



**UNDERSTANDING LOW-CARBON ENERGY
SYSTEM OPTIONS IN NON-WESTERN COUNTRIES**

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Introduction

Climate change is a major threat to our future. If we are not able to reduce global greenhouse gas emissions, the world faces the prospect of dangerous and unprecedented impacts on global security and prosperity. The challenge in cutting greenhouse gas emissions is due to bridging the gap between the world's rapid development, energy security and the need to prevent the planet's average temperature rising by no more than 2°C above the preindustrial level. Due to this urgency there has never been a stronger case for global rapid development of low carbon technologies and use of them for both energy supply and energy efficiency. Unlike Advanced Countries which are highly industrialised and have a well-developed energy infrastructure, Developing countries are actually better placed to move into low carbon technologies and bypass existing technologies based on fossil fuels because of the lack of relatively low levels of industrialisation and energy infrastructure.

However it must be mentioned that each country's situation is different even though the threat is common. Every country has a unique financial availability, policy and political consideration that makes the deployment of low carbon technologies either difficult or easy depending on which perspective is followed. According to the Carbon Trust¹; the transition to a low-carbon world will not be achieved unless developing countries are helped and encouraged to develop their own low-carbon economies. Low carbon technology innovation and diffusion centres would accelerate development and deployment of low carbon technologies in, and for, developing countries; give them the evidence base to design effective domestic technology diffusion policies; help them secure economic value from clean energy technology investment; and give them confidence that they can commit to measurable and verifiable action on carbon emissions reduction.

In the UK for example the Government's approach to carbon dioxide emissions reduction is well documented. The UK Department of Energy and Climate Change clearly state a ²vision for the Year 2050. These include the following: Low carbon buildings, Low carbon transport, & Low carbon power generation etc. This kind of clear vision in relation to low carbon technology is not seen many less developed countries. For these countries including Nigeria and Ghana, the demands of economic growth outweigh all other environmental concerns, On the other hand many of developing countries, lack the technology and the institutions to deal with the consequences of the impact of climate change. ³However such countries also have the benefit of adopting a low carbon approach in their industrialisation. Of special interest to less developed countries should be the ability of harnessing low carbon technologies locally which would create jobs, spur economic growth and still provide energy. The Purpose of this paper is to explore what low carbon energy system options there are in a non-Western context using Nigeria and Ghana as a case study.

The Importance of this Project

Climate change is real but ultimately not the primary concern in developing Non Western Countries. It certainly is not as important as economic growth, competitiveness in the global market, energy security and improved living conditions. Economic growth is the most important factor in these countries and it shows in the policies made by Government as shown in the interviews (See Appendices) with Government officials. Developing countries like Ghana and Nigeria, for instance perceive lowering their energy consumption as a brake on growth.

The reasons why energy systems and policies, are important in a country, is the on-going argument that, energy plays a crucial role in economic and social development particularly in sectors of an economy like manufacturing where the Industries in the sectors depend solely on energy. ⁴Many studies have been done which have attempted to test the relationship between energy consumption and economic growth; however from interviews that have been conducted there is a general agreement that there is a direct or indirect link between the two. Energy consumption for instance contributes to the Gross Domestic Product (GDP) in almost all sectors of the Economy such as Agriculture, Mining, Manufacturing (Cement Production, Oil Refining, Textile Manufacturing, Building & Construction, Communications, Transportation, Wholesale & Retail etc.).

Furthermore without energy it is impossible to run basic commercial and residential aspects of a society, the whole spectrum of wholesale and retail trades just as access to electricity is imperative for basic activities in the home with regards to appliances. In Sub-Saharan Africa the energy mix is not diverse, and there is a high dependency on certain types of fuel, be it biomass or Oil and Gas. There is poor energy infrastructure in all these countries, ⁵so if a modern distribution system is not in place, households cannot obtain access to modern fuels, even if they can afford them.

Developing countries could reap enormous benefits from Low Carbon energy systems powered by renewable energy. These systems would create local jobs, improve health effects because they are environmentally friendly, and are not dependant on the ⁶weaknesses of centralised generation system such as maintenance, theft, sabotage, terrorism, political manipulation. When the threat of adverse effects of climate change is added to these weaknesses, it becomes clear that there are many advantages for these countries to strive for change to Low Carbon technologies.

The purpose of this project was to find out the level of discussion that is taking place in countries outside the western world especially in Africa about low carbon technologies and how the people engage with these technologies. Nigeria and Ghana were used as the basis for Africa. The report was to address what the understanding of energy and climate change means in these countries. The following were key Aims of the project:

- What were the Government Incentives for Low-carbon technologies?
- Where there any Local Initiatives for Low-carbon technologies and any Investment and NGOs involved in bringing in Low-carbon mechanisms?
- What role does Government Policy play in shaping infrastructure and Investment with regards to low-carbon technologies?
- How is Government Policy changing and why? And what is driving this change in Policy?
- What is the discourse on energy security?
- Is there a possibility of seeing things differently via Carbon regulations?

Summary of Methodology

Due to the specific set of objectives that were needed for this project and a general lack of information on the issues with regards to these Countries, the method used for obtaining this information was the information format in which a list of questions was drawn and interviews were performed either via video recordings or email. The advantage of the video interviews was that the answers were captured first time and could not really be manipulated and the interviewer was able to drive key issues and stay on the topic whenever the interviewee may have wanted to give more political answers as opposed addressing the issue at hand. The disadvantage with the interviews was if the government official did not have answers straight away or felt that they were being put under pressure, they referred the Interviewer to documents. A structured questionnaire was used for the interview. The respondents are mainly the officials at the energy commission and centre in Nigeria and Ghana. There was also the unique experience to see the situation first hand by visiting the sites for pilot projects and interviewing government officials and some residents in these countries.

Summary of Results

Nigeria

The Nigerian National Energy Policy was produced by the Nigerian Energy Commission. The First issue that called for attention was the date on the Energy Policy; the Nigerian National Energy Policy was written in 2003, which means that the policy had not been updated recently. The lack of dated information was an indicator that the energy situation has either not changed. In regards to Low Carbon technologies, the policy was that it was not specific; there were no figures or graphs showing basic generation and consumption of the current resources used for energy. The policies and strategies said nothing about targets in years or percentages. It talked about incentives, but does not list what these were. Policies like this do not have a lot of accountability. Nevertheless, there were projects taking place, but not all were successful though. They were mostly pilot projects and in the rural areas of the country. This was because the cost of sustaining systems on Diesel or Petrol had become too expensive.

Ghana

One of the most important outcomes was learning about the policies. It was found that the Ghanaians worked with a lot of organizations like World Bank, Environmental Protection Agency (EPA), International Development Agency (IDA) and Swiss State Secretariat for Economic Affairs (SECO). A result of this was the fact that they had to be very specific about projects and costs. There was no mention of failed projects. Below is an excerpt on some targets for Low carbon Technologies in Ghana.

¹¹Strategic Targets

In February 2012, a feed-in-Tariff is to be introduced.

The Government also hopes to achieve 15% penetration of rural electrification by decentralised renewable energy complementation by 2015 expanding to 30% by 2020.

The Government intends to achieve 1% penetration of solar energy in hotels, restaurants and institutional kitchens using solar water heaters by 2015 and 5% penetration by 2020.

There are further aims to achieve 1% penetration of biogas for cooking in hotels, restaurants and institutional kitchens by 2015 and 2% by 2020.

This was an example of a well-structured Policy Document.

A reoccurring theme with regards to low carbon technologies were the barriers. A few are listed below:

Finance: At the moment there is not enough financial assistance to encourage local entrepreneurs and manufacturers to pursue low carbon technologies. Renewable energy systems often have high initial capital costs and many of the middle income still cannot afford them e.g. Solar Panels on the Roofs. There were not incentives created by the Government for example, Tax and duty exemptions that would push local consumers to make such investments.

Technical Barriers: The Government did not put in place infrastructure that would develop technical capabilities and ¹³technical support that would assist consumers who do not have a science background.

Politics and Contractual Barriers: From the interviews, there seem to be several instances of contractors who install systems with a record of poor performance. This applied to both local and International contractors. It would seem that the contractors did not have the requisite training in the science of these systems hence the countries are left with a case of highly inefficient systems or systems that did not work at all. It would also seem that the organisations, responsible for these systems did not award the contracts based on a standard of certification and credentials.

Awareness & Scepticism: There seemed to be a general lack of urgency about the whole issue of climate change and how it would affect the locals. Many believed that since their countries do not generally emit a lot of CO₂, they should not have to reduce their consumption. It is true that Sub-Saharan Africa does not emit a lot of CO₂ in comparison to most countries; however the threat of Deforestation which leads to desertification is now an issue so environmental protection is an incentive to searching for alternative fuels instead of fuel wood, Oil and Gas.

Conclusion

It was important to see first-hand the unique economic, social and technological perspective that drives each of the countries discourse when thinking about energy in many of these countries it is as basic as fuel for electricity, electricity supply and fuel for transport. Another interesting note was the huge emphasis on rural areas for the use of pilot projects however not many have been successful even the projects put in place by foreign firms that were supposed to have the appropriate technical background. This has further increased the scepticism within the residents of these countries.

Is it also acceptable to take these countries as a little insight for the situation in Africa as a whole? No. The only thing that is common to these countries is the battle for energy security. Energy security according to the International Energy Agency can be seen as “the uninterrupted physical availability at a price which is affordable, while respecting environment concerns”. This means that there is a thin line of protecting traditional energy practices, which include Oil and Gas, reducing carbon emissions which induce climate change, utilising alternative energy sources like low carbon technologies that would enable them to be more secure, more competitive in the future. Oil security remains a cornerstone in many developing Nations GDP and energy; however oil is extremely price volatile and its security is considered very important in the economy of the Country as seen in its contribution to extreme revenue especially in Nigeria, where its price has caused crisis recently in Nigeria and Ghana.

In January 2012, the Government of Nigeria removed a fuel subsidy from Premium Motor spirit and raised the pump price of fuel from ₦64 to ₦140 per litre. Conversion: £1 ≈ ₦ 253. Nigeria has four refineries and they are not working at full capacity, so after the crude oil is drilled, it has to be exported and fuel/petrol imported as a by-product. In order to sell fuel at a price lower than the landed and distributed cost of fuel the Government subsidized the price of fuel. The consumption of fuel was between 35million to 50million litres. This meant that the Government was spending about ₦1.4 Trillion ≈ £5billion. This expense was too much of a burden for the Government and hence made a case for removal of the subsidy. When the subsidy was removed there was a nationwide strike. The Government has since reduced it back to ₦97 per litre but the subsidy has reduced. Ghana also faced a similar reaction recently when the fuel subsidy was removed though the protests did not last for long. This reaction also shows the extreme infrastructure lock-in in Nigeria. Many sectors of economy and programmes have been built around Oil, making it extremely difficult to change. It could appear with the changing policy that Ghana does not and perhaps this is why it is easier for them to swap to alternative energy supplies. It would be interesting to see the situation in ten or fifteen years after the Ghanaians get to exporting levels of Oil. The Above crisis just goes on to emphasize the need to diversify the energy supply mix instead of depending on one source of fuel to reduce associated with shortage and price change. In other words instead of treating the issue of low carbon technologies as an afterthought it could drive policy instead.

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