

Elusiyan Eludoyin Conference Paper Abstract

Title

Bridging the Macro and the Micro: Integrating Empirical Realities with Energy Scenario Analysis

Abstract

This paper proposes a holistic approach to prospective energy policy analysis of pathways to sustainable energy access in developing countries; bridging supply and demand by soft-linking the Analytical Hierarchy Process (AHP) technique and the Long-range Energy Alternatives Planning (LEAP) modelling tool. The study focuses on a southern state in Nigeria, Lagos.

In line with the 'Sustainable Energy for All' initiative (United Nations 2012), much emphasis has been placed on the scale-up of energy access success stories. In the lowest energy access regions [Sub-Saharan Africa and South Asia], there has been relative progress on a project to project basis, but little evidence of systematic wide-scale provision of modern energy services in a sustainable manner. Further, projections based on current policies and commitments expect a worsening trend on energy access for SSA, which indicates the severity of the task at hand (IEA 2012).

Empirical literature in the field suggest that to achieve sustainable interventions; a greater understanding is required on the impacts policy instruments have, in the creation of a conducive environment for sustainable transition to modern energy services, under a given context – and how this varies for differing local dynamics within a country or region.

The benefits of local level insight for energy access success has been well cited in literature; as are the importance of policies and strategies employed by governments and international development agencies (IEG 2008; Bouille, Altomonte et al. 2012). Retrospective empirical research has taken steps to identify the impacts of policy on certain delivery mechanisms and on the local dynamics [connecting the macro to the micro](Mainali and Silveira 2012). However, much of the prospective work conducted on energy access has either taken a macro view (Islas, Manzini et al. 2007), or a micro view (Mustonen 2010), without analytical linkage between the two. Linking the dynamics of macro-level policies to micro-level transition in detail is important in order to further understand the aspects which enable policy/programme success in one instance, and failure in another; for example, the relative suitability of microfinance over fee-for-service for off-grid end-user financing in South Asia, and vice-versa in Sub Saharan Africa.

The IEA opine that a key success factor is the minimization of trial and error in energy access initiatives (IEA 2010). This study seeks to aid this by assessing key factors of an energy access market in a prospective analysis of chosen scenarios. The study will incorporate theories developed from empirical evidence on relations between energy supply and demand – which is seldom adopted in classic scenario analyses. The Analytical Hierarchy Process (AHP) – in which respondents score the decision alternatives based on pair-wise comparisons of decision criteria (Saaty 1980) – will be adopted. As well as the Long-range Energy Alternatives Planning tool [LEAP] (Heaps 2008), which will be utilized with AHP in an iterative manner, to assess the nature of the transition to modern energy services over a specific time period.

AHP will be applied in a novel method using a structured questionnaire to obtain quantitative data from qualitative criteria regarding modern energy service delivery and adoption, to indicate the level of demand and supply under certain market conditions. Both supplier and consumer groups will be included in the survey with separate questionnaires prepared for both stakeholder types. Results of the process will be soft-linked to the scenario model created in LEAP for final consumption levels in the state, and iterated in a 3 year time-step along the scenario timeline. One peculiar aspect of the

study methodology is the design of questions and the characterization of sample subjects, in order to obtain consistent unbiased responses from subjects during the AHP process.

This study is part of an on-going PhD research. For the conference paper, preliminary results will be presented showing the use of AHP and its soft-link with LEAP, along with a full appreciation of the methodological framework, data requirements, and collection plans. Results from a pilot study aims to show that 'simplified direct' questions attributed to stakeholder needs will provide consistent unbiased responses amongst sample subjects, and will differ across chosen stakeholder groups and under varying market conditions. It is expected that the inclusion of decision analysis through AHP, in an energy system modelling tool that is widely used to inform developing country decision makers on energy policy matters (LEAP) for this study, will bring new insights providing a deeper understanding of energy consumer and supplier decision factors. Hence, increasing the robustness of results for energy policy analyses – from which policy prescriptions can be deduced.

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