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# Energy access indicators and trends in Ghana

Gifty Serwaa Mensah [a], Francis Kemausuor [b,*], Abeeku Brew-Hammond [a,1]

[a] The Energy Center, Kwame Nkrumah University of Science and Technology (KNUST), Kumasi, Ghana
[b] Department of Agricultural Engineering, KNUST, Kumasi, Ghana

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ABSTRACT

Providing access to modern energy services for development is a daunting task which requires rigorous planning based on robust information. Energy access indicators enable measurement and monitoring of the progress of energy access expansion efforts, thus informing corrective efforts and efforts worth replicating. This paper reviews what has been proposed to constitute energy access and energy access indicators. The paper further reviews briefly the different types of energy access indicators and analyses access to modern energy in Ghana as measured using the energy access indicators employed in Ghana. The paper concludes that Ghana has achieved commendable access to modern energy services compared to her sub-Saharan peers but recommends further efforts to achieve the set targets of universal access to electricity by 2020 and 50% access to LPG by 2020. The paper finally recommends further work on the different types of indicators which are relevant for tracking energy access progress but are not currently employed in the country.



**Contents**



## 1. Introduction

The Sustainable Energy for All (SE4All) Initiative which was launched by the UN Secretary General has an overarching objective of ensuring universal access to sustainable energy by 2030 [1]. SE4All is designed to reach out to the over 1.3 billion people who have no access to electricity and another 2.7 billion people who still cook with traditional biomass such as dung and wood and other plant/crop residue, with a majority of these people in Developing Asia and Sub-Saharan Africa [1–3]. The initiative has three specific objectives of ensuring universal access to modern energy services, doubling the rate of improvement in energy efficiency and doubling the renewable energy share in the global energy mix by 2030 [1]. Ghana with support from the United Nations Development Programme (UNDP) is the first country to develop a SE4All country action plan with a focus on access to clean cooking fuels and modern energy services for productive uses.

Even before the SE4All Initiative the Government of Ghana had committed itself to a target of 50% access to LPG by 2015. The Government had also committed itself to the National Electrification

* Corresponding author. Tel.: +233 20 7457532; fax: +233 32 2063573.
*E-mail addresses:* kemausuor@gmail.com, fkemausuor.soe@knust.edu.gh (F. Kemausuor).
*URL:* http://energycenter.knust.edu.gh/pages/index.php (F. Kemausuor).

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Programme (NEP) which is aimed at achieving universal access to electricity by 2020, ten years ahead of the SE4All initiative. Achieving these targets is a challenge that requires strong political and financial commitment, rigorous planning, tailor-made institutions and adequate policies.

In addition, effective monitoring and measurement of energy access programmes enhance access provision as the results of these exercises aid in tracking the progress of energy access initiatives; diagnosing failures and/or challenges of access programmes, leading to remedial strategies; and identifying functioning policies for replica tion [4]. In order to measure energy access in ways that inform improvement and decision making, there should exist indicators that clearly portray the progress being made on all fronts. There are different types of energy access indicators and this paper focuses on those used in Ghana and the access picture these indicators paint of Ghana. Section two of the paper reviews the different types of energy access indicators and what constitutes energy access. Section three reviews electricity access in Ghana and section four reviews access to LPG. This is followed in section five with issues and priorities while conclusions and recommendations are presented in section six.

## 2. Definitions of energy access and indicators in Ghana

### 2.1. Energy access, what is it?

Although access to modern energy services has always been mentioned as being a prerequisite for development, the year 2012 saw the agenda becoming more conspicuous with the launch of the SE4All initiative by the UN Secretary General. So what constitutes access to modern energy services? Is it the presence of electricity in a community, or the presence of an LPG station? The definition of energy access is one that is highly contentious and there is no one universal definition. Some definitions include access to modern cooking fuels and minimum electricity for lighting and reading at night [5]. Access to electricity has also been defined as the availability of electricity in areas reached by the grid or other off-grid electricity solutions. In the case of off-grid solutions, electricity is provided by a decentralized or stand-alone power source (petrol or diesel generator), or renewable energy device (solar PV, wind turbine or biomass gasifier) [6]. The International Energy Agency defines energy access as “a household having reliable and affordable access to clean cooking facilities, a first connection to electricity and then an increasing level of electricity consumption over time to reach the regional average” [7]. One of the weaknesses associated with these definitions is their failure to account for energy access for economic activities which is critical for development, the driver of access provision. Other efforts have also been made to define energy poverty (lack of energy access) by entities such as Practical Action and UNDP [8]. Furthermore, whether defining energy access or energy poverty, one cannot lose sight of the fact that most of these definitions may be based on assumptions and thus subjective, and may fail to take cultural practices into consideration [8].

In Ghana, access to modern energy services is defined as the communities/households connected to the grid (i.e. electricity access) and the number of households using LPG either as their main fuel for cooking or in combination with other cooking fuels (i.e. access to clean cooking fuels). Work is on-going within the country to take cognizance of the energy access for productive and communal purposes but this is still at the research stage.

### 2.2. Energy access indicators

Once what constitutes access to modern energy has been defined, the need for indicators to measure modern energy access or energy poverty becomes critical.

Energy Access Indicators are the quantitative and/or qualitative measures derived from a series of observed facts that can reveal a country, community or person's relative status in modern energy access [9]. They simplify, clarify and make aggregated information available to relevant stakeholders to aid in drawing attention to issues and setting policy priorities. They also help to establish trends over time [9–11], which facilitates projections and planning for energy access. Energy access indicators can be single (one-dimensional), a set of individual non-aggregated indicators (dashboards), or composite in nature [8,12]. Both dashboards and composite indicators are multidimensional.

One-dimensional indicators measure the performance of energy access from a single aspect of the issue. Although these are straightforward, easy to interpret and send clear messages, they tend to give a narrow perspective of the issue [8]. Examples include electricity consumption per capita and number/percentage of population with electricity access. The ‘dashboards’, which are a collection of single indicators developed to address an issue from different angles, seek to correct the weakness of the one-dimensional indicators thus allowing a more holistic evaluation. However, it is not an easy feat measuring and tracking these respective indicators, or even communicating them to stakeholders [8]. Composite indicators have been created to provide an intersection between one-dimensional indicators and dashboards in order to account for the multidimensional nature of issues such as energy access, sustainability and the like. A composite indicator is produced by condensing many different single indicators that address the multidimensionality of energy access into a single index based on a model [9]. Examples of composite indicators are the Multidimensional Energy Poverty Index (MEPI) developed by a team at UNIDO, the Energy Development Index (EDI) used by the International Energy Agency and the Energy Access Index proposed by the UK Charity, Practical Action.

Bazilian et al. [12] argue that the subject of quantity and quality of energy access should be seen to reflect in the metrics used for energy access. This goes to buttress the need for indicators that reflect the multidimensionality of energy access indicators. In addition, Hailu [11] agrees with Bazilian et al. [12] that in developing indicators, issues such as their political acceptability and simplicity of use, comparability, theoretical correctness and statistical strength as well as availability of data should receive careful consideration since they will serve as/form part of decision support tools to aid in planning for energy access. The next subsections review briefly three of these multidimensional EAIs namely; MEPI, EDI and the Energy Access Index.

#### 2.2.1. Multidimensional Energy Poverty Index (MEPI)

The Multidimensional Energy Poverty Index (MEPI) is a composite indicator that measures energy deprivation as opposed to other EAIs that focus on measuring the availability of modern energy services. It takes into account the occurrence and magnitude of energy poverty. It captures six dimensions of energy poverty (Table 1) and an individual is energy poor if “the combination of the deprivations faced exceeds a pre-defined threshold” [8]. The MEPI score is calculated as the product of a headcount ratio (share of people identified as energy poor) and the average intensity of deprivation of the energy poor. There is a total score of 1.0 and the higher the score for a country, the higher the intensity of energy poverty. MEPI scores for sub-Saharan African countries, ranging from 0.53 for Namibia and Senegal to 0.9 for Ethiopia, are a clear indication that energy poverty is prevalent in Sub-Saharan Africa. Barring all criticisms of the tool including the issue of weighting, this information can be used to design robust policies to remedy the situation.