A Preliminary Evaluation of Renewable Energy Technology Financing Options for Nigeria

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Abstract

Renewable energy technologies (RETs) ought to play a complementary role to conventional energy technologies as these have the potential to meet up energy needs in rural areas with regards to access, availability and affordability. Despite these potentials, the current challenge is how to finance their deployment and services. Since long-term growth in the market for RETs is going to be determined by social and economic development that is occurring in both the rural and urban areas as well as the ability of these technologies to compete financially with other energy options on a level playing field, there is need to evaluate various options available to finance the deployment of RETs in Nigeria. This paper attempts a preliminary evaluation of the possible options and their implications for sustainable commercial financing of smallscale RE projects in the rural areas of Nigeria. It is divided into five sections. The first section is the introduction which provides background information, next section "Overview of energy and financing needs of rural people" gives the market definition and an overview of energy and financing needs of rural people; this section also reviews energy access, availability and affordability challenges. It also gives an overview of RET financing barriers in Nigeria. The next section gives the possible RETS financing barriers in Nigeria. RET financing options for Nigeria are discussed further in the next section, Conclusion are discussed in the end of paper by stressing the need for an enabling environment for financing RETs.

Keywords: Renewable energy technologies, financing barriers, evaluating financing options, rural areas

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INTRODUCTION

Renewable energy technologies (RETs) appear to play a major role in meeting up the energy needs of a country's economic growth. With costs falling rapidly, environmental awareness and political attention, RETs may at last live up to their potential, especially in rural areas. Even though RETs have the potential to meet up rural energy needs, the problem now is how to finance their deployment and services. Long-term growth in the market for RETs is going to be determined by social and economic development that is occurring in both the rural and urban areas as well as by the ability of these technologies to compete financially with other energy options, thereby promoting a level playing field. Understanding the financing gaps that exist in the various stages of sustainable energy market development in Nigeria is a complex task. Looking from the government angle, supportive regulatory and tax environments are key drivers of the development and financing of new technologies. However, these macro-government approaches are not always enough to create the true enabling environment needed for investment, especially in sustainable RE systems. In Nigeria, a major cause of this financial gap is lack of effective project delivery and financing mechanisms adapted to national and local market conditions. But the existence of global experience from the developed and other developing nations in innovative and effective mechanisms for commercial financing of RE projects and RE finance programs that organize and systematically deliver RE projects, services and financing to implement multiple projects in specific target markets can play a good role in defining options for sustainable RE financing system in Nigeria, most especially in the rural settlements. Many RE finance programs have been implemented by governments, development agencies and development finance institutions (DFIs) in commercial partnership with financial institutions (CFIs) around the world [1]. This paper discusses some possible options and gives a preliminary evaluation of their implications, for sustainable commercial financing of small scale RE projects in the rural areas of Nigeria.

OVERVIEW OF ENERGY AND FINANCING NEEDS OF RURAL PEOPLE

Rural people do not need energy per se, but access to its services. If we look into the Millennium Development Goals (MDGs) such as reducing poverty, increasing primary education, improving environmental conditions, increasing access to safe water, reducing infant and maternal mortality, and reducing the spread of HIV/AIDs, all cannot be achieved without access to energy and energy services. Energy services can be used for various purposes, for example, productive uses involve utilizing energy for incomegenerating activities and household uses involve utilizing energy inside the house for lighting, cooking. and running home appliances like televisions, pressing irons, radios, and fans. Community uses are largely confined to schools, hospitals, health clinics, and community centers. Many RETs are proven, economic and actionable for scaled up deployment to rural areas, to render such aforementioned energy services, but because of some challenges faced with the sustainability of these RE projects, RETs remain unimplemented in most of the rural areas. These challenges are categorized in terms of access, availability, and affordability.

In the case of energy access challenge, most people who lack access to modern energy services are poor and live in rural areas, where there are often no roads connecting these regions to larger towns, and people sometimes have to travel a long way on foot to reach market places, energy services, and financial services. Not only do these people have a difficult time accessing services, but also servicing their needs is as costly and difficult for energy service providers, and finance agencies. Accessing modern energy services for cooking needs is even a bigger barrier. Most rural people still rely on biomass for their cooking needs. Locating and collecting fuel wood is time-intensive and laborious. In parts of sub-Saharan Africa, women and children travel for 6–8 hours a day collecting sparsely distributed fuel wood for their cooking needs. Deployment of modern energy services is a big challenge. The energy availability challenge is that for people living in rural areas, energy services may not be available because energy service providers do not necessarily view this as a strong, viable market for their products. Despite the fact that people are willing and able to pay for energy services, providers will not go to the rural areas because they are typically remote, isolated and more challenging communities for them to work.

Also, in the case of energy affordability challenge, majority of the rural people cannot afford the initial capital costs of investing in energy technologies installations. This does not only apply to decentralized renewable energy systems but also often to the cost of obtaining a connection to the grid, which involves the cost of getting a wire from the distribution line to one's house and wiring and appliances inside the house can be too high. Down-payments on loans can also be expensive even if a rural individual or household has access to credit, which itself can prove to be prohibitively expensive. Finally, terms of credit may not match income patterns of rural dwellers, since rural earnings are often not in the form of a constant amount every month. Income can, for example, vary according to changes in agricultural market prices, and be earned in a few lump sums at times of crop harvests. Such variations in income are often not compatible with fixed, regular loan payment schedules established by rural credit agencies.

Market Definition

For the purpose of this paper, financing small scale renewable energy (RE) projects can be defined as all forms of RE investments in retrofitting existing equipment and purchasing of new facilities in all end-user sectors (residential. commercial. industrial. agricultural, municipal/institutional), including a full range of end-use equipment such as boilers, thermal plants, lighting, motors, controls, heating and air conditioning, industrial process systems, refrigeration, and other RE systems in the size range of up to 5-15 MW. Small-scale RE also includes household and community-scale projects such as solar photovoltaic, bio-gas systems targeting the "energy access" market to deliver energy services in off-grid RE and underserved communities mostly in the rural areas, and has essential roles to play in meeting Millennium Development Goals [1]. Single RE project investment costs range from \$250-500 for micro-projects, for example, a solar home system to \$5-15 million for macroprojects; for example, an industrial bio-mass cogeneration system [2].

OVERVIEW OF RET FINANCING BARRIERS IN NIGERIA

The increase in the share of renewable use has become an important energy policy target in most parts of the world. However, RET accounts for only a modest proportion in meeting the world's total energy demand which, therefore, means that there is a gap between the actual and optimal level of use. The deployment of RET projects in Nigeria also face some financing barriers, which often explains the slow or none take-up of these technologies in some rural areas within the country. Some of the most observable are:

- a. Lack of access to credit: Beneficiaries of RETs have poor credit worthiness, lack collateral and lending mechanisms for small-scale renewable energy systems are non-existent.
- b. High financial cost of RETs: A very pertinent barrier is the high cost of RETs as compared to the conventional generation technologies using fossil fuels. Many RETs cost more and repeatedly deter the adoption and use, more so in countries that cannot afford these RETs.
- c. Lack of long-term financing: RET projects need access to long-term funding, due to the nature of RETs, which are

characterized by high upfront capital costs and low ongoing operating costs.

Absence of such long-term financing promotes investment decision towards conventional and traditional technologies which are often financially viable with short-term loans, since long-term financing is particularly difficult to obtain in developing countries and low-income countries generally.

- d. Unfavorable requirements for RETs financing by lending institutions: Lending institutions set stringent conditions for RETs consumers and this discourages potential users from investing in these technologies.
- e. Lack of familiarity with RET: There is a lack of knowledge among possible users and beneficiaries as to the long-term advantages and cost benefits of RETs. This means users are not familiar with the advantages renewable energy can add.
- f. Lack of level playing field for RETs: Huge subsidies on fossil fuels are putting renewable energy at a highly competitive disadvantage. RET would require subsidies in the initial stages due to the high initial capital investment but just like most technologies, after a high level of technology distribution has been reached, RET can become self-sustaining over the long term thereby allowing these subsidies to be withdrawn.
- g. Lack of policy and regulatory frame work: The success of any technology is dependent on the existing government policy as government policies help to create an enabling environment for the adoption and dissemination of these policies. Unfortunately, most governments do not have a centralized policy on the development and promotion of RETs; this leads to an energy planning and policy void.

REFINANCING OPTIONS FOR NIGERIA – A PRELIMINARY EVALUATION

In this section, a preliminary evaluation of the RE financing options for Nigeria is provided. The concept of microfinance, leasing and Esusu (thrift) is examined and their advantages are evaluated.

Microfinance

It is essential to keep in mind when designing energy and financial services that people generally have different incomes and may not receive income on a regular monthly basis, most especially in the rural areas. Also, energy services are quite expensive to maintain. Microfinance institutions have played an important role in enhancing the economic opportunities available to poor people. These opportunities, however, will remain limited if people cannot access and pay for modern energy services. There are three main types of microfinance institutions: (a) formal institutions, i.e., rural banks (public and private) and cooperatives. (b) semiformal institutions. i.e.. nongovernmental organizations, and (c) informal sources, i.e., money-lenders and shopkeepers. These institutions can provide a broad range of financial services including deposits, loans, payment services, money transfers, and insurance to poor and low-income households and their micro-enterprises. Some lend only to individuals, some only to groups, and others lend to both.

Cooperatives will generally only lend to their members. Certain microfinance agencies can be affiliated with rural NGOs and social movements that are also member-based. Some finance agencies lend only to women, and while some do lend to the "poorest of the poor," the vast majority lends to the rural middleclass. Even within one microfinance agency, different lines of credit may be operated differently. Some microfinance agencies do not demand collateral; however, many do, especially if there is no external line of credit they can access for lending purposes [4]. Access to consumer credit for financing the delivery of energy services depends on the availability of suitable mechanisms and institutions that are willing to provide capital. As the awareness of both microfinance and technologies grows, financial energy institutions will be able to better channel capital into loans for energy services for poverty reduction.

Leasing

It is well known that most rural households lack access to reliable and affordable finance for rural enterprises and in particularly financing of technological development. Rural dwellers reside in isolated areas where access to financing from retail and traditional banking is limited and assets that can be used as collateral are unavailable. Consequently, a viable option for seeking financial support for deployment of RETs is financial leasing. In this arrangement, the provider (lessor) owns the equipment and allows the customer (lessee) use the equipment for a time period which is eventually transferred to the customer upon completion of the lease agreement [5]. This model provides access to affordable finance and removes the need for collateral as required with traditional loans. There is safekeeping as the leasing company maintains ownership of the equipment thereby saving cost of transaction. However, the shortcomings are: the time frame for the lease as compared to an outright purchase of the equipment, leasing in rural areas is underdeveloped and limited, and lacks clear legal framework. But given the potential of leasing as a source of funding and a means for rural areas to have access to infrastructural development, the following organizations can provide leasing services: Bank of Agriculture (BOA), Bank of Industry (BOI), JAIZ Bank and the World Bank Group under the Micro, Small, and Medium-Sized Enterprise Project [6].

Thrift (Esusu/Isusu/Adashi) and Cooperative Bodies

It has been reported by CBN that 65% of Nigerians lack access to credit facilities. Esusu/Adashi is an informal microfinance form of financial body that obtains its money from the savings of its members. It is otherwise known as thrift or mutual financing. It is the most predominant type of financing in Nigeria as people of different classes and ages participate for a personal reason with the intention to save money to start a business or buy assets [8]. This form of financing facility gives access to credit funds without the need for collateral or down payment, at zero interest. It is an informal form of partnership with no written laws except in some few cases. It is called Esusu or Ajo among the Yorubas, lsusu or Utu among the Igbos while the Edos call it Osusu, Hausas call it Adashi, the Nupes call it Dashi, the Ibibios call it Etibe [8]. Some operate with written laws while others operate with unwritten laws but on oath of allegiance and mutual trust [7]. The general practice is that members of Esusu/Adashi associations contribute a fixed amount periodically to a nominated member known as the "keeper" of the money, and give all or part of the accumulated funds to one or more member(s) in rotation until all members have benefited from the pool [8]. With this type of credit facility (Esusu/Adashi), rural people can have access to funds and purchase RETs for their personal use. The risk facing this form of partnership is security and safe keeping, where a member can decide to opt out halfway through or the money keeper runs away with people's money. But with the introduction of "Esusu Shield" by banks and insurance companies, it uniquely combines features of Ajo, Esusu, thrift and mutual financing to meet the savings, financing, life assurance and personal accident benefits of policyholders. These features include life insurances and personal accident benefits to members. A member of Esusu shield contributor can take full or part of his contribution after two years without penalty and can take loan of a total of up to 75% of his contribution [9].

CONCLUSIONS

An imperative paradigm for accelerating growth, reducing poverty and providing a better livelihood for Nigerians is to ensure that the rural populace in particular has available, accessible and affordable sources of energy. particularly power. RETs have been found to have the potential to meet up these rural energy needs but the dilemma is how to pay for their redeployment. Due to the different incomes and the existing financing barriers in Nigeria, some unconventional and traditional methods of financing were proposed. These include micro-financing, leasing, thrift/esusu and mutual financing, which would help improve the economic opportunities available to poor/rural people. This will give them access to affordable finance by removing the need for collateral or down payments to zero interest. These forms of financing would help rural people have access to funds to purchase RETs for their personal use thereby improving their quality of lives.

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