

## **A World without Poverty: Psycho-Socio-Economic Impacts of Village Mini-Grids on Rural Women in Nigeria**

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The thrust of the human civilization and social innovation include “grid and off-grid” electrification of often neglected communities in developing nations like Nigeria. For instance, the distribution of hydro-electric supply in Nigeria is the responsibility of the Federal Government through Power Holding Corporations of Nigeria (PHCN). Though currently privatized, this arm of the government has been unable to meet the growing demands of electricity supply in the nations fast growing urban centers (e.g. Lagos, Ibadan, Abuja, Kano and Port-Harcourt). It has also been unable to successfully extend its national grid reach through feeder pillars to all of the urban-fringes and rural communities in the country. This therefore calls for a need to reconsider alternative means of energy generation for the sub-urban and rural dwellers in Nigeria. Many of the rural and suburban dwellers engage in informal sector activities which are extensive, weakly developed economic activities with low level of investment and characterized by heavy reliance on family or friends for capital. These make industrialization in both the rural and urban-fringes to lag far behind the rate of urbanization due to hydroelectric energy crises. Hence, the need for this paper on the creation of a world without poverty through social innovations and rethinking of distributed electricity generation from renewable technologies, such as wind turbines and solar photovoltaic cells in Nigeria.

*Key Words:* World, poverty, feminisation of poverty, electrification, sustainability, development

### **Introduction**


Poverty is a state of insufficient resources or income. In its most extreme form, it is a deprivation of basic human needs, such as adequate and nutritious food, clothing, housing, clean water, and health services (Chen et.al. 2005). It often results in appalling suffering and death. It most essentially prevents people from realizing many of their desires. Many of the poorest people in Nigeria (70%), especially women, live in rural and urban-fringes (Aderonmu, 2010). Majority of them struggle daily for food, shelter, and other necessities (Ugoh and Ukpere, 2009). They often suffer from severe malnutrition, epidemic disease outbreaks and famine. Although, majority of these rural women are the centers of family life, custodians of cultural and fundamental values of the society; occupationally, they are over-represented in unpaid and low-wage work. They are essentially small-scale poor illiterate farmers and the backbone of agriculture which is the mainstay of the nation’s economy.

Basically, the grass-roots women in Nigeria have limited access to social and economic infrastructure such as economic, health, portable water, sanitation and consequently, limited chance of advancing their quality of life. They are usually unable to cater ade-

quately for the basic needs of food, clothes, shelter, obligations, lack of gainful employment and skills. This lack of basic life opportunities for the grass-roots women is the hall mark of poverty in rural communities. UNIFEM describes it as “the burden of poverty borne by women ...” (Chen et.al. 2005). Rural women in Nigeria earn less income than men; they are deprived of basic education and healthcare, which lowers their lifetime earning potential. The responsibilities associated with motherhood further limit rural women's economic attainment. Grass-roots women's increasing share of poverty is also related to the rising incidence of lone mother households or households without a second parent or guardian (Chant, 2007). Thus, poverty rates are higher for rural women in Nigeria than for men. It has wide-ranging and often devastating effects on women, children, the elderly, and people with disabilities in rural communities in Nigeria.

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The women and their family members in the rural settings, in Nigeria have low social-economic status and are restricted in their access to critical resources such as credit, land and inheritance. Their labour goes unrewarded and unrecognized. Their health care and nutritional needs are not given priority; they lack sufficient access to education, income-generating work and support services, and their participation in decision-making at home and in the community are minimal.

Without adequate income, the rural women commonly depend on men, families and other support networks for basic necessities, but often get little. However, neither poor families nor the governments can adequately support the non-working women and children in particular. Their children have underdeveloped immune systems, and they easily acquire diseases in unsanitary living conditions. Caught in the cycle of poverty, rural women lack access to resources and services to change their situation. Hence, the need for this paper which makes proposition for creating a world without poverty through off-grids electrification of rural communities and urban fringes in Nigeria.

### **Rationale for Creating a World without Poverty in Rural and Urban-Fringes in Nigeria**

Nigeria which is the largest country in Africa is situated in the western part of the sub-Saharan Africa. It comprises a total land area of 923,768sq.km and is highly-populated, with a population of more than 150 million, and high concentration in urban areas. It has witnessed a lot of drastic transition from rural to urban oriented economies, accompanied by the increasing mobility of large proportions of the population and economic activities to the urban-fringes of major cities like Lagos, Ibadan, Kano, Aba, etc (Worldmark Encyclopedia of Nations, 2007).

An urban-fringe is the boarder zone between urban and rural landscapes, and is often a conflict zone that lies outside the corporate existence of the city and incorporates a hybrid of rural and urban features (UN-Habitat, 2008a; Browder, J.R. Bohland, & J.L. Scarpad, 1995). The rural areas are generally occupied by the poor and low-income workers in Nigeria. The socio-economic distribution of residents in both rural and urban-fringes includes low income, low to medium income, medium to high income and high income earners.

The inadequate access to electricity in rural areas and urban-fringes in Nigeria is of the same order of magnitude as lack of access to other types of infrastructure, such as dependable formal institutions, modern energy services, clean water and other basic services. This relation (high service costs versus low

ability to pay due to low income) is obviously part of the problem, but may also be part of future solutions-expanded access to off-grid electricity distribution from renewable technologies, such as wind turbines and solar photovoltaic cells while ensuring environmental sustainability and improving access for the poor.

The continuous disruption in electricity service throughout the nation has also necessitated the need for a rethinking and social innovation of off-grid electricity distribution to the rural and urban-fringes in Nigeria. Added to this is the high price of hydro-electricity distribution in the nation and problems with emissions from existing individually owned household and industrial electricity generating power plants.

Creating a World without Poverty (Yunus, 2007) is a concept which implies the running of 'social business' and social innovations not primarily to earn profit, but to provide a social good. This is in line with the World Bank Group's mission which aims at building a world without poverty. An important part of this mission is expanding access to modern energy services for an estimated two billion people who still lack such services (World Bank, 1996; ESMAP, 2000c). This is also consistent with the thrust of Millennium Development Goal 1. It is also in line with the Platform for Action adopted by the Fourth World Conference on Women, held in Beijing in 1995, which identified the eradication of persistent and increasing burden of poverty on women as one of the 12 critical areas of concern requiring special attention and action by the international community, governments and civil society.

Moreover, the current global economic crisis has propelled developing nations towards the drive for a new world of human civilization and social innovations where no one has to suffer the indignity of poverty, unemployment, degradation of environment and healthcare irrespective of their residential place (i.e. urban, suburban or rural communities) and social-economic status.

### **Off-Grids Rural Electrification as an Antipoverty Program**

All developing societies need to have extensive antipoverty programs in order to adequately fight poverty. One of such programs is rural and urban-fringes electrification project as the basis for industrial and infrastructural development. It may be established by nonprofit groups, cooperative associations, and public organizations. These may fund the construction and operation of electricity-generating plants and power distribution grids that will serve the rural and sub-urban communities in Nigeria. Such project will

yield increase in power and light distribution for rural and urban fringes and could bring a long-term reduction in the movement away from rural areas as well as encouragement of more compact forms of development on the urban fringes.

Although the delivery of such electrification services to rural and urban fringes populations may be expensive, the high transaction costs may be reduced by bundling energy services with other services in demand in order to profit from economies of scope (e.g. water, communications, financial services, or consumer electronics sales and service). Such bundling may increase infrastructural development in these areas.

Consequently, there is need for the Federal Government of Nigeria to prioritize their rural and urban-fringes electrification program in Nigeria according to proximity to market viability. This is due to the assumption that rural and urban-fringes' energy usages consist mainly of households, productive and public uses. Urban-fringes are closest to commercial viability in terms of proximity and may be given highest priority.

In Nigeria, electricity may be generated from a variety of resources, using diesel, biomass, wind, PV, small hydro-generators, or hybrid combinations of these. Depending on the characteristics of a specific use (i.e. willingness to pay and load profile) and the local supply options, the least cost solution for a rural off-grid system may consist of any combination of the above options (Foley, 1995; Fraunhofer, 1995 & World Bank, 1996). The rural and urban-fringes off-grid electrification may be supplied through two basic distribution options: village mini-grids to serve tens or hundreds of users or isolated systems to serve just one or two users.

A village mini-grid is a village-scale electrical distribution system that is served by an isolated diesel generator of up to a few hundred kW in capacity. Its power supply may also be generated through local renewable resources such as microhydro, solar, biomass or wind. Decentralized village mini-grid is advantageous to rural communities and urban-fringes because it offers intermediate solution between stand-alone individual home power systems and main grid connection. It is often more cost-effective, reliable and beneficial to rural communities than the main grid connection or isolated systems. However, both renewable energy-based mini-grids and isolated systems will provide significant increased access to reliable electricity services for the grassroots.

Off-grid electrification projects from renewable technologies, such as wind turbines and solar photo-

voltaic cells in the urban-fringes and rural communities may have commercially viable returns once they are funded. Rural communities with commercially viable returns should fall under the medium priority areas in the electrification project development costs. Rural communities farthest from commercially viable returns and who are low in consumption energy uses (households, productive and public uses) should fall under the lowest priority scheme.

### **Psycho-Socio-Economic Effects of Off-grid Electrification on Rural Women**

There are over 82% of rural communities and households waiting to be connected to the national grid in Nigeria. Investment in off-grid rural electrification will make significant contributions towards achieving several of the MDGs in the nation. It will also offer the following life-changing household, economic and institutional benefits for grass-roots women and their family:

**Women Empowerment:** Empowering women is a critical factor in freeing the millions of people who are caught in the cycle of poverty and hunger. Rural and urban-fringes off-grid electrification will be particularly transformative for women—particularly women of female-headed households. By providing Off-grid electrification in rural and urban fringes in Nigeria will increase women's access to economic and educational opportunities, as well as the autonomy needed to take advantage of such opportunities.

**Economic Value:** Off-grid electrification is a major avenue of alleviating poverty, creating employment and expanding rural markets. It may fast track the development process of the rural and suburban communities by creating access for income-generating activities and micro-enterprise. It will improve the socio-economic status of women from poor households. It will add productive hours to the working day as well as attract industrial development to the rural areas so that the demand use can spread across the day and evening. Additionally, off-grid electrification will provide clean and renewable energy with no emissions. It will require no long transmission lines. Its energy source is free and predictable. It will eliminate worries over increasing fuel prices. It is easy to operate and maintain. It is equally flexible and easily scalable by adding more capacity as demand increases. It has positive long term impact on home based business such as ice-block making. It can be used to provide light for village shops at dusk instead of the usual kerosene lamps.

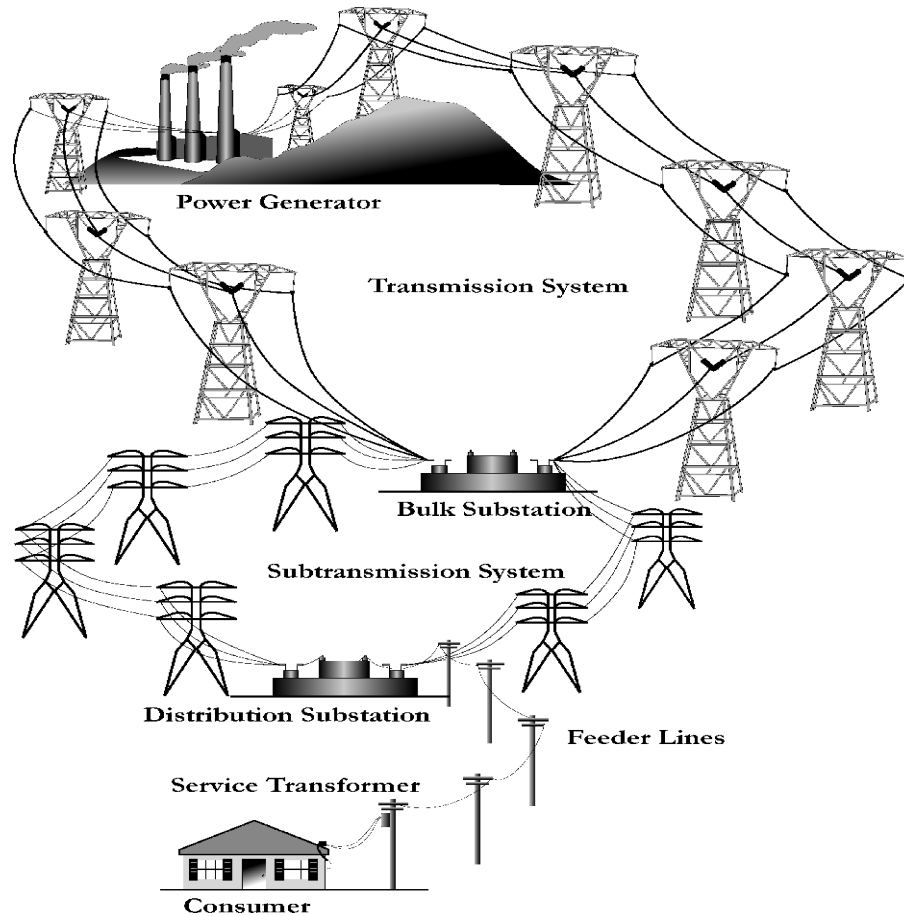


Figure 1: An Electric Power System. Source: Congressional Budget Office based on a figure from EPRI PEAC Corporation.

**Quality of life:** Rural electrification through village mini-grids will ameliorate the working and living conditions of grass-root women's quality of life in terms of housing conditions, infrastructure, access to various amenities, income, standard of living, as well as satisfaction about the physical and social environment.

**Education:** Availability of solar electrification in rural communities will support the education of boys and girls at both primary and secondary levels in project areas. It will improve their chances for better performance in basic school examinations than those in communities without electricity. It may attract postings of teachers to such communities. It may also aid the availability of photocopiers, computers and other educational media, as well as open the possibility of having night classes, mainly for the education of adults.

**Health Care:** Access to solar electrification in the rural areas will contribute to better medical facilities, including refrigeration, equipment sterilization, and operating theatres. It will also aid improved delivery of health care services especially in emergency cases (at night) such as child delivery, vaccination

and other treatment services requiring light and refrigeration.

**Environmental Benefit:** The environmental benefits of such distributed electrification include promotion of renewable energy sources, less polluting forms of fossil energy, and high efficiency technologies and reduction of environmental harm.

**Media Information:** It will increase and create better access to television and radio than regular batteries

## Recommendations

Below are the recommendations for sustainable development in the rural areas and urban fringes in Nigeria:

**Baseline Study:** Before embarking on a renewable energy-based mini-grid and isolated systems power supply for the rural and urban-fringes dwellers, it is always better to first of all conduct a rapid, comprehensive and participatory baseline study of the current level of electricity services and the per-

ceptions of the users towards it within the project area. The background information should be collected from key stakeholders, such as individuals and representatives of groups who may be invited to participate in the development of the local action plan. This will help to determine the requirements needed for an adequate village mini-grid from both technical and user perspectives in the project area. It will also facilitate participatory decision making in the planning process; improve further designs to meet users' needs; as well as help face the operation and maintenance challenges of day-to-day service delivery in the project areas (NETSSAF, 2008).

**Desk Review of Energy Policy:** Finally, there is also the need for a review of existing energy policy framework and minimization of existing subsidies in Nigeria. These subsidies frequently hamper rural electrification. Subsidies targeted at the rural poor often do not reach them at all. Direct fuel subsidies for example, often reach the urban dwellers instead of rural poor because companies will prefer to sell limited fuel resources in urban areas with low transaction costs and in higher quantities (Barnes and Halpern, 2000).

**Commercial Off-grid Electrification:** Furthermore, there is the need for the government to provide a level the playing field for private investors in the mass production of isolated power generating systems such as inverter and other energy saving devices at affordable prices for the rural poor, most especially targeting the grassroots. This can be made sustainable through government subsidy or usage of less expensive technology as the rural dwellers often lack disposable income.

## Conclusion

The persistent unavailability of hydroelectric power supply in Nigeria has hampered sustainable development across all sectors of the nation's economy and health. The implication of which is persistent poverty in the rural areas and urban slums. This is contrary to the Millennium Development Goal 1 – which centers on eradication of poverty, as well as the World Bank Group's mission of building a world without poverty. To accomplish this target, the Nigerian Government needs to embark on off-grid rural and sub-urban electrification in order to meet the demands and challenges of the global Agenda for sustainable development. There is also the need for governmental and private sectors investment in high production of inverter and other energy saving devices for the use of the rural and sub-urban dwellers who

are low income earners at affordable process in pursuance of Sustainable Development Goals (SDGs 2020/2030) in Nigeria.

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