



In Partial Fulfillment of the Requirements for the Degree of

**Doctor of Philosophy**  
**Chukwunonso Chidebell-Emordi**

Will defend her dissertation

**A complex systems approach to energy poverty in sub-Saharan  
Africa:  
Nigeria as a case study**

**Abstract**

Energy poverty is pervasive in sub-Saharan Africa. While there are different schools of thought on how it should be defined (qualitatively or quantitatively), the general consensus is that energy poverty is a state of deprivation of access to basic energy services required to alleviate poverty which in turn perpetuates extreme poverty. Nigeria, located in sub-Saharan West Africa, is the world's seventh largest oil exporting country and is a resource-rich nation. It however experiences the same levels of energy poverty as most of its neighboring countries. Attributing this paradox to corruption or the "Dutch Disease" is simplistic and enervates attempts at reform. In addition, data on energy consumption is aggregated at the national level via estimates, disaggregated data is virtually non-existent. Finally, the wave of decentralization of vertically integrated national utilities sweeping the developing world has caught on in sub-Saharan Africa. However, little is known of the economic and social implications of these transitions within the unique socio-technical system of the region's electricity sector, especially as it applies to energy poverty. This dissertation proposes a complex systems approach to measuring and mitigating energy poverty in Nigeria due to its multi-dimensional nature. This is done via a three-fold approach: the first section of the study delves into causation by examining the governance institutions that create and perpetuate energy poverty; the next section proposes a context-specific minimum energy poverty line based on field data collected on energy consumption; and finally concludes with an indicator-based transition management framework encompassing institutional, economic, social, and environmental themes of sustainable transition within the electricity sector. This work contributes to intellectual discourse on systems-based mitigation strategies for energy poverty that are widely

applicable within the sub-Saharan region, as well as adds to the knowledge-base of decision-support tools for addressing energy poverty in its complexity.

Monday, August 17<sup>th</sup> 2015

10 am

Wrigley Hall, Room 308

Faculty, students, and the general public are invited.

Supervisory Committee:

Abigail York – Chair

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