

# The Role of Energy Poverty on Economic Growth in Sub-Saharan African Countries

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## 1. Motivation underlying the research

Access to energy is one of the essential inputs for socio-economic development (Johansson & Goldemberg, 2002; Davidson & Sokona, 2002). Access to energy is also one component of the wider range of problematic issues faced by those living in poverty. Economic poverty is defined as insufficient income to acquire basic goods and services; within this definition, energy poverty is defined as the exclusion of people from basic access to energy that is energy poverty. In addition, the particular and important role of electricity to the countries' economic growth has been extensively discussed in the energy literature. The literature has not reached clear consensus on nexus between electricity and economic growth but Payne (2010) summarizes the four hypotheses assumed and confirmed: growth (electricity consumption  $EC \rightarrow$  economic growth  $EG$ ); conservation hypothesis ( $EG \rightarrow EC$ ); neutrality ( $EC \neq EG$ ); and feedback ( $EC \leftrightarrow EG$ ).

In the sub-Saharan African region, it is a priority for reliable and affordable energy to be widely available which is critical to the development of this region. This region is important as sub-Saharan African region accounts for 13% of the world's population, yet only 4% of its energy demand. This is evident from sub-Saharan Africa's rapid economic growth contributing to energy use rising by 45%, since 2000 (IEA, 2014). A major objective of development policy in sub-Saharan African countries is also alleviating poverty. Ideally, alleviating poverty is to create an environment of inclusive growth which achieves an efficient allocation of resources is vital. One of the channels to reduce the population's poverty is through provision of access to energy and other services.

Hence, the primary aim of this paper is to examine empirically the role of energy poverty to boost economic growth in the sub-Saharan African region, within the context of the importance of electricity consumption to ignite growth and development. Specifically, this paper examines the hypothesis that energy poverty is a positive contributor to economic growth in the context of developing countries with a focus on fourteen sub-Saharan African countries (Benin, Botswana, Cameroon, Congo – Republic, Eswatini, Kenya, Mauritius, Mozambique, Namibia, Nigeria, Senegal, South Africa, Tanzania and Togo) for the period from 1990 to 2016. This research is relevant given that many sub-Saharan African countries are in a unique position of shifting investments in the energy sector as traditional forms of energy production are being replaced by modern sustainable energy options.

## 2. A short account of the research performed

The theoretical framework of this study is based on one side on the discussion of the definition of energy poverty and the concept that economic growth and development depend on the "quality" of the population. Based on this the estimated economic model is as follows:

Where GDP is Gross Domestic Product per capita; ACCESSELEC is the percentage of population with access to electricity used as a proxy for energy poverty with an expected positive relationship with the dependent variable; URBANIZATION is %share of people living in urban areas; POPULATION is the annual population growth; EDUCATION is the total enrolments in primary education of country in period as a measure of economic growth.

A Generalized Method of Moments (GMM) regression was used to estimate Eq1. due to its ability to control for econometric issues such a cross-sectional dependence of countries and multi-collinearity among variables, and hence the results might be dissimilar to those of the fixed effects estimation.

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In all regressions where the control variables were introduced one by one, all the access to electricity coefficients are positive and statistically significant against GDP growth. This suggests that a reduction in energy poverty is beneficial to economic growth: the coefficient ranges between 0.095 and 0.120. When factoring all the control variables for the need of robust testing, an increase by 1% in access to electricity leads to an increase of 0.120% in the annual growth rate, *ceteris paribus*.

### **3. Main conclusions and policy implications of the work**

Access to electricity proved to be a robust macroeconomic determinant of growth, which highlights its important role in determining economic activity in the region. What is of importance is the multiple benefits that the economy will receive at a later stage from an increase in people with access to electricity. These associated benefits are the effects on the quality of education, gender equality, health and poverty reduction socio-economic development for that household.

This study's findings are added to the recent literature on electrification that states access to electricity is a positive contributor to the livelihoods of households in a variety of ways. The fourteen sub-Saharan African countries' experience is informative because it exemplifies the importance of access to energy, particularly in developing and relatively poor countries. It signals to government in these regions that priority should be given to policies that intend to increase the access of electricity to households within their country. As per Gonzalez- Eguino (2015) quoting a report by IEA, "the cost of providing universal access to energy by 2030 would require annual investment of \$35 billion, i.e. much less than the amount provided annually in subsidies to fossil fuels". Hence, significant investment and allocation of resources is essential. In the current constrained economic conditions, the net benefit of such investment should be estimated: the cost of the investment in providing access to energy infrastructure vis-à-vis the economic benefit associated with the improvement of living standards and essentially economic development. In this study, we have provided some quantitative evidence for the impact that access to electricity can potentially have to economic growth.

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