3: LIVING FLARES IN THE NIGERI DELTA (2)

The cessation of gas flaring would reduce be the most significant step in the reduction of emissions, whilst at the same time providing energy to the surrounding areas. This has to be significant focus for Nigeria, from both environmental and development perspectives.

Paradoxically, the continent of Africa is known to be one of the world's richest continents in terms of energy and natural resource deposits, and, with abundant natural resources of every variety[13] and with abundant supplies of renewable energy sources such as solar, wind and hydropower. Unfortunately it is also the continent with the lowest consumption of conventional energy. It produces about 7 per cent of world commercial energy production, a figure that has remained constant since 1970 and is expected to remain so until 2020.[14] Production of coal is mainly from South Africa,[15] although substantial deposits are found in Nigeria, North Africa, and Zaire. Natural gas production and utilization currently comes predominantly from the North African countries of Algeria and Egypt, although utilized gas from Nigeria is steadily increasing. Crude oil is currently produced mainly in Algeria, Egypt, Libya,, Nigeria, Gabon, Angola, Sudan, and Equatorial Guinea. However, most countries have some ongoing exploration and production and there are substantial known reserves in Cameroon, the Congo, and several other states. Most of Africa's uranium remains untapped. South Africa is one of the world's seven major uranium provinces, and significant deposits are also to be found in Nigeria, Gabon, Zaire, and Namibia.

[13] It has substantial deposits of various minerals, including coal, crude oil, natural gas, bitumen, uranium, radium, low-cost thorium, iron ores, chromium, cobalt, copper, lead, zinc, tin, baryite, titanium, antimony, gold, platinum, tantalum, germanium, lithium, phosphates, and diamonds. See Yinka Omorogbe. 'Regional and National Frameworks for Energy Security in Africa," *Energy Security: Managing Risk in a Dynamic Legal and Regulatory Environment*, Barry Barton, Catherine Redgwell, Anita Ronne, and Donald Zillman, ,eds.(2004) 121.
[14] See Section on commercial energy production in Africa in a World Context, available at www.eia.doe.gov
[15] Fui Tsikata, Abeeku Brew Hammond, Y.B. Osafo "Increasing Access to Clean Energy in Africa: Challenges and Initiatives," *Beyond the Carbon Economy: Energy Law In Transition*, Donald N. Zillman, Catherine Redgwell, Yinka O. Omorogbe, and Lila K. Barrera-Hernandez , eds. (2008) 163 at 165-166.

As a whole the continent produces far more than it consumes. Figures place Africa's total conventional energy consumption at about 3 per cent of world energy consumed[16] with the significant amounts being consumed by Egypt and South Africa..with the latter consuming about 12 per cent of Africa's total energy consumption. This low consumption is linked to the very low levels of electricity consumption. One of the highest percentages for access to electricity is 75 per cent of the population, for South Africa. In Nigeria, less than half the [17]population is connected to the national grid. In Rwanda less than 1 per cent have any access to electricity. These low rates are also indicative of the inadequacy or absence of existing domestic infrastructure. For landlocked countries such Botswana or Namibia the issue is more acute as there is no infrastructure to carry oil inland from the East African coasts. Poverty has impacted on conventional energy use. Even if a typical African country had an electricity grid that covered its entire population, large numbers would not be able to pay the commercial price.

It is therefore impossible to consider climate change and energy markets in an underdeveloped region without considering developmental needs, and the first challenge must be the provision of affordable energy to those who can least afford it. In other words, the primary need for the energy poor is energy services from the most efficient and economical source. Ideally, this would be through the use of renewable energy. However, renewable energy is far more expensive in the short-term, unless one is considering energy for those located in rural inaccessible areas. This is most likely why poverty alleviation devices such as multifunctional platforms are built to use both diesel and biofuels such as oil extracted from palm oil or the jatropha plant.[18] Sometimes, it is more practicable such as when there is the need to keep vaccines refrigerated in rural areas without conventional electricity.[19] Measures are currently underway to stimulate its growth of renewables in Africa. A recent International Conference on Renewable Energy in Africa, held recently in Senegal,[20] came up with a Dakar Declaration on Scaling Up Renewable Energy in Africa which agreed on 'a vision to scale up renewable energy so as to enhance wider access to modern energy, strengthen the continent's energy security as well as support its industrialisation and socio-economic development. The Declaration[21] was adopted at the Ministerial segment where the Conference also agreed to:

> an African continental target for governments, with support from development partners, to scale up annual renewable energy investments to US$10 billion between 2009-2014;
> adopt a Plan of Action consisting of five key programme dimensions;
> call upon African governments, their international development partners, non-governmental organizations and the private sector to support implementation of the Plan of Action with

[16] See e.g. World Primary Energy Consumption by Region 1996-2005, available at www.eia.gov .

[18] "How Do Rural Energy Services Reduce Poverty? Frequently Asked Questions About the Multifunctional Platform" UNDP March 2005, Vijay Modi, Susan McDade, D. Lallemont, J. Saghir, *Energy Services for the Millennium Development Goals* (2006) available at www.millenniumproject.org .

[19] As is done under the various mass vaccination schemes in Nigeria and other countries.

[20] Jointly organized by The Government of Senegal, the African Union, the German Federal Ministry for Economic Cooperation and Development (BMZ), and the United Nations Industrial Development Organization (UNIDO)

[21] Available at www.ren21.net/pdf/Dakar_Declaration_Scaling_Up_Renewable_Energy_in_Africa.pdf . See also the UNIDO website, www.unido.org.

adequate resources; and recommend that the AU, UNIDO and other relevant development partners establish a ministerial-level policy advocacy group, to be supported by a coordination unit.

The non-oil African countries have made some progress in the use of renewable. There should be an increase and the results of this Declaration should be seen within the coming years.

ENERGY, DEVELOPMENT, AND ENERGY MARKETS

The role of energy in the promotion of development is now well – recognized. In this age of the Millennium Development goals, it is now obvious that access to energy is a prerequisite to the attainment of all eight goals, which strike deeply at the root of underdevelopment. The following box identifies some internationally recognized linkages.

Box 1: THE MILLENNIUM DEVELOPMENT GOALS
Source: UNDP, *Energizing the Millennium Development Goals: A guide to Energy's Role in Reducing Poverty (2005)*

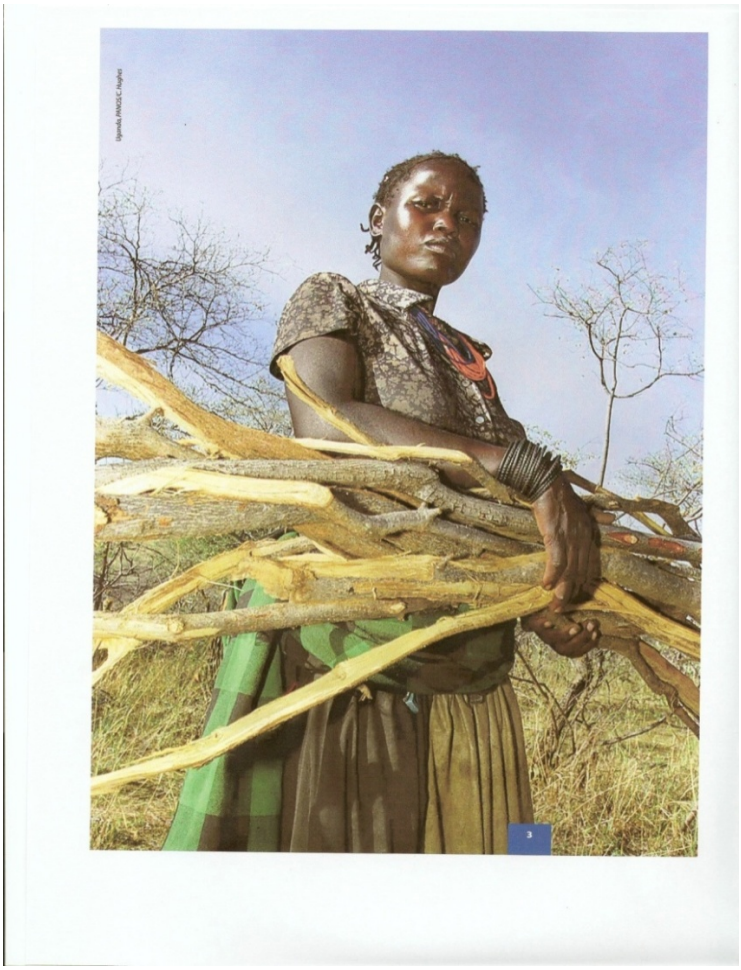
MDG	**Energy Linkages**
1. Eradicate extreme poverty and hunger	Energy inputs such as electricity and fuels are essential to generate jobs, industrial activities, transportation, commerce, micro-enterprises, and agriculture outputs. Most staple foods must be processed, conserved, and cooked, requiring energy from various fuels.
2. Achieve universal primary education	To attract teachers to rural areas electricity is needed for homes and schools. After dusk study requires illumination. Many children, especially girls, do not attend primary schools in order to carry wood and water to meet family subsistence needs.
3. Promote gender equality and empower women	Lack of access to modern fuels and electricity contributes to gender inequality. Women are responsible for most household cooking and water-boiling activities. This takes time away from other productive activities as well as from educational and social participation. Access to modern fuels eases women's domestic burden and allows them to pursue educational, economic, and other opportunities.
4. Reduce child mortality	Diseases caused by unboiled water, and respiratory illness caused by the effects of indoor air pollution from traditional fuels and stoves, directly contribute to infant and child diseases and mortality.
5. Improve maternal health	Women are disproportionately affected by indoor air pollution and water – and food borne illnesses. Lack of electricity in health clinics, lack of illumination for nighttime deliveries, and the daily drudgery and physical burden of fuel collection and transport all contribute to poor maternal health conditions, especially in rural areas.
6. Combat HIV/AIDS, malaria, and other diseases	Electricity for communication such as radio and television can spread important public health information to combat deadly diseases. Health care facilities, doctors, and nurses, all require electricity and the service that it provides (illumination, refrigeration, sterilization, etc.) to deliver effective health services.
7. Ensure environmental sustainability	Energy production, distribution, and consumption has many adverse effects on the local, regional, and global environment; these effects include indoor, local and regional air pollution; local particulates; land degradation; acidification of land and water; and climate change. Cleaner energy systems are needed to address all of these effects and to contribute to environmental sustainability.
8. Develop a global partnership for development	The World Summit for Sustainable Development (WSSD) called for partnerships between public entities, development agencies, civil society, and the private sector to support sustainable development, including the delivery of affordable, reliable, and environmentally sustainable energy services.

For me, the following woman epitomizes the problems of energy use in developing countries, and the linkage between climate change and energy markets.[22] She is the ultimate and most important

[2222] Her picture is prominently placed in the United Nations publication, *Energising the Millennium Development Goals.* See also Yinka Omorogbe, W*hy We Have No Energy*, 2008 University Lecture, Univeristy of Ibadan Press,

customer because, once her energy needs can be met in an environmentally sustainable way, great achievements will have been made. This young Ugandan woman, obviously poor and uneducated, is gathering her only energy source, firewood. She has no other options or she would not be engaged in this arduous task. She, and millions like her, are unwittingly contributing to deforestation, desertification, global warming and harmful emissions through no fault of their own. They are poor and they have no choices. This paper is ultimately about helping people like her.

FIGURE 4: A WOMAN GATHERING FIREWOOD



However, she is only one aspect of the energy market. The middle and upper classes in the society, living in estates such as this one in Lagos, also have energy needs that must be met. Growth is driven by this segment, which is composed of the professional, industrialists, and those in leadership on society. It is a segment that will suffer reduced standards of living and will gradually diminish if it has no conventional energy. If industries are forced to create their own infrastructure to survive, they will either die or migrate out of the country, if they have an alternative. Currently these segments provide their own energy They would be more productive and the countries would be in better shape if their energy needs of these persons were met.

In many developing countries, the markets meet. Those who have risen from communities within which persons such as those in figures 1,2, or 3 live, usually have links with those communities.

Many build country homes with generators, to which they go back to during holiday seasons and practically all are taken back at death to be buried. The cultural systems mean that the more affluent members cater far more for their less privileged members than is the case in the west, (a factor that must be borne in mind when discussing the effects of e.g. energy subsidies, and when considering the fact that Africans donate far less to charities. This is because the average life for many is one where constant demands are being made by poorer relations.)

FIGURE 5: THE UPPER SIDE OF THE AFRICAN ENERGY MARKET

All over the country mass transportation needs using energy fuels must be met. These needs must be met through motor fuels, for private and public transportation along roads such as this one in Lagos.

FIGURE 6: IKORODU ROAD IN LAGOS

In Nigeria, public transportation is fraught with problems. In most cities taxis and buses are in the hands of the private sector, and they are insufficient. There are therefore more customers than there are vehicles. The shortfall is met by motorcycles, which are cheaper than cars or buses, and which provide a means of revenue for motorcycle riders. It is also a very popular means of transport for the rural and urban poor and lower middle classes. The next picture is from Kano and shows people, including a covered Muslim woman, riding motorcycles, popularly known as 'okada' in Nigeria. The okada is very dangerous and prone to accidents, as its drivers do not obey any traffic rules. Therefore it is banned in Abuja. Kano is a city in northern Nigeria which is the capital of the state with the same name. Kano is an industrial city and massive air pollution. A major culprit is the okada, thanks to a 'poverty alleviation' measure of the government which provided and allowed the sale of environmentally polluting two stroke engines in preference to the more expensive, and environmentally friendlier four stroke engine.[23] There are said to be 2 million motorcycles in Kano city. This, coupled with the industries that are in that city, makes it a heavily polluted city, with visible fumes seen at every city intersection. A news item on Kano's air pollution is annexed to this paper.

[23] Two stroke engines are not allowed in the United States because of their high emissions. They pollute the atmosphere more and use more petrol although they are powerful alternatives to the more environmentally benign four- stroke engine. See www.whybike.com/motorcycle15.htm; Eric Murray, How Two Stroke Expansion Chambers work and Why You Should Care" April 23, 1996,found at www.motorcycle.com

FIGURE 4: MOTORCYCLES IN KANO

The needs of all these people must be satisfied.

It is possible for the objectives of development and the protection of the environment to be compatible. Domestic energy needs of developing countries can be met without sacrificing either objective, even when the increased use of hydrocarbons will not only be part of the objective but will be actively encouraged in hydrocarbon producing states. The energy deficiencies are acute and the satisfaction of these energy needs must take priority over the environmental sustainability of the energy source. For developing countries the focus has to be on development and not on climate change, but in aiding the attainment of the former, environmental degradation should be halted. There are many meeting grounds e.g. the cessation of gas flaring, the use of smokeless briquettes or , clean coal (which is increasingly used in the west,) and the use of environmentally acceptable practices for exploration and development. What is needed is a government that is willing and able to take the right decisions. The importance of energy services so as to improve development indicators in any country is premised on the presence of good and informed government with good governance structures. It is good governance that will ensure the prioritization of energy services so that adequate resources will be available for the attainment of efficient energy services that will impact on those who need it the most, people like the lady in figure 4.

In solving the energy needs of the people, the aims should be both the promotion of development and the protection of environment, in that order. Solving the energy needs of my lady in figure 4 will stem the harmful effects caused by her use of wood as her energy source, and will free her so that she

can go to school and do whatever she sets her mind to. The cessation of gas flaring, and its domestic utilization, including its utilization for the use of the energy deprived communities within the vicinity, will greatly reduce emissions and contribute to the development of the communities in question, and to the wellbeing of the person in figures 2 and 3. In these instances, the energy market needs will be met through the more environmentally friendly use of a fossil fuel, in such a way that emissions reductions are greatly reduced. So, for communities in the Niger delta of Nigeria, or in other petroleum producing areas, the environmentally friendly options for meeting the needs of the energy markets of the area are likely to be realized through the use of natural gas, or crude oil.

The motorcycle is the means of transportation for the rural populace, and for the urban poor and lower middle classes. It is a major means of mass transportation in the cities and villages of Nigeria. In this case what option serves the needs of the energy markets and of the climate? It is definitely the use of legal and administrative devices that discourage the use of two-stroke engines, which are cheaper than four stroke engines. But, where money is limited, the response could be that developmental reasons militate against such a ban. But, is this so? Is it not better and cheaper in the long run to utilise a more expensive and healthier option such as the four stroke engine? After all, supposed price gains from cheaper prices cannot outweigh the problems of ill-health and atmospheric pollution. Of course any ban would have to be accompanied by stimulating the creation of an efficient and safe mass transportation system to replace motorcycles as a means of mass transportation. Good policies are vital, as is the standard of governance.

CONCLUDING THOUGHTS ON CLIMATE CHANGE AND ENERGY MARKETS

Does this mean that climate change issues are secondary for developing countries? Unfortunately, yes. One reason that I have included pictures within this presentation is so that the development problems of countries with great contrasts can be comprehended. It is also to graphically depict the fact that there has to be a certain level of comfort before choices based primarily on environmental considerations can be made. However, in this day and age, governance must be sensitive to environmental matters or it cannot be described as good. Environmentally insensitive governance is often driven more by ignorance than necessity because usually, there are environmentally friendly alternatives. Problems arise when the less environmentally friendly option is much cheaper. Then a balance is required and the question of greater benefits must be addressed. However, long term analyses usually show that environmentally friendly options, including natural gas utilization as opposed to flaring, will often have the greatest benefits. For developing countries, as stated several times within this presentation, the primary goal has to be poverty alleviation, and the needs of the markets have to be addressed against this background. This was not done in past years in the resource-rich countries. Petroleum was treated first and foremost as a source of revenue. Its importance as a domestic energy source was unrecognized, which is why the present energy famine and increasing numbers of poor people in the developing resource-rich countries has been so acute.

I have often said that just providing energy to the poor would be sufficient for them to climb out of the poverty trap.[24] I have come to see that I have been wrong. Now I have come to believe that the major cause of continued and persistent abject poverty is not so much about scarcity of resources as much as its misallocation. It is one thing to have a certain amount of money. What you spend it on is another matter. Below the poverty line there are limited survival options. As resources increase so do the choices. The difference between the person who climbs out of the poverty trap, and the person who does not, lies in the choices made by these respective persons. In short, the alleviation of poverty lies in the right allocation of resources by people and by government, not in increasing the availability of resources. If you give me more money and I allocate the surplus- over and above what I need to survive- to areas that will not increase my quality of life and safeguard my future resources, all you have done is to give me a palliative. If you come back to me after some time, I will still be poor. The secret to poverty eradication therefore lies in changing the mindsets of policy makers and the poor on the right allocation of resources. If one analyses the problems of the poor nations along these lines, the misallocation of resources will always be apparent. And, fundamentally speaking, what is corruption? It is the wrong, dishonest and criminal misallocation of public resources, and its effect is ultimately to decrease the quality of life and the future resources of the rightful owners of the resources, the people. What are the characteristics of most people caught in the poverty trap? It is the misallocation of resources, vividly illustrated for me by the sight of the poor in the western world, living on welfare and carrying the latest designer bags and wearing extremely expensive designer labels. All around me it is epitomized by disadvantaged people who suddenly get comparatively large amounts of money, which they spend on consumables, and remain at the level that they were prior to acquiring the money.

So the lack of good governance and the misallocation of resources has led to the diversity of domestic energy markets, as I hope has been shown above. Many of those in these energy markets include persons who cannot allocate resources effectively, either for reasons of ignorance or a wrong mindset. The challenge is for the leadership to govern in line with principles of good governance, and for the people to embrace principles that promote the correct allocation of their resources, and to demand the same from their leaders. For those outside, in the developed world, what we need is an appreciation of the problems faced, recognition of the differences and of the need for a different kind of prioritization, recognizing that the goals of the developing world will ultimately achieve the objectives of a cleaner and environmentally sustainable world, and for assistance where necessary.

[24] Most recently. I made this assertion in Yinka Omorogbe 'Promoting Sustainable Development Through the Use of Renewable Energy: the Role of the Law', *Beyond the Carbon Economy: Energy Law in Transition* Donald Zillman et al (2008) 39 at 41, note 6.

APPENDIX

Nigeria: Motorcycle Pollution Causing Health Risks in Kano City

United Nations Integrated Regional Information Networks, posted to the web 12 February 2008

Found at allafrica.com/stories

At two million mopeds or 'achabas' for five million people, the number per capita in Kano exceeds that of any other Nigerian city, according to Ahmed Ibrahim, head of the Kano office of the Federal Roads Safety Commission (FRSC).

The two million motorcycles plying the roads of Kano produce as many fumes as six million cars - too much for a city of five million people," said Yusuf Adamu Mohmmed, an environmentalist at Bayero University in Kano.

"The damage motorbike pollution is causing to the city is enormous, and something needs to be done to address [this] problem, which is already... out of proportion," Ibrahim told IRIN.

Dirty fuel

The collapse of public transport services in most cities has led to motorbike taxis being adopted as a means of inner-city transport, according to Ibrahim.

The problem in Kano has been exacerbated by the 2006 government ban on commercial motorbikes in Abuja, which led operators to head to Kano, where moped use doubled in a year, according to FRSC studies.

Commercial motorcyclists have a habit of adding engine oil to their fuel to make it denser, Ibrahim told IRIN, which means it burns more slowly over a longer period, creating more pollution. Adding the oil can stretch a full tank of petrol to 10 hours of travel as opposed to just seven.

"I'm in business to make financial gains and as a businessman I need to cut costs and that is why I add engine oil to my fuel," Bala Adamu, a motorbike taxi driver told IRIN as he revved the engine of his vehicle, sending billows of smoke into the air.

Health impact

Ibrahim Musa, a medical doctor in Kano is concerned that the excessive fumes from the motorbikes are affecting the health of residents.

"These fumes have the potential of causing skin cancer if one comes in constant contact with them, [particularly] because of the engine oil added in the petrol," said Musa.

"A lot of cases that are common in Kano, including anomalies in the upper respiratory tract and eye infections, especially conjunctivitis, can be traced to the fumes people are always exposed to," he added.

The density of motorcycle traffic is also increasing the number of accidents in the city, according to the FRCS's Ibrahim, who says bikes cause at least 70 percent of the city's road traffic accidents.

Kano General Hospital has a ward called the 'achaba ward' where only accident victims from taxi mopeds are hospitalised. "We receive [no fewer] than 20 cases of 'achaba' accidents a day," Samira Yakubu, a nurse at the hospital, told IRIN.

Political considerations

Local authorities in Abuja and Plateau states have faced similar problems in the past: They banned taxi mopeds, but to date, the Kano authorities have not followed their lead.

"There [is] no law mandating us to prosecute automobiles that produce excessive smoke as long as the smoke they generate does not blur the visibility of the person behind," said Ibrahim.

"Our hands are tied and there is nothing we can do in the face of this wanton madness."

For Sunusi Suleiman, a lawyer in Kano, the solution is simple. "The government should pass legislation putting a ceiling on the level of emissions from motorbikes... All the government needs to do is firmly enforce the legislation without giving room to cutting corners."

Rather than trying to limit the number of bikes on the road, in the run-up to the April 2007 general elections, Kano council distributed free motorcycles to party members as thanks for their support.

"The beneficiaries hailed them [Kano council] for the gesture and now for them to come back and ban or restrict the activities of the motorcyclists will be political suicide," said Habibu Musa, a political science teacher at Bayero University.

"The government lacks the political will to tackle the problem. Legislation and sensitisation should go hand-in-hand [to curb] this ugly trend. Nothing short of this will work," stressed environmentalist Yusuf Adamu Mohamed