

TECHNICAL / INVITED PAPERS

Four texts

Economic Impact of the Use of Generators As A Main Power Source in the Domestic Sector: Challenges and Prospects for the Energy Road Map

By

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Invited Technical paper, NSE Abeokuta , Thursday 12, April 2012

Introduction

The centrality of electrical energy as a driver to our socio-economic polity cannot be overemphasized. Irrespective of sectional participation: Agriculture, health, Education, Commerce, Industry, finance, entertainment , the key actors finally return to the domestic sector where their homes are. The domestic sector therefore is a major utiliser of electric energy. This resource, which is a social responsibility to be made available in a reliable, cost-effective, affordable environmentally friendly and sustainable manner, has become a source of worry despite all attempts to re-engineer the power sector. The new energy road map basically was propounded as a last bus stop to reposition the energy sector by encouraging healthy competition providing infrastructure that will guarantee adequate, reliable, sustainable, affordable environmentally friendly electricity to the people of Nigeria. To date all set targets have not been met. It has become worrisome to end users especially home owners as the cost of providing power for home use jeopardizes comfort savings, health, environment and the future of home, communities and the country at large.

The new energy road map had also identified finance as a major impediment to the realization of its set goal: provision of adequate and affordable electricity/ this paper shall use the domestic sector to show how much financial economic losses exist due to the non-availability of electricity.

Abstract

A case study has been developed to show the financial/ economic losses possibly existing in the domestic sector as a result of the use of petrol/ diesel generators. In this study Nigeria's population has been exclusively put at 160 million(people , with a family size of six per family. Also an assumption was made that at least each family own a 500VA generator popularly known as "I better pass my neighbour-IBEMN"- the cost purchase, running and maintenance are hypothetically assumed and a computation to determine the annual cost borne by the families was ascertained. The study revealed that each family spends a minimum of ₦196,000p.a. for running the generator for at least 18 hours per day. The total realizable investment to provide alternative electricity supply is put at ₦5.4 trillionp.a

If this simplistic analysis is favourable received, then the financial challenge in the road map may be dealt with by 'harvesting' funds from the domestic sector. If this is true, then prospect of our new

energy road map is bright and similar consideration in the domestic, industrial, education, health, entertainment, banking, telecommunication sectors will also yield some considerable financial resources that if well invested in the power/ electricity sector will result in stability, security, sustainability and a guaranteed future.

Informed actions/ decisions will be the political will to ban the use of generators and other energy inefficient gadgets (incandescent lamps, irons, fridges, freezers, air-conditioners etc.) ban the importation of junked gadgets and promote the use of energy efficient gadgets.

Cost implication of using 500VA generators in the Domestic Sector

The domestic sector in the case shall be strictly residential abode for the 160million people in Nigeria

Total number of families in Nigeria, F

$$F = \frac{160}{6} \text{ million} \cong 27 \text{ million families}$$

Using a 500VA generator per family pa (save repairs and replacement of any part)

$$B = 27 \text{ million} \times 200,000$$

$$= 27 \times 10^6 \times 2 \times 10^5$$

$$= 54 \times 10^{11}$$

$$B = \text{N} 5.4 \text{ Trillion}$$



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by
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OUTLINE

- INTRODUCTION
- SIMPLISTIC ANALYSIS
 - Showing how N1.5 trillion can be saved!!!
- CASE STUDIES AND RECOMMENDATIONS
- CONCLUSION

INTRODUCTION



- The centrality of electrical energy as a driver to our socio-economic polity cannot be overemphasized.
- Irrespective of sectoral participation: Agriculture, Health, Education, Commerce, Industry, Finance, Entertainment, Telecommunication etc the key actors finally return to the domestic sector where their homes are.
- The domestic sector therefore is a major utiliser of electric energy.

INTRODUCTION *cont'd*



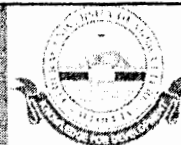
- This resource, which is a social responsibility to be made available in a reliable, cost-effective, affordable environmentally friendly and sustainable manner (by gov't and other agencies), has become a source of worry despite all attempts to re-engineer the power sector.
- The new energy road map basically was proposed as a last bus stop the repositioning of the energy sector by encouraging healthy competition, providing infrastructure that will guarantee adequate, reliable, sustainable, affordable environmentally friendly electricity to the people of Nigeria.

INTRODUCTION *cont'd*...



- It has become worrisome to end users especially home owners as the cost of providing power for home use jeopardizes comfort, savings, health, environment and the future of homes, communities and the country at large.
- The new energy road map had also identified FINANCE as a major impediment to the realization of its set goal: provision of adequate and affordable electricity/ this paper shall use the domestic sector to show how much financial economic losses exist due to the non-availability of electricity.

INTRODUCTION *cont'd*...



- A case study has been developed to show the financial/ economic losses possibly existing in the domestic sector as a result of the use of petrol/ diesel generators.
- Assumptions include

Assumptions



- In this study Nigeria's population has been exclusively put at 160 million people, with a family size of six per family.
- Also an assumption was made that at least each family own a 500VA generator popularly known as "I better pass my neighbour- IBPMN"-
- The cost of purchase, running and maintenance are hypothetically assumed and a computation was made to determine the annual cost borne by the families.

Assumptions *cont'd...*



- The study revealed that each family spends a minimum of ₦196,000 p.a. for running the generator for at least 18 hours per day.
- The total realizable investment to provide alternative electricity supply is put at ₦5.4 trillion p.a

Simplistic Analysis



Aside budgetary allocations, loans etc., how can we source for \$10 billion (N 1.5 Trillion) per annum to invest in the power sector?

Production of 1 kW of Energy \cong \$750 =
 N112,500 = $\text{N}1.13 \times 10^3$

$$\text{N}1.5T \rightarrow \frac{1.5 \times 10^{12}}{1.13 \times 10^3}$$

Simplistic Analysis cont'd...



$$\cong 1.33 \times 10^9 \text{ kW}$$

$$= 1330 \text{ GW}$$

**i.e. \$10 billion (N1.5 Trillion) would give
 1330 GW**

This is more than enough to meet the power need of Nigeria currently placed at about 160GW considering a world average of 1000W(1kW or 10^{-6} GW)/ person

Back to the important question, how can we get N1.5 Trillion?



- Assume :
- Nigeria has a population of 160 million people (160×10^6)
- Assume a family size of 6 people.
- Assume each family uses at least a 500 VA generator costing @ N15,000 to purchase, N1000 to service per month and N 1500 per day for 18hrs (petrol & oil) i.e. N180 000pa
- OR N196,000 net per family pa of approximately N200,000 per family pa.

Back to the important question, can we get N1.5 Trillion? *cont'd.*



- Total number of families in Nigeria, F

$$F = \frac{160}{6} \text{ million} \cong 27 \text{ million families}$$
- Using a 500VA generator per family pa (save repairs and replacement of any part)

$$B = 27 \text{ million} \times 200,000$$

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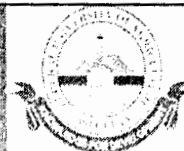
$$B = \text{N } 5.4 \text{ Trillion}$$

Conclusion



If this simplistic analysis is favourable received, then the financial challenge in the road map may be dealt with by **seriously looking inward** and 'harvesting' funds from the domestic sector

Conclusion *cont'd...*



- If this is true, then prospect of our new energy road map is bright and similar consideration in the domestic, industrial, education, health, entertainment and telecommunication sectors will also yield some considerable financial resources that if well invested in the power/ electricity sector will result in stability, security, sustainability and a guaranteed future.
- What Nigeria needs in 4yrs (\$40b) can be available in 1 year if reform proponents have a rethink on financing power projects.

Recommendations



- Judging from the foregoing analysis, there is a need to ban the use of diesel/ petrol generators.
- Institute a penalty for the use of generators
- Institute incentives for adherents.

CFL - INCANDESCENT LAMP INTERVENTION



This is aimed at optimizing the use of available capacity without building any power station.

- Consider the projected 6,000MW target expected to be attained by the end of 2012.
- How many 100Watts Incandescent lamps can this light? = $\frac{6000 \times 10^9}{100} = 6 \times 10^{10}$ lamps
- How many 20 Watts CFL can it light?
= $\frac{6000 \times 10^9}{20} = 30 \times 10^{10}$ lamps

CFL - INCANDESCENT LAMP INTERVENTION *cont'd.*



- This shows that with the same quantity of energy, we can light five times more CFL than Incandescent lamps
- In others, by switching from Incandescent lamps to CFL, we would reduce the energy consumed by lighting systems by **80%**

Comparative Cost of the two alternatives



- What is the cost of incandescent lamp?
Between ₦80 and ₦100
- For 6×10^{10} Incandescent lamps, the total cost = $6 \times 10^{10} \times 10^2 = \mathbf{N6 \times 10^{12}}$ (assume unit cost of ₦100)
- What is the cost of a 20 W CFL? Between ₦450 – ₦550
- Since the lumen output of Incandescent = CFL
- For 30×10^{10} CFL lamps, the total cost = $500 \times 30 \times 10^{10}$. (assume unit cost of ₦500)

Comparative Cost of the two alternatives *cont'd...*



- What are the power savings? $100-20 = 80W$.
- Where we used 6000MW with Incandescent Lamps we can save 4800MW using CFLs!!!

RECOMMENDATION



- For short term it is possible to optimize existing power using energy saving approaches. **How?**
- Initiate a light up Nigeria project.
- Ban the use of incandescent lamps.
- Mass purchase / distribute lamps.
- Remove custom duties on energy saving devices.

RECOMMENDATION *cont'd.*



- Mount sensitization campaign in English and 3 major languages using posters, flyers, radio, television, church, fellowships, schools etc.
- Give incentives to adherents to practices advocated in the light-up Nigeria campaign.
- More energy-efficient substitutes can be found for some other common electrical appliances and equipment and policies should be made to encourage their patronage/ use.

HYBRID/OFF GRID INTERVEN



- In our bid for hybrid / off-grid provisions, what are we doing with solar especially in Northern Nigeria, tidal (coastal areas/ beaches), biogas (dump sites)?

RECOMMENDATIONS



- Take off custom duties from the importation of solar panels, batteries (deep cycles), inverters and other accessories involving solar power.
- Encourage off-grid supplies around coastal areas by making use of the tides/ waves and wind.
- Rid our environment of massive waste from our streets, dump sites and produce biogas as infeed to gas fired thermal plants

New Roles for CSOs, CBOs and Private Sector



- This is majorly a group of recommendations for the participation of these sectors
- Creation of an Electricity Trust fund with companies paying 1.5 – 2.5% of their net profits
- Institute a schedule to phase out the use of (large) diesel generators
- Encourage Private-Private partnerships to gain interest in power provision and management including universities, churches, banks, telecom industry etc.
- Institute Energy Saving home policies for real estate developers

Smart Technologies Interventi



- Institute Energy Saving home development policies for real estate developers
- Support retention technologies for preservation, cooking etc using the wonderbag experience
- Bring back the prepaid metres in bulk, massively install and charge the customers as appropriate
- Create a handbook for smart technologies and energy savers and publicize widely.

CONCLUSION



- Informed actions/ decisions will be the political will to ban the use of generators and other energy inefficient gadgets (incandescent lamps, irons, fridges, freezers, air-conditioners etc.) ban the importation of junked gadgets and promote the use of energy efficient gadgets.
- If the measures discussed above are adopted, there would be a significant improvement in the provision and management of electricity in Nigeria which will ultimately increase the level as well as rate of development

**Thank you
For
Listening**

