



Africa-EU Renewable Energy Research and Innovation Symposium, RERIS 2016, 8-10 March
2016, Tlemcen, Algeria

Energy poverty and its spatial differences in Nigeria: reversing the trend

Yekeen A. Sanusi^{a*} and Gideon S. Owoyele^a

^a*Department of Urban and Regional Planning, Federal University of Technology, P.M.B. 65, Minna 234, Nigeria.*

Abstract

The high level of poverty in the developing countries is also manifested through access to energy. Nigeria is faced with an extreme lack of access to electrical energy in the midst of abundant natural energy resources. While attention is on hydro sources for electricity, energy supply is grossly inadequate and other sources of renewable energy attract very little attention. This study is focusing on energy poverty at the level of the households. The objectives of this work are to examine households' access to energy, to measure energy poverty, to demonstrate spatial disparity in energy poverty and to establish a relationship between energy poverty and factors of energy access. The study used data published by the National Bureau of Statistics on energy access and parameters that may influence consumption of energy. These data are electricity connection to national grid by households and the use of clean energy for cooking by the households. Energy poverty is determined on the basis of Energy Development Index [EDI] and regression analysis is used to establish a statistical relationship between energy poverty and the possible determining factors. The results show high energy poverty for the country and disparity in energy wellbeing between the northern and southern states; the former are poorer in terms of energy access.

© 2016 The Authors. Published by Elsevier Ltd. This is an open access article under the CC BY-NC-ND license (<http://creativecommons.org/licenses/by-nc-nd/4.0/>).

Peer-review under responsibility of the organizing committee of RERIS 2016

Keywords: Energy access; energy poverty; energy development index (EDI); spatial differences.

* Corresponding author.

E-mail address: grandspace@yahoo.com

1. Introduction

The high level of poverty in the developing countries is also manifested through access to energy. The poor access to energy in less developed countries, in particular in Sub-Sahara Africa, is ominous. Records show that 585 million people in Sub-Sahara Africa lack access to electricity while 653 million rely on biomass for cooking [1]. Nigeria is faced with an extreme lack of electrical energy in the midst of abundant natural energy resources to satisfy the expected need. Although an emphasis is set on generating electricity from hydro resources, the supply is grossly inadequate. Other sources of renewable energy attract very little attention. While electricity supply from hydro and thermal (gas) sources hovers around 4000 MW, wind energy supply from four stations, one of which is a research station add up to 16.7 kw/h [2]. The poor energy supply is against the background of an increasing population of the country. Households are an important component of energy consumption. Therefore, the study focuses on energy poverty at the level of the households in Nigeria. The objectives of the work are to examine households' access to energy, to measure energy poverty, to demonstrate spatial disparity in energy poverty, to establish a relationship between energy poverty as well as factors of energy access and to link energy poverty to renewable energy potentials of the country.

Energy poverty is an indicator of poverty. It means that part of the bundle of products needed to maintain a good life is missing. While it may be part of the general deprivation, energy poverty is specific and in the face of the enormous opportunities that energy wellbeing offers, energy deprivation undermines this opportunities. The starting point of energy wellbeing is access. Energy access is defined as access to modern energy and household access to electricity and clean cooking energy [3] and is seen as a 'pathway out of poverty' [4]. The consensus is that there is a link between wellbeing and consumption of energy and electricity [5].

The *Poor People's Energy Outlook 2010* indicates three mechanisms in the link between energy access and wellbeing; creating new earning opportunities, improving existing earning activities and reducing costs, drudgery and releasing time to enable new earning opportunities [6]. When access to energy is affected, energy poverty takes hold on the people. Energy poverty is seen by World Economic Forum as 'the lack of access to sustainable modern energy services and products'[5]. It is seen as 'a situation where the absence of choice of accessing adequate, reliable, affordable, and conveniently suitable energy services is found [5]. Determining energy poverty is better done through measurement. There are many metrics of energy poverty. These range from single factor based measure to multidimensional poverty metrics including production of an overall index that summarizes the deprivation that people and communities suffer in the consumption of energy. Eight metrics of energy poverty have been identified [7]. Out of these, four reflect absolute poverty concept. These are Minimum energy consumption threshold approach, Income-variant energy demand approach, Multi-dimensional energy poverty index [MEPI] and Global energy access. There is also the Energy development index [EDI] of the International Energy Agency.

Both the MEPI and EDI have received some large applications. Essentially, the MEPI captures the set of energy deprivations that may affect a person. It is composed of five dimensions representing basic energy services with six indicators; cooking, lighting, services provided by means of household appliances, entertainment/education and communication. The emerging index places communities on a scale of 0 to 1. The higher the index, the greater the energy poverty [8]. On the other hand, the EDI utilizes two dimensions of energy poverty, each with two indicators. These are household access measured by access to electricity and use of clean energy for cooking and community access measured by access to energy in public sector and access to energy for productive use. Although, the EDI is also measured on a scale of 0 to 1.0, however, the lower the index, the more serious the energy poverty. Energy poverty has cross-cutting characteristics manifesting in availability, affordability, adequacy, convenience and reliability [3]. The need for measurement of energy poverty is premised on 'improving availability of information about the range and impacts of energy access; helping nations to monitor actions they can take to improve energy and increasing awareness among countries of policy actions and best practice [9].

While these two metrics are popular, a new and more comprehensive energy poverty metric is represented by Multi-tier energy access framework. By this approach, energy access is defined as the ability to avail energy that is adequate, available when needed, reliable, of good quality, affordable, legal, convenient, healthy and safe, for all required energy services across the locales of households, enterprises and communities [10]. The metric was introduced in 2013 by Sustainable Energy for All Global tracking framework. It provides a 5-tier system of assessment through the energy attributes across the three locales [households, enterprises and communities]. The

Download English Version:

<https://daneshyari.com/en/article/5447024>

Download Persian Version:

<https://daneshyari.com/article/5447024>

[Daneshyari.com](https://daneshyari.com)