

**NEGOTIATING THE LABYRINTH OF MODERNITY'S PROMISE
A PARADIGM ANALYSIS OF ENERGY POVERTY IN PERI-URBAN
KUMASI, GHANA**

by

Lily Ameley Odarno

A dissertation submitted to the Faculty of the University of Delaware in partial fulfillment of the requirements for the degree of Doctor of Philosophy in Energy and Environmental Policy

Summer 2014

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ABSTRACT

Energy poverty in developing countries has been conventionally attributed to a lack of access to sufficient, sustainable and modern forms of energy (ESMAP 2001; Modi et al. 2006). Per this definition, Sub-Saharan Africa is the most energy poor region in the world today. In line with this, efforts at addressing energy poverty in the region have concentrated on the expansion of access to modern energy sources, particularly electricity. In spite of the implementation of diverse energy development interventions, access to modern energy services remains limited. That energy poverty remains one of the most pressing challenges in Sub-Saharan Africa today in spite of the many decades of energy development necessitates a candid and thorough re-evaluation of the questions that have been traditionally asked about this issue and the solutions that have been offered in response to it. Based on theoretical analyses and empirical studies in peri-urban Kumasi, Ghana, this study attempts to offer some of the much needed re-evaluations. Using Kuhn's paradigm approach as a conceptual tool, this dissertation identifies peri-urban energy poverty as a paradigm-scale conflict in the modern arrangement of energy-development relations. By emphasizing the importance of context and political economy in understanding energy poverty, the study proposes strategies for an alternative paradigm in which energy-development relations are fundamentally redefined; one which enlists appropriate knowledge, technologies, and institutions in addressing the needs of the energy poor in ways which promote environmental values, social equity and sustainable livelihoods.

Chapter 1

INTRODUCTION

Energy and Development

Expanding energy access has been a central component of development efforts globally. The birth of the development movement in the early 1950s signified an important landmark in the history of the now developing countries. The world's image was for the first time projected as consisting of two major groups of players who were all running, albeit at different speeds, towards achieving the common goal of economic growth. In this race, countries now characterized as underdeveloped or developing countries were found to be lagging far behind the so-called developed countries given their extremely low per capita incomes (Sachs 1993). Governments of the underdeveloped countries and foreign development agencies alike have since then committed diverse resources to the attainment of "catch-up" (Rihani 2002) development strategies. Early development efforts concentrated on the expansion of "modern, organized and large scale industrial activity" as the principal avenue for the attainment of economic growth (Streeten 1979:29). Such large scale industrialization necessitated the availability of vast amounts of energy for driving the industrial engine, making the development of energy infrastructure a necessary and significant component of development efforts during the period.

In addition to the industrialization impetus, more recent development efforts have focused on promoting access to affordable and reliable energy services for

communities, small businesses and individuals as prerequisites for the attainment of the objectives stipulated by the Millennium Development Goals (MDGs)¹ which has become the current blue print for poverty alleviation and development globally (Modi et al. 2006). The United Nations has categorically affirmed the central role of energy in development, stating that “no country in modern times has substantially reduced poverty without massively increasing its energy use” (United Nations 2005). Numerous studies have in this regard focused on investigating and establishing links between access to modern energy sources and improvements in indicators of development. Goldemberg and Johansson (1991) for instance suggest that whereas energy in itself may be of little use to communities, energy can be employed in the satisfaction of basic needs which have direct impacts on social indicators such as illiteracy rates, infant mortality, life expectancy and fertility rates. Increases in the consumption of total commercial energy is said to correlate with improvements in such social indicators especially in very poor rural communities (Goldemberg and Johansson 1991).

¹The Millennium Development Goals were adopted in September 2002 at a meeting of world leaders at the United Nations Headquarters in New York. World leaders and leading development institutions at this meeting agreed to cooperate to reduce extreme poverty by the year 2015. “The eight Millennium Development Goals (MDGs) – which range from halving extreme poverty to halting the spread of HIV/AIDS and providing universal primary education, all by target date of 2015 – form a blueprint agreed to by all the world’s countries and all the world’s leading development institutions”. (<http://www.un.org/millenniumgoals/bkgd.shtml>).

Energy Poverty

The world today has access to a vast array of energy sources and conversion technologies. Global energy consumption steadily increases each year as the tools and methods at hand for accessing and utilizing energy resources are perfected. In spite of this global trend, energy access remains one of the most daunting challenges of the modern era. About 1.4 billion people in the world today still lack access to energy even for the satisfaction of the most basic human needs such as cooking and heating (Modi, McDade, Lallement and Saghir 2006). These comprise the energy poor.

Amongst the groups classified as energy poor, energy consumption levels are reported to be abysmally low with households more often than not, unable to obtain the minimum amount of energy needed for the satisfaction of their basic needs. This is estimated at 50kg of oil equivalents (kgoe) of annual commercial energy per capita; 40kgoe for the satisfaction of cooking needs and 10kgoe for the satisfaction of electricity needs (Modi et al. 2006). In 2009 for instance, all 791 million people in Sub-Saharan Africa consumed roughly the same amount of energy, 40TWh, as the 19.5 inhabitants of the state of New York in the United States (International Energy Agency, IEA 2010).

Another commonly identified characteristic of energy poverty is the heavy reliance on fuels which have been categorized as 'traditional', i.e. bio-based fuels such as wood, charcoal, tree leaves, crop residues and animal dung. The heavy reliance on these bio-based energy sources is predominant in Sub-Saharan Africa where up to 89% of the total population still depends on traditional biomass sources for cooking and heating (IEA 2010). Traditional biomass is the fuel of choice in rural areas in Sub-Saharan Africa but also plays a significant role in meeting the cooking needs of up to 60% of the urban population in the region (IEA 2010).

Simultaneously, the lack of access to modern energy sources, particularly electricity, is a commonly identified indicator of energy poverty. Per this criterion, Sub-Saharan Africa is the most energy poor region in the world today. The region presently has the lowest power generation capacity globally. Household energy connections to electricity grids are lowest here, compared to all other developing regions in the world; just a little over 30% of the Sub-Saharan Africa population has access to electricity compared to 65% in South Asia and 90% in East Asia (Eberhard, Rosnes, Shkaratan and Vennemo 2011).

Energy Poverty: A Persistent Modern Problem?

In spite of the prospects for economic growth and technological advancement in the developing world, energy poverty is expected to remain a significant development challenge in the foreseeable future. The International Energy Agency (IEA) has forecasted that even with the adoption of policies which facilitate an expansion in rural energy access, up to 15% of the world's total population will still be without access to modern energy services by the year 2030; a majority of these are projected to be in Sub-Saharan Africa (IEA 2010). Although about 2 million people in energy poor regions are expected to gain access to electricity by 2030, rising population levels are expected to offset these gains. In fact, the expected net fall in numbers of non-electrified populations is expected to be realized in Asia; the numbers are expected to *increase* in Africa (Birol 2007). Should current trends continue less than 40% of countries in Sub-Saharan Africa are expected to attain universal access to electricity even by 2050 (Banerjee, Wodon, Diallo, Pushak, Uddin, Tsimpo and Foster 2008). The chronicity of the electricity access problem in Sub-Saharan Africa is now considered a crisis which has stifled economic growth and productivity in the region.

It now stands as one of the most fortified barriers to the attainment of the Millennium Development Goals. With energy interlinked with the satisfaction of most of the basic needs being addressed as central elements of the MDG's, energy poverty indeed poses a monumental threat to the attainment of the greatest development mandate of our time.

The pervasiveness of the energy poverty problem in Sub-Saharan Africa has been variously attributed to a multiplicity of factors. Amongst these are the region's low generation capacity, extremely low rates of electrification, low electricity consumption levels, power sector inefficiencies, unreliability of electricity supply services and high generation and transmission costs (Eberhard et. al 2011). Power sector investments in the region are also reported to be abysmally low resulting in a power sector financing gap of about \$21 billion dollars a year. According to the World Bank, the region only spends a quarter of what it is actually expected to spend on its power sector, with most of this being spent on operating the region's high cost power systems, leaving little room for long-term investments in lasting solutions to the present power problems (World Bank 2011).

Consistent with Sub-Saharan Africa's low electricity access levels, per capita electricity consumption is lowest here compared to all other world regions. Annual per capita electricity consumption averages 457kWh. Excluding South Africa, this average drops to 124kWh (World Bank 2005). Comparing this to the averages of per capita consumption levels in the developing world (estimated at 1155kWh) and the developed world (estimated at 10198 kWh), a vivid picture is painted of the severity of the electricity access problem in the region. In fact, excluding South Africa, Sub-Saharan Africa represents the only region in the world where electrification and

electricity consumption is on the decline (Eberhard 2009). This situation may be considered as highly paradoxical, given the various efforts that have been established to promote electricity access in the region by way of electrification expansion investments, electricity subsidy programs and the implementation of power sector reforms in various countries across the region.

Power sector reforms were adopted by several countries in Sub-Saharan Africa beginning in the 1980's. Reform orthodoxy includes "legislation, independent regulation, and restructuring to foster competition in generation and private sector participation across the electricity-supply chain" (Eberhard 2009:15). The impact of reforms has been mixed and questions have been raised about its suitability for the Sub-Saharan Africa context. The performance of Sub-Saharan Africa's power sector still lags behind those of other regions across the globe in terms of indicators such as "installed capacity, electricity production, access rates, costs and reliability of supply"(Eberhard 2011). There have been almost no improvements in performance indicators such as transmission and distribution losses which average 25% and are as high as 50% in some countries (World Bank 2009:17).

Subsidies are almost universal in Sub-Saharan Africa; most households nonetheless are still unable to afford electricity services. Electricity access is found to be highest amongst higher income groups; three quarters of the electrified Sub-Saharan Africa population belong to the upper two quintiles of the income distribution. Only about 10% of the population in the lowest two quintiles of income distribution has access to electricity (Eberhard et al. 2009). With low income households unable to access grid electricity to begin with, they tend not to benefit from electricity price subsidies.

Until the recent surge in urbanization, Sub-Saharan Africa remained predominantly rural. This rural character of the region was posited as presenting a daunting challenge to electrification efforts owing to the great distances over which grid extensions had to be made to expand access to remote rural communities. Communities close to existing grid networks are said to hold greater promise of having access to grid electricity. Specialized agencies and funds have been instituted to facilitate electrification efforts. Predominant amongst these are Rural Electrification Agencies and Rural Electrification Funds which have been adopted in most Sub-Saharan African countries. The actual levels of success realized by these institutions in extending rural electrification efforts differ from country to country. Whereas some countries with established rural electrification funds and agencies have succeeded in expanding electricity access to rural areas, rural electrification remains generally low in Sub-Saharan Africa. Electricity access tends to be higher amongst urban areas which are home to 70% of electrified households with rural household electrification rates standing at about 10% on average (Eberhard 2011).

The Changing Landscape of Energy Poverty

The face of the world is rapidly changing. This transformation has been attributed to two fundamental drivers; population growth and rapid urbanization in the developing world. 50% of the total developing world population is expected to live in urban areas by 2030 (UN HABITAT 2010). All things being equal, this should come as welcome news for most development experts. Cities are generally believed to act as engines of economic growth through the creation of wealth, employment and the promotion of social development. Contrary to this however, some cities in the developing world “have become repositories for poverty, social ills, exclusion,

environmental degradation and potential hotbeds of social unrest” (UNHABITAT 2010:98). This is attributable to the fact that the expansion of urban forms in most developing world regions has been associated with significant and rather detrimental transformations in the nature of human settlements in these areas. With urban change come significant modifications to the existing built environments as well as the greater expansion of urban areas into new areas to satisfy the changing dynamics and needs of urban growth (UNHABITAT 2009). A direct off-shoot of this is the significant increase in the numbers and sizes of informal urban settlements in many areas of the developing world. In many of such informal settlements, urbanization is outstripping the management capacities of governments and urban planners and with poverty simultaneously pervading these spaces, access to clean, affordable and reliable sources of energy as well as basic services such as clean water and sanitation facilities, issues which for a long time remained predominantly rural concerns, are now emerging as pressing urban problems.

The proliferation of informal urban settlements which are home to increasing numbers of the poor has redefined the outlook of the energy poverty problem in most developing world regions. Energy poverty has thus ceased from being an exclusively rural affair. In fact it threatens to be one of the most pressing urban challenges of our time.

Urban Change² and Informal Urban Settlements

Even though there may exist different characterizations and expressions of informal urban settlements in different contexts, such settlements have generally been characterized as ones which fail to meet certain requirements for their legal recognition having been “constructed without respecting formal procedures of legal ownership, transfer of ownership, as well as construction and urban planning regulations” (Vienna Declaration 2004:1) that govern what is officially recognized as the formal urban development approach. Generally, the classification of a settlement as “informal” may be dependent on the identification of one or a combination of some or all these factors: “informal or insecure land tenure, inadequate access to basic services, both social and physical infrastructure and housing finance” (Vienna Convention 2004:1).

Informal urban settlements are found to be generated through a number of processes; these also provide a basis for differentiating between the different types of informal settlements encountered in contexts of rapid urban growth and development. The first form of informal settlement development can easily be mistaken for formal development because of the nature of its progression. In rapidly urbanizing developing countries, the development of much middle and upper-income neighbourhoods may proceed in this manner. Because of the economic and sometimes social influence

² It is acknowledged that urbanization and industrialization are deeply intertwined processes, with industrialization serving as a major driving force of urbanization. This study focuses on urbanization because the phenomenon serves as an important force in shaping the spaces where we live and work. And in a study which seeks to portray the peri-urban as not merely a transitional space but as permanent places where people live, the focus on urbanization provides a context for exploring this new dimension of the peri-urban experience.

borne by these groups of people and/or the ineffectiveness of the urban development process in itself, they may easily gain access to detailed layouts and building permits for developing areas not necessarily zoned for immediate development. These informal areas are well developed, built to very high standards and have an effective and efficient system of service delivery but they may still not fit into the region's broader development and/or environmental policies (UNHABITAT 2009). In other instances, houses may very well be located in areas designated as appropriate for development. However these houses may not comply to building codes and other land development regulations primarily because the mechanisms for enforcing such laws are either non-existent or are ineffectual due to planning authorities' lack of capacity to enforce such regulations (UNHABITAT 2009).

The third form of informal development occurs within the already built up environment. As population densities increase with urban growth, there is increased plot coverage on both formally and informally developed areas and even in some cases on government owned lands, as well as the construction of additional storeys on already existing buildings. As a result of this, the density of development ends up exceeding permitted levels in terms of plot coverage and floor area ratios in these areas. The extension of buildings and business operations in these high density areas may intrude into public spaces, such as roads which may become narrower or even completely non-existent after a period of time. Buildings may also be adopted for alternative uses other than what those particular areas were originally zoned for (UNHABITAT 2009). The modification of building structures with the densification of the built environment place significant strains on available infrastructure and greatly impede the provision of other services in these areas. These types of informal

urban settlements are popularly labelled *slums or squatter settlements*. These areas tend to be home to significant economic activities even though such activities may not be considered a part of the formal economy since these usually do not comply with formal registration and licensing procedures. The importance of the goods and services provided by these informal dwellers to sustaining their own livelihoods and even that of formal settlers is however becoming increasingly evident.

The development of informal settlements may also occur in areas which are “undeveloped because they are zoned for future development, are beyond the current built-up area or are unsuitable for development due to their environmental sensitivity or their vulnerability to other natural disasters” (UNHABITAT 2009:13). Much of this type of informal development occurs on land that is suitable for development lying at or beyond the fringes of the city and without access to mains services. This type of informal settlement development is called peri-urbanization. It has been responsible for the creation of peri-urban areas or interfaces in many parts of the developing world.

The widespread development of the two latter types of informal settlements, slums and peri-urban areas, in developing countries is resulting in the generation of novel development challenges and concerns. The rapid and almost uncontrollable expansion of these informal urban settlements is now outstripping the management capacities of governments and urban planners. Since this study will be specifically focusing on peri-urban settlements in understanding the nature of the energy poverty challenge, there will be a further attempt to explain peri-urbanism, the factors that generate it and why it is particularly relevant to study the dynamics of energy poverty in this type of informal settlement.

Peri-Urbanism Defined

Rapid urbanization, coupled with population growth, technological change and the expansion of built up areas is changing the interface between rural and urban areas rather profoundly (Simon, McGregor and Nsiah-Gyabaah 2004). Whereas there previously existed a clear dichotomy between areas which were unambiguously urban or typically rural this neat dividing line is increasingly blurred as the two worlds are brought into closer interaction with progressive transformations in the urban fabric (Tacoli 1998a,1998b; Baker and Claeson1990; Mountjoy et al. 1989; Marshall et al 2009; Potter et al. 2004; Potts 1997; Rigg 1998; Soja 1969; Mabogunje 1967). In the developing world, the growth of cities has been dynamic, disordered and space intensive as well. The outward growth of the city has led to the creation of non-contiguous transitional zones in urban and/or rural fringe areas, variously called urban-rural interfaces³ or peri-urban areas (Simon et al. 2004).

The zones classified as urban and peri-urban tend to increase with the outward growth of the city. Peri-urban spaces therefore tend to be areas of very rapid change over time. The interface tends to shift dynamically with the outward growth of cities as well as with shifts in populations. Thus, “land that earlier met the definition of peri-urban may become urban whilst truly rural land now becomes peri-urban” (Brook and Davila 2000:3). This dynamism tends to frustrate definitional approaches which attempt to measure the positions of urban-rural interfaces by focusing on the

³ It is important to emphasize the distinction between urban-rural interfaces and suburbs. In spite of the tendency to equate the two, they are not identical. “Suburbs would be more helpfully distinguished as the principally residential areas already forming part of the built up area, the outermost edge of which constitutes the start of the urban fringe”. The urban-rural interface thus comprises “distinctive zones of *mixed character* beyond the suburbs” (Simon 2008:170).

“progressive incorporation of new areas into the urban sphere of influence”. The locations of these zones, as well as their widths, may very well change with time (Simon 2008:171). The intensity of urban pressures acting on the interface as well as rural migrations towards it may lead to rapid changes in these zones over very short periods of time.

The growth of peri-urban interfaces is emerging as one of the most interesting phenomena of the urbanization process in the developing world. At these interfaces, urban and rural livelihoods physically intersect and populations in these areas are said to be “rooted in both of two worlds; the rural and the urban”. The interface is characterized by “flows of produce, finance, labor and services and by processes of rapid economic, sociological, institutional and economic change” (Halkatti, Purushotthaman and Brook 2003:149). Recent approaches at defining the urban-rural interface have therefore focused on a process-oriented definition which identifies these interfaces by assessing changes in land use, availability of services and markets, infrastructural development, exposure to negative environmental effects of urban pollution and production processes and mixed livelihoods. The interface tends to reflect a sort of hybridity characterized by “dynamic blends of lands uses, activities, populations, institutional arrangements, and rural-versus urban oriented allegiances” (Simon 2008: 171). Peri-urban areas are now becoming important locations for the poor in many developing countries especially in Africa as both the urban poor and poor rural-urban migrants move into and settle in these spaces; 40% of Africa’s poor can now be found in peri-urban areas alone (ESMAP 2001).

Peri-urban areas play significant roles in the functioning of larger urban centers. Together with their proximate villages they may provide energy, water,

building materials, ecological services and act as sinks for the disposal of urban generated waste (CICRED 2007). Also to a very large extent, these interfaces remain partially rural in character (especially in the very early stages of their formation and existence) and thus tend to be extremely relevant in terms of rural development and other rural livelihood policies as well (Simon 2008). It must be emphasized that even though village or rural fringe areas may become enmeshed in the urban sphere of influence with the outward expansion of the city and the subsequent extension of the urban-rural interface, these rural areas, having their distinct histories and identities might be keen to safeguard this identity even if their day-to-day lives and activities become somewhat integrated into the urban economic and social system in the course of meeting their livelihoods needs (Simon et al.2003). The persistence of traditional governance systems at these interfaces for instance, is one such expression of the effort of the once typically rural communities to retain their traditional identities in spite of their participation in the larger urban system.

The Global Reach of Peri-Urbanism

Peri-urbanism is experienced in diverse forms in different areas across the globe. Regardless of the nature of peri-urbanism experienced, the phenomenon remains an important one in the developing world context.

Asia

In Asia, the densification and redevelopment of built up areas in towns and cities have played significant roles in the development of informal urban settlements with significant numbers of the population living in slums. It has however been projected that much of the future urban growth in the region will occur in peri-urban

areas. It is projected that by 2025, three quarters of urban growth in Jakarta, over half in Bangkok and 40% in China will occur in peri-urban spaces. In South-East Asia, the term *desakota* was coined to describe the type of urban sprawl occurring at the urban-rural fringe areas. These new urban forms emerged in areas which had hitherto been home to large numbers of rural populations primarily engaged in agriculture (UNHABITAT 2009). The creation of the *desakotas* was driven by a number of factors significant amongst which were the relocation of people from urban centers to the peripheries, the expansion of entrepreneurial and physical development activities from urban into peripheral areas to take advantage of the lower cost of vacant land, the densification of villages in response to growing demand in the fringe areas as well as the gradual de-agrarianization of the hitherto predominantly agricultural rural populations (UNHABITAT 2009). With the juxtaposition of different classes of people, ranging from high and middle income residential dwellers and entrepreneurs with low income informal households, fertile grounds are created for the generation of inequalities, major transformations in livelihood as well as consumption patterns.

Latin America and Caribbean

Similar dynamics of urban growth are seen playing out in the Latin American and Caribbean regions. In the 20th century there has been much densification of the already built-up area through incremental squatting in many Latin American city cores. Rapid urbanization in the face of limited resources and inappropriate and/or insufficient government policies led to the creation of a low and middle-income group which was to a very large extent unable to afford formal housing. Squatting and informal development was commonly practiced by these groups of people in countries like Venezuela and Colombia leading to the degeneration of some portions of the built

area into slums (UNHABITAT 2009). Peripheral growth has been an even more important source of urban growth in the region over the recent decades. In Buenos Aires, Santiago and Sao Paolo, the expansion of metropolitan areas is leading to a gradual incorporation of surrounding villages and towns into the urban sphere of influence, driving significant transformations in these peripheral areas. A similar process is observed in Mexico City where the core built-up area has increasingly lost its population to a surrounding peri-urban area of mixed urban and rural character which saw the most rapid growth between the 1970s and 1990s. An outer peri-urban area further developed beyond this peripheral area between the 1990s and the 2000s, through the further incorporation of rural areas into the metropolitan area with greater outmigration of the growing urban population; this area accounted for a third of total urban growth in the city within the period. Peripheral growth in Mexico City has been accompanied with significant reductions in agricultural activities, growth in manufacturing and housing development, some infrastructural improvements in some areas as well as the creation very large areas of informal and poorly serviced lands occupied by the poor (UNHABITAT 2009).

Africa

Like the other developing regions, Africa is also experiencing significant urban growth. Between the years 2000 and 2010 the percentage of Africa's population living in urban areas increased from 36% to 40%. With an annual urban growth rate of 3.36%, Africa is presently the continent experiencing the fastest rate of urbanization (UNDESA 2011). West Africa particularly is projected to experience a staggering increase in its rate of urbanization over the coming decades. Whereas urbanization proceeded very slowly in the West African sub-region between 1950 (when there was

an urban population of 6.6 million) and 1990, urbanization picked up from 1990 and overtook the continental average. Between 2000 and 2010 alone there was an almost 50% increase in the urban population in the sub-region arising primarily from rapid coastal urbanization.

Associated with this urban change is a significant increase in the growth of informal urban settlements in Africa. Compared to all other regions in the world today, Africa has the largest proportion of its urban dwellers living in informal settlements; 62.2% of the urban population in Sub-Saharan Africa resides in informal settlements (UNHABITAT 2009).

Africa's urbanization has been described as a demographic rather than economic urbanization (Clarke, 1993; Gould 1998; Songsore, 2003) and the peri-urban interface is becoming an important locus for the demographic redistribution associated with this type of urbanization. Urbanization in the region has not been associated with much transformation in productive systems as experienced in most parts of the developed world. Even in some developing countries such as China, peri-urbanization has been associated with the relocation of industrial activities to fringe communities bringing industrial entrepreneurs into the region. This is however not the classic experience in Africa, where the outgrowth of the city has not been associated with much industrial expansion. Urbanization in many parts of Africa has thus been driven predominantly by rural-urban migrations, de-stabilization driven migrations and increases in the natural populations of urban centers (Songsore 2003). Owing to this, the manner in which urban structures have taken in poor rural migrants and the naturally increasing urban population has been entirely different as well. Peri-urban areas are becoming critical locations for the poor in many African countries. Unable to

afford high rents and other urban services, the urban poor, poor rural-urban migrants, and other low income groups migrate to and settle in peri-urban areas which are comparatively affordable and still allow them access to urban centers and the benefits they offer (CICRED 2007). It is therefore not uncommon to find the poor occupying shanties, informal or irregular housing with little or no infrastructure or social services at the urban fringes (Simon et al 2004).

This however should not be taken to mean that the urban-rural interface is only home to the poor. With increasing urbanization and outward growth of the city, some middle-class urban workers may also move into peri-urban communities away from the hustle and bustle of urban life. This, over time, may lead to the creation of a heterogeneous social composition of “small farmers, informal settlers and migrant workers and some urban middle-class commuters” (Arabindoo 2009:880). The conflation of these diverse classes of people at the urban-rural interface leads to the creation of what has been characterized as “mixed spaces” (Dupont 2007 in Arabindoo 2009) where the social and cultural overlap of the rich and the poor “weaves an intricate condition of heterogeneity and segmentation, creating new forms of segregation, polarization and fragmentation” (Arabindoo 2009:880). These dynamics tend to increase the complexity of the social structure encountered in peri-urban areas. In the African context, the relocation of middle-income urbanites into peri-urban communities tends to drive up land prices leading to the subsequent displacement of the poor into newly-forming peri-urban communities or even into the rural areas. The concentration of these heterogeneous social groupings, comprising rural migrants, the urban poor, bourgeois urbanites and peasants with de facto land rights is a defining characteristic of peri-urban communities with the passage of time. This situation could

be problematic considering the diverse and possibly conflicting interests, practices and perceptions that each of these groups of people might have (Arabindoo 2009:881).

Energy Challenges in Peri-Urban Settlements

With the increasing concentration of poor populations in informal urban settlements in the developing world, the challenge of modern energy access which was primarily situated in the rural areas has become an important concern in informal urban settlements as well. In most slum and peri-urban communities, energy sources which have been conventionally classified as traditional such as charcoal and woodfuel remain important sources. Electricity connections are still limited even though illegal connections in slums and increasingly in peri-urban areas are a very common occurrence. For many of the poor living in these areas, this presents a cheaper alternative to the electricity provided through legal means. In peri-urban areas connected to the grid, electricity consumptions may remain significantly low. This, together with non-technical losses, such as results from the non-payment of bills and/or the non- or under-billing of consumption leads to high overhead costs in managing electrified peri-urban communities; this discourages utilities and other commercial energy companies from investing in the electrification of peri-urban areas (ESMAP 2001).

Relevance of the Study

This study attempts to answer the question as to why energy poverty persists as a pressing modern problem in spite of the unanimously accepted importance of energy for development and the numerous interventions adopted to address it. The study not only seeks a better understanding of the energy poverty challenge as presently

experienced but seeks to address some of the theoretical problems relating to how we think about it.

Defined as the lack of access to modern energy forms, particularly electricity, addressing energy poverty has become primarily focused on addressing the challenges that impede the development, adoption and consumption of modern electricity and other modern accoutrements. Such efforts as earlier discussed, have been focused on expanding generation capacity, instituting ambitious electrification programs, promoting power sector financing, stimulating consumer demand, restructuring the power sector, to mention but a few. Undoubtedly, these efforts have to an extent helped in extending the reach of modern electricity to otherwise unserved communities and households. This study however attempts to show that the essential nature of the energy poverty problem does not make it amenable to these conventional approaches alone. Energy poverty is approached in this study as a structural problem, whose structures can be found in the very nature of modern energy-development relations. Thomas Kuhn's paradigm approach is adopted as a tool for critiquing modern energy-development relations.

In spite of the widespread nature of energy poverty across the Sub-Saharan Africa region, the study will attempt to address the issue drawing on experiences with peri-urban energy poverty in Kumasi, Ghana. The peri-urban is chosen as a focus for the study because of the unique opportunity it offers (as will be seen later) for unveiling the paradoxes inherent in conventional energy-development relations. The failure of rural development efforts as well as efforts by governments of African cities to live up to the development by modernization theses is most evident in peri-urban

spaces. These areas thus surface as useful starting points for understanding the contradictions inherent in the present dominant paradigm.

Inasmuch as it is recognized that the dynamics of energy poverty could be very context specific, varying from country to country and region to region, it is hoped that the findings of this study will provide a useful starting point for re-evaluating the traditional questions which have been asked about energy poverty and development in the Sub-Saharan Africa region in general, as well as the approaches which have been adopted in addressing them.

Structure of the Dissertation

This dissertation comprises six chapters. Chapter One serves as an introduction to the research and presents the background to the problem being addressed in the study.

Chapter Two presents the conceptual framework of the study. This chapter discusses how Kuhn's paradigm thesis is employed as a tool for critiquing modern energy-development relations. The application of the Kuhnian approach in assessing the problem of energy poverty in peri-urban spaces is also presented here.

Chapter three presents the methodology of the study. In this chapter a justification for the adoption of the research methods adopted in the study is presented. The design of the field study is also presented here.

Chapter Four presents the macro-context within which energy poverty in peri-urban Kumasi is experienced. The chapter establishes the nature of the paradigmatic worldview which guides energy-development relations in Ghana, its political-economic foundations and how this worldview has functioned in shaping approaches aimed at addressing energy poverty and development in local spaces.

In Chapter Five, there is an assessment of the experiences and challenges that confront real people in meeting their energy needs in a micro-context, Oti in peri-urban Kumasi. This chapter also sets out to make sense of these real life experiences of these people through a consideration of how the macro-context influences and shapes what happens in the micro-context.

Chapter Six serves as a concluding chapter to the dissertation. The lessons learnt from the Kumasi peri-urban experiences as well as the theoretical analyses are collectively used to inform the development of an alternative approach to the problem of energy poverty.

Chapter 2

CONCEPTUAL FRAMEWORK

Kuhn's *Structure of Scientific Revolutions*

The conceptual basis of this study is guided by Thomas Kuhn's "paradigm thesis" propounded in his book *The Structure of Scientific Revolutions*. Here, Kuhn presents a revolutionary historiography of the nature of scientific development which directly challenges conventional knowledge of the nature of scientific advance. Science has historically been perceived as a constellation of facts, theories and methods; scientific development has thus been widely perceived as a process of accretion in which scientists continually add on knowledge to the already existing body of knowledge. Kuhn however offers that a historical consideration of the nature of the scientific research activity itself challenges rather than proves the widely accepted development-by-accumulation notion of scientific advance. Through a focus on the community structure of science and "paradigms", Kuhn presents a revolutionary perspective of scientific development as arising from a staged process of *change* rather than accretion; one in which one knowledge paradigm is replaced with another though a revolutionary process he characterizes as a *paradigm shift*.

The Community Structure of Science

Critical to understanding Kuhn's thesis of the nature of scientific advance is an understanding of the community structure of science. According to Kuhn, the

practitioners of a particular scientific enterprise comprise a scientific community. Because they have common educational and professional training, members of a scientific community are committed to a specific subject matter, having acquired their knowledge by studying the same technical literature which more often than not defines the boundaries of the subject matter that the particular community of scientists focus on. Due to the confinement of the scientific community's perspective to a particular technical orientation on the basis of the training received in that community, different scientific communities "may approach the same subject from incompatible viewpoints".(Kuhn 1962:177). Members of a scientific community commit themselves to pursuing certain shared goals which they consider themselves and are considered by others to be uniquely responsible for; training their successors, amongst other things, is an important aspect of their group commitment.

Kuhn identifies scientific communities of this sort as the producers, validators and articulators of scientific knowledge (Kuhn 1962). What such communities share in common is "a paradigm". Owing to the existence of this shared paradigm, there tends to be what Kuhn calls a "relative fullness" of professional communication and a "relative unanimity" of judgment within a community of scientists (Kuhn 1962). The paradigm primarily directs the activities of the community of scientists themselves, not only the subject matter which their research aims at addressing or articulating. Thus for Kuhn, it is an absolute necessity that paradigm related studies begin with a clear identification of the communities or group(s) responsible for producing and articulating that paradigm.

Paradigms and Paradigmatic Communities

Kuhn defines paradigms as “universally recognized scientific principles that for a time provide model problems and solutions to a community of practitioners” (Kuhn 1962:x). Science is carried out by a community of scientists whose sense of community derives from “an agreement which extends not only to the rules governing inquiry and to stipulations concerning what qualifies as a scientific question and counts as a scientific answer, but extends as well to the particular theory which is accepted as true by the members in their research and investigations” (Wolin 1968:166-167). Gutting identifies a paradigm as a super theory which offers “a distinctive way of seeing all the phenomena within its domain” (Gutting 1980:12). Implicit in the acceptance of a paradigm is the acceptance of a comprehensive worldview under which is subsumed distinct methodological rules, scientific and metaphysical principles as well as values (Gutting 1980). A paradigm thus provides the “consensual basis which consolidates the loyalties and commitments of its members” (Wolin 1968:167). Within a given scientific community, the paradigm serves as the arbiter of what comprises significant scientific activity by guiding choices as to what constitutes valid problems and solutions in that paradigm (Wolin 1968). The unanimous recognition of the authority of the paradigm within the scientific community is an important indicator of a mature science.

Characterization of Paradigms

Kuhn adopts the term “disciplinary matrix” to capture the nature of paradigms as comprising a collection of ordered elements which serve as objects of group commitment for a community of practitioners. He identifies various elements of the disciplinary matrix. The first of these elements he identifies as symbolic

generalizations. Symbolic generalizations are the formal parts of the disciplinary matrix which can be represented either in symbolic forms or as statements of fact. These generalizations serve both as laws of nature as well as definitions of the symbols they represent. The general acceptance of such symbolic generalizations by a community of scientists provides a basis for the utilization of “various techniques of logical and mathematical manipulation” in addressing the problems of their particular discipline (Kuhn 1962:183).

A second element of the disciplinary matrix Kuhn identifies as “metaphysical paradigms or metaphysical parts of paradigms” (Kuhn 1962:184). This includes commitments to widely accepted beliefs in particular models including relatively heuristic ones. Such models are useful for providing a particular scientific community with a collection of analogies and metaphors that enable it to clearly define what will account as acceptable explanations and solutions to the problems encountered by scientists in that particular discipline.

A third element of the disciplinary matrix is values. Values are important in providing a sense of community for scientists since they tend to be much more widely shared than both generalizations and models amongst different communities. There are important values relating to the judgment of a theory by a community of scientists as well as regarding the nature of scientific predictions (Kuhn 1962).

Paradigms as Exemplars

The fourth component of the disciplinary matrix Kuhn characterizes as exemplars and it emphasizes the importance of *concrete examples* in the advancement of knowledge in a community of science. Science is generally perceived as a theory and rule-based discipline; the ability of a scientist to address scientific problems in this

sense is seen as resting in his ability to study and understand certain theories together with the rules that govern the application of that theory. Kuhn however offers that the situation of the cognitive content of scientific knowledge in theories and rules alone tends to blur the all important role of examples in the generation of scientific knowledge.

When faced with problems, students of science, tend to see such problems as ones earlier on encountered. Scientists tend to identify a resemblance between new problems and those previously encountered with the aim of drawing analogies between distinct problems; the scientist tries to make sense of a new problem in a way which has proven to be effective in the past. By working on exemplary problems, scientists acquire the ability to perceive various situations “as like each other and as subjects for the application of the same scientific law or law sketch” (Kuhn 1961:189). By the time a scientist completes a couple of problems, which may vary significantly from one individual to another he is able to perceive “the situations that confront him as a scientist in the same gestalt as other members of his specialists’ group...he has assimilated a time-tested and group licensed way of seeing” (Kuhn 1962:189). Thus in solving problems scientists are found to model those problems on the basis of prior puzzle-solving experiences. Acquiring scientific knowledge is therefore not limited to the acquisition of rule-based knowledge through verbal means alone but also through the careful consideration of concrete examples of how such rules play out in reality. Kuhn considers exemplars to be the most important component of the disciplinary matrix. They, according to him provide the “the community fine structure of science” (Kuhn 1962:191). The knowledge generated from the study of exemplars is tacit knowledge. Kuhn reiterates the fact that by emphasizing the significance of

knowledge embedded in shared examples i.e. tacit knowledge, he does not attempt to sanction a recourse to a less systematic and less cerebral system of knowledge. He states:

“I am not referring to a mode of knowing that is less systematic or less analyzable than knowledge embedded in rules, laws or criteria for identification. Instead I have in mind a manner of knowing that is misconstrued if reconstructed in terms of rules that are first abstracted from exemplars and thereafter function in their stead”.(Kuhn 1962:192)

The techniques that permit a member of a scientific community to grasp and apply the shared and tested possessions of that community does not arise from individual intuition but are acquired through the training received by such an one in preparation for his joining the membership of that particular community. Members of a particular community are taught to “see the same thing when confronted with the same stimuli” by being exposed to numerous examples of what their predecessors have learned to see “as like each other and as different from other sorts of situations” (Kuhn 1962: 194).

Anomalies and Crises

Scientists working within an established paradigm are said to be engaged in “normal science”; their research tends to be grounded on “one or more past scientific achievements...achievements that they acknowledge as supplying the foundation for further practice” (Kuhn 1962:10). The scientific community becomes engaged with working out the paradigm by concentrating on one of three components of factual research; rigorously establishing the class of facts encompassed by the paradigm, drawing correspondence between facts and the predictions of the paradigm and most importantly, articulating the paradigm (i.e. resolving some of its inherent ambiguities

and addressing the problems brought to light by the paradigm) (Kuhn 1962; Wolin 1968). By concerning themselves with these components of factual research in the conduct of normal science, scientists become involved with fleshing out the details of the grand picture that the paradigm presents; a practice Kuhn refers to as *puzzle solving*. According to him, a scientist engaged in normal science is usually guided by a solid framework of conceptual, theoretical, instrumental and methodological commitments which clearly define for the scientist “what both the world and his science are like, so he can concentrate with assurance upon the esoteric problems that these rules and existing knowledge define for him. What then personally challenges him is to know how to bring the residual puzzle to a solution” (Kuhn 1962:42). The conduct of research in the normal sense therefore, does not result in the production of any major conceptual or phenomenal novelties.

In the pursuit of normal science, a scientist may encounter facts which are inexplicable within the prevailing paradigm; nature is in this case said to have “somehow violated the paradigm-induced expectation that govern normal science” (Kuhn 1962:53). These violations of the paradigm’s expectations generate what Kuhn describes as *anomalies*. Anomalies in a particular paradigm may not always be uncovered by the scientific community that subscribes to that paradigm. Scientists working on completely different sets of problems may discover facts which may put the factual basis of some other paradigm into question and spur on investigations within that paradigm. There is increasingly a shared sense of new ideas which have no factual evidence in the prevailing paradigm; the paradigm provides “all phenomena *except anomalies* with a theory-determined place in the scientists field of vision” (Kuhn 1962:97). In spite of the fact that the pursuit of normal science tends to limit the

scientists field of vision, leaving him to consider only those facts amenable to the operative paradigm, it is this very characteristic of normal science which facilitates the identification of anomalies when they do occur. The articulation of a paradigm in the pursuit of normal science leads to the generation of detailed information about a particular phenomenon and a corresponding heightened precision of the observation-theory match. It is the perfection of this specialized apparatus for predicting and anticipating specific observation-theory matches which facilitates the identification of anomalies when they are encountered. For novel facts and ideas arise only when “the man, who knowing with precision what he should expect, is able to recognize that something has gone wrong”(Kuhn 1962:65). Faced with an anomaly, a community of scientists’ immediate response is to treat it as another puzzle of normal science; the scientific community becomes engaged in modifying and further articulating those conflicting aspects of the paradigm in order to accommodate the new facts. However if those facts are unable to be accounted for within the confines of the given paradigm, they necessitate further exploration of the area of the anomaly resulting in the pursuit of *extraordinary research* (Kuhn 1962).

Competing theories may be propounded in response to the anomalies identified in the existing paradigm. The proliferation of such competing theories is evidence of a *crisis*. Even though the identification of an anomaly does not always lead to a crisis, when they do occur, crises are particularly significant in making evidently clear the need for a redefinition of the existing paradigm (Kuhn 1962). “The proliferation of competing articulations, the willingness to try anything, the expression of explicit discontent, the recourse to philosophy and to debate over fundamentals” (Kuhn 1962:91) are, according to Kuhn, symptomatic of the need for a transition from normal

science to what he calls extraordinary research. The articulation of different versions of the same theory aid in weakening the established paradigm; it tends to blur the rules that govern the prevailing paradigm and in the process may break down consensus between practitioners in the field. Formerly accepted standards and rules of scientific practice may then be called into question. The response to crisis of this nature may be one of three forms; the problem may resist all alternatives, it may be treated as a special case to be handled by future tools to be developed within the prevailing paradigm or may lead to the birth a new paradigm entirely different from the existing paradigm (Kuhn 1962).

Paradigm Shifts and Revolutions

Kuhn calls the shift from one paradigm to another a *revolution*. He uses the term revolution to characterize the nature of these shifts on the basis of parallelisms between scientific and political communities (from which the word revolution originated). Central to both forms of revolutions is a fundamental sense of malfunction which drives the search for alternatives. The second type of parallelism between political and scientific revolutions provides profound and significant information about what the essential nature of a scientific revolution is. Political revolutions attempt to change existing political institutions in ways which are otherwise unacceptable within the confines of existing political institutions. Like scientific communities, a crisis and that alone succeeds in attenuating the institutions in any given political arrangement. Individuals in a political community may become dissatisfied with certain or all the institutional arrangements of that community and as this disaffection increases with a deepening of the crises, individuals who have by now become estranged from the existing political order may begin to suggest and take steps

towards the reorganization of society on the basis of a new institutional framework. The particular political society may thus become polarized with some section of it supporting the existing institutional framework and another supporting a new one. The resulting polarization tends to erode the supra-institutional framework around which society coalesced. In its place, supporters of competing parties or institutions may resort to persuasion and in some cases force in an attempt to adjudicate the revolutionary difference. In much the same way, the choice between scientific paradigms also tends to be a choice between “incompatible modes of community life” (Kuhn 1962:94).

According to Kuhn, it is the logical incompatibility that exists between a prevailing paradigm and an incoming one which permits the incoming one to serve as a resolution to an observed anomaly in the existing paradigm. Owing to the logical incompatibility of the two paradigms, the assimilation of the newer paradigm necessitates the displacement of the earlier paradigm. Thus revolutions do not merely result from the evaluative procedures (i.e. logic or experiments) characteristic of normal science but come to entail “techniques of effective persuasive argumentation” (Kuhn 1962). It should be emphasized that because paradigms define appropriate methods, problem-fields as well as acceptable solutions for a given scientific community, the replacement of one paradigm with another also necessitates the redefinition of the corresponding science. According to Kuhn, “some old problems may be relegated to another science or declared entirely unscientific. Others that were previously non-existent and trivial may, with a new paradigm, become the very archetypes of significant scientific achievement” (Kuhn 1962:102). Thus, the transition from one scientific paradigm to another in the aftermath of a crisis does not

progress as a cumulative process through the extension or further articulation of the existing paradigm but rather entails a “reconstruction from new fundamentals; a reconstruction that changes some of the field’s most elementary theoretical generalizations as well as many of its paradigm methods and applications...when the transition is complete, the profession would have *changed its view of the field, its methods and its goals*”(Kuhn 1962:85). The new normal-scientific tradition that emerges from such a revolution is thus incompatible and incommensurable with that which was before it (Kuhn 1962).

What happens in revolutions are *not mere changes in the interpretations* afforded to phenomena by scientists. According to Kuhn, a scientist interpreting data or observations makes such interpretations within the confines of a particular paradigm. Interpretations are part of normal research and function to further extend and articulate that particular research paradigm. It is the perfection of this practice which leads to the identification of anomalies when they do exist as well as subsequent crises. Anomalies and crises, as earlier mentioned are not terminated by further interpretation and deliberation within the anomalous paradigm but are terminated by sudden and usually unstructured revolutionary changes in paradigm. By accepting a new paradigm, a scientist rather than serving as an interpreter is confronted with a completely different worldview. “Confronting the same constellation of objects as before and knowing that he does so, he nevertheless finds them transformed through and through in many of their details” (Kuhn 1962). Thus rather than the mere reinterpretation of stable data, what actually happens with the occurrence of a scientific revolution is that scientists may actually see different data; challenging any perceptions of the supposed unequivocal stability of such data. There

is a complete shift in the network of fact and theory that the scientist attempts to fit to nature. Observations such as these may cause the scientist to see the “world of their research experience very differently” (Kuhn 1962:111). Since a scientist’s research experience is influenced both by his environment and by the normal-scientific research tradition he subscribes to, there is the need to re-educate the scientist’s perception of his environment when the normal-scientific tradition he subscribes to changes with the occurrence of a scientific revolution. This is because in a revolution, “theories do not evolve to fit facts that were there all the time. Rather, they emerge together with the facts they fit from a revolutionary reformulation of the preceding scientific tradition, a tradition within which the knowledge-mediated relationship between the scientist and nature was not quite the same” (Kuhn 1962:140). Scientists may thus be said to be responding to a very different world after the occurrence of a revolution. The new research tradition created here will become incommensurable with that to which the scientist previously belonged. The consequence of this is that scientists and schools of thought guided by different paradigms will always tend to be at cross-purposes with each other. Once a new paradigm is established after a revolution, the interpretation of data is now employed by the scientist to further explore and articulate the paradigm (Kuhn 1962).

The Interdisciplinary Applicability of Kuhn’s Paradigm Theory

Kuhn’s transformative thesis of the nature of the development of scientific knowledge stimulated discussions as to whether or not the development of other disciplines could be accounted for in the same sense. Kuhn’s reference to the social sciences as a “pre-paradigmatic science” owing to its lack of a firm research consensus (Kuhn 1962:15) created an important locus for debating the “scientificness” of the

social sciences. In the natural sciences, the paradigm's function in generating consensus is essential for understanding scientific advance; the lack of such consensus in the social sciences has made the applicability of the Kuhnian perspective to understanding the development of the social sciences rather problematic.

The difficulty of tracing counterparts of the Kuhnian paradigm approach in the development of the social sciences does not however imply the inapplicability of the approach to other contexts⁴. According to Gutting, some non-scientific communities actually do embody a type of consensus which bear striking similarities to those experienced in the natural sciences as described by Kuhn (Gutting 1980). Gutting thus offers that social scientists would have had more success searching for paradigms “not amongst themselves, but *amongst the communities* that they study”(Gutting 1980:15). Historians and political scientists have, in this vein suggested the profitability of searching for paradigms not in history or political theories per se but in the political groups studied by history and political theory (Gutting 1980; Wolin 1968).

⁴ In fact, Kuhn himself offers that the interest by some in exploring the applicability of his thesis to other fields of study arise from the very fact that his portrayal of the development of science as a “succession of tradition-bound periods punctuated by non-cumulative breaks”(Kuhn 1962: 208) embodies a thesis which has a wide applicability. He acknowledges that different historians of music, literature art and politics have already adopted this approach of periodization “in terms of revolutionary breaks in style, taste, and institutional structure” as fundamental tools in their studies (ibid) Thus, the novel thing about his work, he offers, is the application of the thesis to the field of science which had for a long time been known to develop along an entirely different trajectory.

Kuhn and Political Societies

Wolin (1968) attempts to draw an analogy between political theories and scientific paradigms, but clearly calls for the adoption of Kuhn's paradigm approach in the analysis of *political societies*.

“My proposal is that we conceive of political society itself as a paradigm of an operative kind. From this viewpoint society would be envisaged as coherent whole in the sense of its customary political practices, institutions, laws, structure of authority and citizenship, and operative beliefs being organized and interrelated. A politically organized society contains definite institutional arrangements, certain widely shared understandings regarding the location and use of political power, certain expectations as to how authority ought to treat members of society and about the claims that organized society can rightfully make upon its members” (Wolin 1968:183).

Given the organized and interrelated system of beliefs that a society possesses and the commitment of its members to particular beliefs and expectations, it may be safely concluded that society in this sense “believes itself to be one thing rather than another; a democracy rather than a dictatorship, a republic rather than a monarchy, a directed society rather than a free one” (Wolin 1968:184). Inasmuch as a society conducts its political life within the confines of these unanimously accepted beliefs, those ensemble of beliefs may be said to constitute a paradigm of an operative kind. Analogous to a scientific community's fundamental instrumentalities and how they are employed are the societal rules and systems of enforcement that characterize a political society. Within the political society, there are normative standards as to what constitutes permissible action and what does not, as well as the individual and group actions which will be promoted, tolerated or suppressed. Furthermore, in deciphering the course of future actions, society employs a “complex organization of politics through legislatures, political parties and the media of opinion” (Wolin 1968:184) in determining what direction society should take. “A society which is operating fairly

normally has its theory in the form of the dominant paradigm, but that theory is taken for granted because it represents the consensus of society” (Wolin 1968:186).

Just as scientific communities in the Kuhnian sense may be confronted with challenges or novelties which the community may attempt to address through puzzle solving, political societies also, from time to time may experience some changes within the society; there may be the emergence of new social classes, religious and/or racial groups and classes or new economic relationships (Wolin 1968). A political society may be seen as operating in a manner analogous to Kuhn’s normal science provided it is able to solve these puzzles and “make minor adjustments in the paradigm to accord with these new facts brought about by social change” (Wolin 1968:185). In response to these social transformations, the political society might adapt its posture to accommodate these changes and so far as such efforts are successful they may be compared to the puzzle-solving activity of Kuhn’s scientific community. Wolin illustrates this point with an example from nineteenth century England where growing self-consciousness from the working classes, accompanied with their demand for reforms of the suffrage laws challenged England’s profession of being a society with “representative institutions and guaranteed liberties” (Wolin 1968:184). England as a political society had to alter its perception of the facts in order to accommodate the reforms that the working classes demanded. In Wolin’s words, “the facts had to be viewed differently for the paradigm to be altered accordingly and this resulted in a change in the facts themselves” (Wolin 1968:184). Thus in nineteenth century England, new voters were created in altering the existing paradigm to accommodate the new suffrage reforms. It is important to indicate that, in much the same way that Kuhnian normal science may be impatient with philosophy,

considering it to be a distraction of energies away from valuable puzzle-solving activities, political societies also view political philosophy as unwelcome distractions, especially when such philosophies attempt to challenge some of the grounded fundamental assumptions which characterize that particular political society. Rather, political societies are usually preoccupied with working out the practical puzzles on the basis of the prescription of the paradigm operative in society.

Like the dissatisfaction that occurs amongst scientists when they are unable to solve puzzles within a given paradigm during a *crisis* in the development of scientific knowledge, political scientists have also been grossly dissatisfied with and heavily criticized the inability of some traditional political theories to provide “operational theories for investigating specific problems” (Wolin 1968:182) in the world. The attempt to provide answers to the problems the traditional theories had failed to address led to the generation of many great theories. In the Kuhnian sense, these major theories may be thought of as resembling extraordinary science arising in response to a crisis. The emergence of these new theories has not been prompted by methodological failures in the existing theories but in their inability to provide a response to a crisis in the world. Wolin thus states:

“It was not a methodological breakdown that prompted Plato to commit himself to the *bios theoretikos* and to produce the first great paradigm in western political thought; it was instead the breakdown of the Athenian *polis*. Again it was not the simple desire to replace theological with Aristotelian methods that led to the *Defensor Pacis* but a continuing crisis in the relations of church and state....The intimate relation between crisis and theory is the result not only of the theorists belief that the world is deeply flawed but of his strategic sense that crisis and its usual accompaniments of institutional collapse and the breakdown of authority, affords an opportunity for a theory to re-order the world” (Wolin 1968:182).

Kuhn and History

“The Structure of Scientific Revolutions has become a major text for interdisciplinary discourse...Kuhn’s audience beyond history and philosophy comes to him for what he says, or implies, about the relation of permanence to change, knowledge to culture and history to value”...(Hollinger 1970:196).

Hollinger offers that the interest of historians in Kuhn’s *Structure of Scientific Revolutions* stems from the fact that his propositions about what happens in scientific communities can be applied to non-scientific communities. According to him, Kuhn’s description of the nature of scientific advance within scientific communities can be heuristically adopted as a methodological postulate in understanding the organization and functioning of other non-scientific communities (Hollinger 1970). He suggests the utility of the Kuhnian approach in understanding the dynamics of change in historical societies.

By appropriating Kuhn’s ideas in historical studies, historians do not seek a scientific explanation of their discipline, but seek to put to good use the inherent value of the historical sense of development that Kuhn’s thesis embodies (Hollinger 1970). Historians have found Kuhn’s sense of historical development particularly useful in understanding what tradition is, its sustaining conditions and the relation between tradition and change (Hollinger 1970: 196). For the historian, the notion of paradigm captures the definition of tradition as comprising the defining principles and instruments with a proven ability to organize the experiences of given social constituencies (Hollinger 1970:197) by creating the sustaining conditions that enable communities to carry out the common activities that afford them their unique identities as communities. Tradition in this sense is grounded in society and serves as the framework for social organization. Usually, a society has devices and other structures

of enforcement such as formal and informal institutions, abstract principles, as well as concrete examples of how problems have historically been solved in that society. The traditions and its organizing devices of society may encounter contingent experiences which may require the expansion or adaptation of those traditions; usually traditions may be flexible enough to survive such adaptations without losing their constituency. Thus change is possible in tradition; but such changes are only possible if the principles and tenets of an operative tradition can be altered to account for new experiences in society without it losing its identity. Such innovations in the existing tradition are done with utmost care; “they are energized by an essentially conservative instinct, to maintain the viability of tried-and-true ways of acting and thinking” (Hollinger 1970: 198). This is analogous to the puzzle solving activity of the scientific community in the conduct of normal science.

Occasionally, however, traditions do lose their constituencies. And here, historians find Kuhn’s notions of normal science, anomaly, crises and paradigm-shift particularly compelling in furnishing an understanding of how prevailing traditions may sometimes lose their constituencies and transition into new ones. Traditions may sometimes be faced with problems and challenges which may defy all attempts at a resolution. The conventional organizing devices of society, irrespective of how they may be stretched may encounter certain challenges within society which they are unable to account for or solve. Such experiences may take many forms; a particular society may encounter conditions which are of an absolutely different kind from what existed at the time of the institutionalization of that tradition. Secondly, upheavals in one aspect of the community’s social life such as a political upheaval may resonate in other areas such as the religious or economics lives of a people. Alternatively,

novelties in another culture next door which may be difficult to ignore or overlook may stimulate novelties in another society's traditions. Lastly, dynamics from within an existing tradition itself may suddenly unearth problems that cannot be addressed by that tradition. The unaccountable experiences represent anomalies in the Kuhnian sense. Over the years of a tradition's existence, its organizing devices (by the retooling and adjustments they encounter in addressing some of the society's challenges) are able to acquire a degree of precision that permits them to identify an 'unorganizable' experience when they come into contact with one.

Unable to deal with these anomalous or unorganizable experiences, a society is thrown into a state of disorder, a crisis, and must seek alternative ways of re-organizing itself to deal with the crisis. Rather than seeking to further alter the existing tradition and its devices which have at this time proven to be ineffective, society embarks on a conscious search for novel devices for organizing society; there is a deliberate proliferation of alternatives other than that espoused by the operative paradigm. Here, "a community's entire store of cultural resources may be ransacked before a consensus begins to emerge that certain proposed devices are superior to others. The more complete the consensus, the greater the stability the community enjoys and the more likely it is that the new organizing devices will become traditional"(Hollinger 1970:199). Along these lines therefore, Hollinger identifies five stages of change that communities may go through in transitioning from one tradition to another; "1) secure tradition; 2) novelty and confusion; 3) disagreements as to whether to resist innovation or encourage it, and if the latter in what direction; 4) coalescence around a candidate which might become another 5) secure tradition" (ibid). He maintains that not all communities successfully go through all five changes

in traditional change; for some, the state of confusion permanently remains with such communities never reaching what might be characterized as a complete revolution (Hollinger 1970:199).

The Kuhnian Approach in Energy-Development Studies

It is the versatility and invaluable utility that Kuhn's approach affords in understanding non-scientific communities, change, and the essential nature of change that this study seeks to employ. Of particular importance is the usefulness of the paradigm approach in understanding societies as constituencies guided by *worldviews* which serve as the basis for guiding social action and maintaining consensus. Kuhn's notion of the indispensability of revolutions to paradigm shifts is also instructive of the nature of change as embodying fundamental shifts in worldviews. This study attempts to utilize these and other elements of the Kuhnian approach as a conceptual apparatus for exploring the energy poverty problem as experienced in a typical peri-urban space, the factors that generate and sustain it and the opportunities that exist for developing viable solutions to the problem. The coming sections engage a series of discussions which provide the groundwork for understanding how the Kuhnian approach is employed in exploring peri-urban energy poverty as a pressing problem of modern development efforts.

Development and the Modern Energy System

The term "development" was originally defined as a process through which the "potentialities of an object or organism are released, until it reaches its natural, complete full-fledged form" (Esteva 1992:8). It was commonly utilized to metaphorically describe the natural growth of plants and animals in the biological

sciences. With the introduction of Darwin's theory of evolution, the application of the term development in the biological sciences was shifted from a focus on a transformation towards an *appropriate form* to a focus on a transformation towards an *ever more perfect form* (Esteva 1992: 8). The extension of the term to the social sphere was pioneered by Justus Moser, the founder of social theory, who sought to describe social change as resulting from a process analogous to natural processes; social change was perceived as a continuation of natural change (Esteva 1992).

These early notions of development are fundamentally different from the modern conception and utilization of the term in the social sphere. Aside the primacy given to human subjects as the authors of their development and not some natural order, development has come to embody distinct prescriptions for organizing social life and the human experience whilst simultaneously defining the ends of such. The modern conception of development now embodies the pursuit of economic growth through technological advancement in an industrial economy. Thus amongst the definitions of development offered in the Cambridge Dictionary, is one which defines development as the “the planned increase of a country's industry and wealth” (Cambridge Dictionaries 2011⁵). Underdevelopment, in the social sphere, is also now associated with a “relatively low economic level of industrial production and standard of living (as from lack of capital)” (Merriam Webster Dictionary 2011⁶). So-defined, development is now extendable to groups of people without the appropriate form of economic and industrial productivity; the so-called underdeveloped or developing

⁵ <http://dictionary.cambridge.org/> Cambridge Dictionaries Online; Cambridge University Press

⁶ <http://www.merriam-webster.com/> The Merriam-Webster Dictionary

countries who also now aspire for the attainment of the state of being developed. In this way, development became an all encompassing phenomenon. It “converted history into...a necessary and inevitable destiny. The industrial mode of production, which was no more than one among many forms of social life, became the embodiment of the terminal stage of a unilinear mode of social evolution” (Esteva 1992: 9).

The pursuit of economic growth for development through the institution and expansion of modern large-scale industrial production could not be achieved without the existence of an energy system which not only provided the vast amounts of physical energy needed to drive the industrial engine but also integrated the quantitative logic so pertinent to the operation of the modern regime. Centralized large-scale energy systems undoubtedly became the energy systems of choice for supporting the ideals of the modern industrial culture. In this way, modern development became inseparable from the modern energy system. This relationship between development and the modern energy system has been described as a coevolutionary one (Norgaard 1994; Byrne et al. 2006) in which the two reinforce each other in a synergistic manner (Byrne, Toly and Wang 2006).

The origins of this coevolutionary and/or synergistic relationship between energy and development can be traced as far back as to the period of the industrial revolution. Mumford documents the changes that occurred within societies, and between societies and their energy systems with the birth of the industrial revolution. According to Mumford (1946), the industrial revolution was made possible by very fundamental transformations which paved the way for the era to be ushered in. Predominant amongst these, were the transformation of economies and the power

complex around which life and society were organized. The fossilization of the energy system radically transformed the productive capabilities of industrial society. The limits imposed by the social rhythms which previously governed the rates and extent of energy exploitation and utilization were transcended, permitting the replacement of a subsistence economy with a modern surplus economy (Byrne et al. 2002). Increasing energy production and consumption for the attainment of massive economic growth was the mandate of modernity (Byrne and Toly 2006). And in living up to the modern mandate, the modern energy system and the capitalist political economy joined forces in “a promise to provide every material advantage, every intellectual and emotional stimulus [one] may desire, in quantities hardly available hitherto even for a restricted minority” (Byrne and Toly 2006:3) This was the ultimate expression of progress. For proponents of the progress thesis, the pursuit of progress through the institution of the industrial social system based on production and economic increase was necessary for the ultimate liberation of humanity (Saint Simon 1975).

In its synergistic association with other elements of modernity, the modern energy system assumed a social role. The indispensable role played by modern energy in “creating and integrating the quantitative and transcendent logic which catalyzed the economic and technological forces underpinning industrial and post industrial societies” cannot be overemphasized (Byrne, Toly and Wang 2006). The modern energy system’s social role in creating and sustaining this quantitative logic in its association with other elements of modernity is captured thus by Mumford(1961):

“Quantitative production has become, for our mass-minded contemporaries, the only imperative goal: they value quantification without qualification. In physical energy, in industrial productivity, in invention, in knowledge, in population the same vacuous expansions and explosions prevail”(Mumford 1961:570).

Also importantly, the modern energy-economy complex has now become an important mediator of social relations (Mumford 1946; Byrne and Toly 2006). The technological innovation which accompanied the industrial revolution facilitated the development of new machine energy converters, the first of which was the steam engine. These developments did not only lead to a radical break with the primacy of biological energies; it also resulted in significant upheavals in the relation between humans and energy. “Whereas the clock, the windmill, the watermill used the forces of an environment left unchanged, whereas the fire machine consumes the matter from which it drew its energy, the new energy chains would call for ever heavier investments and the mobilization of steadily greater scientific and technical knowledge. Thereafter energy would become a matter for investors, scientists and engineers. It would constitute an independent and autonomous sector that would play a decisive role in regulating the new economy” (Debeir, Deleage and Hemery 1996:87).

Energy- Development Relations as a Paradigm

The modern energy-development complex and its engineering of social relations has resulted in the creation of a *global order* “operating on the quantity-based logic of modernity; that more, faster and bigger are better” (Byrne, Toly and Wang 2006:x). Quantitative increase and the drive for efficiency pervade every aspect of the human experience mediated by the modern energy-development complex. The global order created by this complex now serves as an unspoken but generally accepted consensus which forms the basis for organizing energy systems, economies and societies for the attainment of modern progress. It is the consensual capability inherent in the energy-development complex that permits its characterization as a paradigm. Of dire relevance in the creation of this global order was the establishment of an

institutional framework, which successfully systematized a quantitative political economy and efficiency as the ultimate goals to which all of society is to ascribe.

In the developing world, the modern energy-development paradigm now constitutes the worldview within the confines of which the aims and conditions surrounding the lives of individuals are determined. Development is institutionalized as a specific way of doing things and organizing society for the attainment of the paradigm's paramount ends; quantitative increase and efficiency. Sachs' proposition that development "is a way of thinking", rather than a mere strategy or program lends support to this claim (Sachs 1993:33).

The modern energy system's unique ability to support the quantification and efficiency ethos of progress justifies its partnership with modern development. The ability to support an industrial mode of production for economic growth and consequent social progress distinguishes the modern energy system from "traditional" energy systems unable to support the modern modes of production. Grid electricity plays a particularly significant role in supporting massive economic expansion in the manner considered technologically and economically superior. Modern energy thus reinforces the quantification and efficiency ideologies which modern development sanction; it also derives its legitimacy as modernity's choice energy system by making possible the attainment of the aspirations of the modern development regime.

The paradigmatic nature of the modern energy-development nexus has profound implications for development practice. By serving as an overarching framework for guiding action, problems encountered within the paradigm tend to be defined in a particular way, specific ways of addressing identified problems are privileged over others, which in turn necessitates the inclusion of specific groups of

actors in addressing the problem whilst simultaneously relegating other actors to the background (Sachs 1999).

Paradigmatic Theories of Development and their Energy Parallels

With the synergistic association between energy and development now established, I turn to a discussion of how this paradigm has influenced dominant theories in energy and development. Even though distinct theories of the modern energy-development complex may not be directly identifiable, the interconnectedness of the two permits the drawing of energy parallels of dominant development theories; that is to say, given the existence of the energy-development nexus, trends as to how development theories condition thinking about energy systems and their roles in mediating social development can be gleaned from general assessments of dominant development theories. The parallels drawn also help to paint a better picture of the respective roles of energy systems and development ideas in this synergistic association.

The Growth Pole Theory

This theory of development also called the trickle-down theory was very important in early development efforts in the aftermath of the Second World War. There was a firm belief during this period that rapid economic growth “especially in modern, organized, large-scale industrial activity” in the developing world would lead to an improvement in welfare and alleviate the deprivation of the peoples of these regions (Streeten 1979:29). Trickle-down theorizing offered that “rapid gains in overall and per capita GNP would either trickle down to the masses in the form of jobs or other economic activities to create the necessary preconditions for the wider

distribution of the economic and social benefits of growth” (Todaro 1981:68).

Industrialization and urbanization were core elements of this modernization perspective. The belief in the ability of economic growth to trickle down from urban centers to rural surroundings was based on three fundamental premises.

The first was the premise that the benefits of economic growth would always trickle down to the poorest segments of society. This premise was grounded on a faith in the ability of market dynamics, increased labor demand, increased productivity, increased wages and lower prices of goods to realize a fair distribution of whatever economic growth would accrue from national development projects. The concept offered that increasing industrialization and modernization in the urban centers would attract subsistence and landless rural farmers into urban centers where they could be engaged in economically viable activities thus undoing the inequality that existed between the urban and rural areas. Influential economists such as William Arthur Lewis played invaluable roles in promoting this development perspective. Based on his reading of British economic history and the work of early classical economists, Lewis proposed that the two fundamental and most significant factors which had fuelled the industrial revolution, the availability of vast supplies of labor in the agricultural sector and the willingness of business owners to reinvest their capital for business expansion could be transported to the Third World to promote development in the region. In his much acclaimed piece, *Economic Development with Unlimited Supplies of Labor*, Lewis offers that for the developing countries which have large populations relative to their natural resources and capital there exists “large sectors of the economy where the marginal productivity of labor is negligible, zero or even negative...as seen in the agricultural sector...and also to the whole range of causal

jobs- the workers on the dock, the young men who rush forward asking to carry your bag as you appear, the jobbing gardener... and petty retail trading” (Lewis 1954:402). In these economies the price of labor is said to be at the subsistence level and for as long as it remains so, the supply of labor is said to be unlimited, if the cost of labor at this price exceeds demand (Lewis 1954). For Lewis, it was the attraction of this surplus labor from the traditional sector into the modern industrial sector which would serve as the driver of economic modernization. Once the profits from the modern businesses were reinvested into the economy, there would be an expansion in the modern economy until all the cheap labor which had originally been trapped in the traditional sector was completely absorbed by the rapidly modernizing economy. Once labor is no longer a surplus, the dual nature of the economy is undone; workers are able to take above-subsistence wages having now transitioned from the traditional into the modern sector. In the Lewis model, income disparities and inequalities were expected to accompany the very early stages of economic growth; in fact “it demanded them” (Tignor 2005: 95). Inequality in this sense was useful if it led to the creation of a capitalist class; “a group of men who think in terms of investing in capital productivity” (Lewis 1954).

The economic growth=poverty alleviation equation which guided earlier development efforts was also centered on a second premise that “governments were democratic, or at any rate concerned with the fate of the poor, and will extend the benefits of growth by policies such as progressive or social services” (Streeten 1979:29). Thus, in the event of the failure of market forces to effectively allocate resources equitably between the rich and the poor, it was believed that developing country governments would correct for these market imperfections.

The third justification for the growth pole approach to development rested on the belief that the initial stages of development had to be concentrated on the development of infrastructure and the productive capacities of economies. Even though the poor could get poorer within this period of rapid expansion, it was believed that the wealth accumulated in the stages of rapid economic expansion would eventually benefit the poor. This third view was founded on the propositions of the Kuznet's curve⁷ which significantly influenced development practice during that period.

Thus, the growth pole approach to development was concerned with *what* development entailed and *where* development took place. Implicit within the concept was the idea that development entailed the creation of a modern industrial economy. Also implicit in the concept was the notion that the concentration of development efforts in the urban cores would inevitably lead to rural development on both regional and local scales (Unwin 1989).

⁷The Kuznet's curve was developed by Simon Kuznet in 1955 after observing the decline in income inequality in England, Germany and the United States (Williamson 1991). The hypothesis states that "income inequality should follow an inverse U-shape along the development process, first rising with industrialization and then declining as more and more workers join the high-productivity sectors of the economy" (Picketty 2006:63). Thus if least developed countries strongly pursued a rapid development agenda without too much focus on the short-run social costs of development, they would inevitably arrive at a point where growth could be achieved alongside reductions in inequality with very drastic reductions in the levels of poverty (Picketty 2006).

An Energy Parallel of the Growth Pole Theory of Development

Inherent in the concentration of the growth pole theory on development through rapid economic growth ‘especially in modern, organized, large-scale industrial activity’ (Streeten 1979:29) is an unspoken prescription of the nature of the energy system needed to support modern development. Large scale industrial activity necessitates the adoption of large scale energy systems able to support the scale of economic development the growth pole theory sanctions. Centralized power grids are the energy systems of choice for meeting such energy needs.

An attribute of the growth pole theory which has an important parallel in the operation of the modern energy system is what may be described as the validation of urbanization and industrialization as necessary elements of development and the simultaneous normalization of poverty. Even though the poor are expected to get poorer in the early stages of economic growth, this is justified on the basis of future gains in economic development trickling down to the poor. Inherent in the theory is a relegation of the very poor to the lowest priority on the development agenda (Mehmet 1999). The operation of the modern energy system has also been fraught with what could be rightly called the normalization of energy poverty as an almost necessary component of the operation of the modern energy system, at least in the early stages of energy development. Like modern development which favors urban development over rural development, primarily due to the economic efficiency of pursuing this form of development, the modern energy paradigm also favors the development of urban energy systems over rural ones because of the economic efficiency of concentrating on urban areas: these areas boast greater market power, are in closer proximity to centralized modern energy sources and are thus significantly cheaper to electrify. Thus

it is commonplace to find rural and peri-urban energy projects sidelined on the basis of arguments relating to economic feasibility.

Rostow's modernization theory

An important contribution to development practice was the work of Rostow who proposed that economic development progresses through five stages; traditional society, preconditions for take-off, take-off, drive to maturity and the stage of high mass consumption. In Rostow's perspective, industrialization and modernization are the end goals of economic growth. In the first stage of development, the traditional society, the structure of society is built around limited production functions. Even though such societies could experience some level of technological innovation as well as changes in output, there was a limit; "a ceiling existed on the attainable output per head" (Rostow 1959:5). Traditional societies experience such limits because they either have no access to or have not as yet exploited the potentialities of modern science and technology (Rostow 1959). Rostow's second stage of economic development, the pre-conditions for take-off (which precedes the crucial take-off stage of development) denotes a period within which a society effects drastic changes in attitudes, political and economic structure in ways which prepare that society's economy for major infrastructural development both in industry and agriculture (Lynch 2005). This involves the erosion of the power of the traditional landed elite and a shift in power from these into the hands of urban-based political elite committed to the process of modernization. At the take-off stage, high levels of agricultural dependence are eliminated with whatever remains of agriculture itself becoming more market-oriented. Investments are stimulated and industries expand unleashing the full potential of economic development (Lynch 2005). This stage, in Rostow's perspective,

calls for urban areas “whose capital costs may be high but whose population and market organization help make industrialization an on-going process” (Rostow 1990:58). Rostow therefore perceived the expansion of urban forms a necessary condition for economic expansion. He proposed a transition from a traditional rural-agricultural sector to an urban-industrial sector for which reason he has been criticized for being anti-rural by promoting industrialization to the detriment of the rural-agricultural sector (Lynch 2005).

An Energy Parallel of Rostow’s Modernization Theory

A distinctive feature of Rostow’s model of development was its depiction of development as a linear and deterministic process; societies are projected as progressively transitioning through phases of development until the ultimate and desired stage of development was attained. This same idea of linearity and determinism is embodied in the energy ladder model which for a while provided a framework for conceptualizing household energy choices in energy development. The model envisioned a three-stage fuel switching process. The positioning of households along this linear progression was said to be determined by income. Thus with higher incomes and other factors affecting relative fuel prices such as deforestation, households were said to progress from the most basic stage of universal dependence on the biomass fuels to the second stage of dependence on transition fuels such as kerosene, charcoal or coal. In the highest stage of the transition there is a switch to the so-called modern energy sources LPG and electricity (Leach, 1992; Barnes, Krutilla, and Hyde, 2002; Barnes and Floor, 1999). Even though the energy-ladder model has been important in determining the income dependency of fuel-choices on the basic level, practical experiences with household fuel choices have defied the proposed

progressive transition from biomass based sources to electricity (Heltberg 2003).

Households are found to adopt a portfolio of energy choices in meeting their energy needs rather than progressing steadily along a linear model of energy use.

In spite of critiques relating to the practicality of the energy ladder model, the model has been particularly effective in setting distinctions between energy sources now classified as traditional and those now considered as modern. The model is effective not only at linking different energy sources with different levels of income, but it also effectively reinforces the primacy of modern electricity as a superior energy source by placing it on the highest rung on the ladder. Also, like the growth pole theory, the industrialization bent of Rostow's theory lends further support to the theory's support of a large scale centralized modern energy system.

Rondinelli's theory of secondary cities

Rondinelli's contribution to the development discourse was embodied in the proposition that rural development could not be achieved apart from cities no matter how carefully such rural development plans were framed. He argued that since markets for agricultural goods as well as social, health and educational services needed by rural areas for development were located in the urban centers, cities would play significant roles in rural development. He therefore called for the adoption of a pattern of development that was geographically dispersed through the "creation of a deconcentrated, articulated and integrated system of cities to provide the potential access to markets to people living in any part of the country or region" (Rondinelli 1986:19). He proposes the decentralization of strategically located settlements to "create the minimum conditions that enable rural communities to develop their own

conditions through bottom-up and autonomous processes” (Rondinelli 1985:8). He perceives rural development as dependent on the ability of strategically situated urban centers to provide rural communities the conditions and elements needed for their development from below; the “manipulation of the urban settlement hierarchy” (Unwin 1989:19) is central to his approach to development. He also tends to rely on the capitalist free-market to bring about developmental change in rural communities through their interaction with cities.

Critics of Rodinelli’s theory have argued that he wrongly assumes that the development of market facilities for rural communities through the development of small cities will necessarily bring beneficial change but “fails to provide a convincing argument that the changes instilled will indeed be mutually beneficial to people living in rural and urban areas” (Unwin 1989:20). Some have also criticized Rondinelli’s theory for making rural development entirely dependent on the altruism of urban populations and on the capability of national and local leaders to create the conditions that favor the development of strategically located small cities to drive rural development (Unwin 1989).

An Energy Parallel of Rondinelli’s Theory of Secondary Cities

Like the earlier theories discussed, Rondinelli’s theory of development also equates urbanization with development and echoes the superiority of urban forms over rural ones in terms of economic development. Development for him is economic growth through greater access to cities’ modern services and markets. He envisages the effective facilitation of greater interaction between the urban and rural areas as necessary for development.

Rondinelli paints a picture of what we can expect the experiences of communities which interact with urban centers to be. Such communities should be able to take advantage of urban markets as well as modern urban services and infrastructure energy including those devoted to the production and distribution of energy.

Recent Development Approaches

Recent development economics publications have sought to offer critiques to some of the dominant early development approaches. Justin Lin, a former World Bank chief economist has proposed an alternative approach to development grounded in what he calls a New Structural Economics (NSE).

Lin's development approach challenges the linear and progressive notion of development embodied in the Rostowian model. He offers that economic development cannot be divided into rigid stages; neither can countries be strictly dichotomized into low-income and high income categories. Rather, economic development, he offers, is better perceived as a "continuum from low income subsistence agrarian economies through middle income industrialized stages to high income post-industrial stages" (Lin 2012). What qualifies as an optimal economic structure is thus markedly different in the various stages of economic development and these according to Lin are determined by the prevailing endowment structure (i.e. land, labor, capital and soft and hard infrastructure) in a country at any given time.

Lin (2012) also challenges some propositions of the old structural economics. Whereas the old structural school identifies the cause of underdevelopment as residing in market failures which are exogenously determined. The new structural economics offers that underdevelopment is endogenously determined and results from relative

scarcities in the various factor endowments which make a shift to capital intensive industries unprofitable. A country's position along the development continuum is determined by its ability to maximize the comparative advantage that its prevailing endowment structure makes possible (Lin 2012). Under the NSE, Lin identifies the appropriate role of the government as entailing the development of a country's soft and hard infrastructure in ways which facilitate the optimum pattern of development for a country at any given time.

A second critique of the conventional development approach has been offered by Andrews (2013). According to Andrews, the problem of development has been reduced to a simple rule; that countries with good institutions grow well, whereas countries without good institutions tend to be left behind. Much development efforts in dominant international development institutions such as the World Bank have thus been focused on either creating or fixing institutions in the so-called developing countries (Andrews 2013). Andrews offers that the results of these efforts have fallen short of expectations because they have narrowly focused on a few agents, primarily government agencies, at the center of the network to the neglect of other agents such as civil society. In doing this, there has been a failure to capture the unseen norms and cognitive mechanisms which emanate from the bottom and are not a part of the dominant structures we focus on. A part of the picture is lost in the process, making the policies and programs that emanate from the approach insufficient as well. Andrews proposes a development approach which draws on multiple agents right from the start and focuses on providing solutions which are locally owned and understood.

Energy Parallels of Modern Development Approaches

An energy regime guided by Lin's development approach will be a predominantly top-down one with the state playing a significant role in energy development; the provision of such hard infrastructure will be critical to government's role as facilitator of the development process. With the cause of energy poverty situated in endogenous rather than exogenous factors, energy poverty will be seen as resulting from the direct interplay between a country's factor endowments; energy poverty cannot be approached as a development challenge with structural roots which may be exogenously determined-one whose foundations could possibly be traced to the functioning of the global political economy.

The development approach proposed by Andrews translates into an energy development approach which is bottom-up ; an approach to energy poverty which is not focused on building the capacity of a few central institutions to address the challenge of energy access, but focuses on engaging multiple actors in designing energy solutions which are well suited to the local context

Even though offered as alternatives to existing development approaches, these new development theories tend to share assumptions embedded in the prevailing paradigm. The predominantly top-down approach sanctioned by the dominant development theories are re-echoed in Lin's approach through his focus on the all important role of the state in the development process.

The modern definition of development as economic growth is taken as a given and not questioned in both approaches. Even though his approach tends to have a more critical cast so far as effecting change in the present arrangement is concerned, Andrews still takes the modern definition of development as given and this as will be

later demonstrated could prove problematic to the adoption of effective energy-development approaches.

The Applicability of Kuhn's Paradigm Approach to Energy Poverty Assessment

Having established the paradigm status of modern energy and development and having teased out the elements of the paradigm which have served as a consensual basis for action the significant role of the paradigm in guiding development efforts in the Third World in the post-Second World War period becomes apparent. By applying Kuhn's notion of normal science, anomaly, crises, and paradigm shifts to modern energy-development relations, this study identifies peri-urban energy poverty as a resistant fact that indicates a paradigm scale conflict whose resolution could most possibly require a significant shift in paradigms.

Through his focus on the community structure of science, Kuhn advocates the need for any study focusing on paradigms to clearly identify the community or group responsible for generating and articulating that particular paradigm. In this study there will be an effort to clearly identify the paradigm articulators, i.e. the architects of the modern energy-development paradigm in Ghana. Identifying the community of experts responsible for articulating the paradigm will permit an examination of how the paradigm has been enforced upon its members since the recognition of a given body of scientific knowledge as a paradigm is not only dependent on a community agreeing to conduct research according to the paradigm's defined lines of research but also on the community's ability to ensure the enforcement of the paradigm on its members (Wolin 1968 :167). This study will seek an understanding of how the modern energy-development relations came to be institutionalized as a core element of development practice. Particularly, it will focus on understanding the institutional

arrangements which facilitated and ensured the enforcement of the paradigm by way of securing the unanimous acceptance and internalization of its practices, beliefs and values in a typical developing country context like Ghana.

Like scientists in the conduct of normal science, the paradigm articulators of the modern energy regime have been involved with resolving some of the inherent ambiguities and problems encountered in the operation of the paradigm. This articulation of the paradigm will be identified as taking place in a manner analogous to the puzzle solving activity of Kuhn's normal science. So long as such articulation takes place within the confines of the dominant paradigm, they will be identified as puzzle-solving activities. Presently, most efforts at addressing energy needs whether in typical rural areas or in peri-urban spaces have reflected the paradigmatic dominance of the modern approach, being largely focused on technology, economics and planning. Energy poverty remains a challenge in spite of the adoption of these approaches.

This study identifies energy poverty as an anomalous expression of the modern energy and development paradigm. The existence of over a billion people who still lack access to electricity after numerous decades of energy development efforts signifies a defiance of the paradigm's expectations. The fact that access to modern electricity is expected to remain a dominant energy and development challenge even with the adoption of policies designed to expand electrification draws attention to the gaping disparities between the facts as experienced and the expectations of theories of energy and development.

The decision to focus on peri-urban energy poverty derives from the practical support it offers to a fundamental premise of this study, which is that: energy poverty

represents a defiance of the paradigm expectations of modern energy and development; and that peri-urban spaces provide a unique opportunity for examining the discrepancies and contradictions inherent in the conventional energy-development paradigm now operative. Peri-urban energy poverty is represented as an anomalous expression of the operation of the modern energy and development paradigm arising from failures in the modernization, urbanization and economic growth ideals that have informed development practice. The question as to why communities closer to urban forms, not only in the physical sense but also in terms of proximity to urban services such as modern electricity and urban markets, are now home to a large population of the poor in Sub-Saharan Africa, presents an interesting issue for exploration.

Kuhn's notion of paradigm is also instructive of the nature of the transformations needed to effect change. With paradigm shifts necessitating entire shifts in worldviews, the Kuhnian approach permits an analysis of whether or not the approaches adopted in response to the anomalous expressions of the present energy and development paradigm are indicative of a wider and more fundamental transformation in the worldviews guiding the paradigm or are mere attempts at further articulating the paradigm in the manner of the puzzle solving that characterizes Kuhn's normal science. The study seeks to offer that present dominant approaches at addressing energy poverty only serve as articulations of the existing paradigm, having their definition of the energy poverty problem and their solutions conditioned by the modern energy and development paradigm.

In the same vein the study will seek to propose that if indeed the persistence of energy poverty as a present modern challenge signifies the existence of a crisis within the modern energy and development paradigm, solutions to the problem will rest in

fundamentally challenging the worldview that the present paradigm embodies. Approaches deriving from this perspective should thus significantly challenge the ideals of the energy-development complex a la the quantification and transcendence logic of the paradigm which equates expansions in the modern energy paradigm, particular systems of social engineering and economic growth with progress.

Such a shift in paradigms will not be expected to occur through a deliberative process in which one paradigm is chosen over another. What is at issue in paradigm shifts are fundamentally new “cognitive and normative standards that embody a new way of looking at phenomena...a break with the existing tradition of scientific practice and the simultaneous adoption of new standards of legitimate activity. Paradigm shifts call for somewhat different rules for inquiry, different problem fields, as well as different notions of significance as to what constitutes a solution” (Wolin 1968:173). This signifies a fundamental break from tradition which has earlier on been institutionalized and integrated via various mechanisms of enforcement. Paradigm shifts are effected when the barriers of resistance to the new paradigm are overcome. Likewise a shift from the conventional energy-development paradigm to a distinctively different one will demand fundamental cognitive and normative shifts which succeed in effectively competing with and overthrowing the prevailing paradigm. Overcoming these barriers through normative and cognitive shifts in the way we think about the energy-development paradigm and how we organize in meeting the paradigm’s objectives is an important component and perhaps the overarching aim of this study.

Chapter 3

METHODOLOGY

The Research Approach

As earlier discussed, challenges with energy access in informal settlements such as peri-urban spaces have an almost global expression; in Africa, Asia and Latin America one encounters various manifestations of energy poverty at the peri-urban interface. In spite of the near universality of the phenomenon, this study attempts to explore peri-urban energy poverty through a consideration of a case study in Kumasi, Ghana. The focus on a singular country case study may appear rather problematic to some, given the widespread nature of the phenomenon being studied. One may question the merit a case study of such a widespread problem may offer, and what contribution to knowledge it may possibly make.

These concerns may stem from popular ideas relating to the case study approach itself. Some have raised concerns about the value of the type of knowledge generated through case studies i.e. the value of practical knowledge as against theoretical knowledge. Yet still, others have offered that since it is impossible to generalize from a singular case study, such studies cannot contribute to the development of scientific knowledge (Flyvbjerg 2001). Other problems with the case study approach have been related to the role of the approach in hypothesis building, and issues of bias and summarization. In the coming sections, I attempt to develop some arguments in support of the adoption of the case study approach in this study to

demonstrate the value of this research method in generating knowledge about energy poverty.

Energy as a Social Study

The modern notion of energy was first introduced by a British physicist, Thomas Young at the beginning of the nineteenth century. Having been formally introduced in the realm of scientific thought, and gaining support from other scientific novelties of the time like the law of thermodynamics, the idea gradually gained currency that energy was “a purely physical phenomenon that could be controlled through technical processes according to a purely economic logic” (Debeir, Deleage and Hemery 1996:xii). In line with this, popular thinking on energy became highly specialized and congregated around these processes. The logic of energy became machines, capital, work processes and exchange networks (ibid). Within this framework of thinking, energy was primary data; “it was considered neutral, unlimited, inexhaustible...*and not only devoid of any particular impact on the future of society but subordinate to this future, adaptable at will*” (Debeir et al 1996:xii).

The confinement of the notion of energy to the techno-economic silo is believed by some to have led to a fragmented approach in dealing with issues of energy. Debeir et al. (1996) circumvent this problem by proposing the concept of an *energy system* as a more holistic and integrated perspective on energy. This characterization of energy combines on one hand, the technological and economic characteristics of energy chains (i.e. energy sources, their converters and the efficiency of their converters) with the social structures that make possible the appropriation and management of these energy sources. In this characterization, energy is no longer viewed as a mere physical input. Energy is now seen as comprising diverse converter

chains which are dependent on each other, drawing on determined sources of energy; this process is “initiated and controlled by classes or social groups which develop and consolidate on the basis of control” (Debeir et al. 1996:5). At any point in time therefore, energy systems can be said to be displaying their social determinants; a determination which results from the very complex interplay of parameters (economic, demographic, psychological, social and political) at work in human societies (ibid). The evolution of social systems over time has occurred in tandem with evolutions in energy systems in a synergistic manner (Norgaard 1994; Byrne et al. 2006). Thus the story of energy is the story of society itself.

Much of the available knowledge about energy poverty and the development interventions adopted in response to it seem to be largely influenced by the techno-economic logic of energy, they being largely focused on issues of technology, economics and planning. This approach to energy issues in modern times can be said to have gained what may rightly be called a paradigmatic dominance.

Whereas these approaches have been helpful in providing useful knowledge about energy poverty and energy systems and served as the intellectual basis of much energy development interventions, the persistence of energy poverty as a problem of modern development necessitates a re-evaluation of these approaches and the exploration of other methods of inquiry which have the potential of generating some other knowledge of the phenomenon otherwise not provided by the traditional approaches of inquiry alone. There is the need to move beyond the traditional rational-analytic approaches towards a social inquiry of energy poverty which attempts to explore how energy systems have evolved and continue to evolve in response to society’s values and goals; an approach to inquiry which permits us to understand

where we are, how we got where we are and where we are going. This dissertation is intended to serve as a contribution to the social study of energy poverty.

The Contested Nature of Social Inquiry

There is not a unanimous agreement as to what the nature of social inquiry should be. For over two hundred years, an important concern in social inquiry has had to do with the question as to whether or not humans and society can be studied using the scientific approach which has furnished much of the available knowledge in the natural sciences. Research advances in the natural sciences and technological progress have hinged on a “relatively cumulative” system of knowledge production, focusing on the principal concepts of explanation and prediction on the basis of context independent theories. There have been, in the history of the social sciences, attempts to make the discipline more scientific by applying scientific principles to objectively provide knowledge about humans and society.

As far back as the period of the Enlightenment, the early proponents of the progress thesis, the fathers of modernity, argued for the adoption of scientific-rational postures in attempts to understand the organization of the social world with the hope of realizing a perfected social order (Saint-Simon 1975). The natural scientific approach in understanding human affairs was adopted by August Comte as well as other influential individuals such as Karl Marx and Sigmund Freud. Marx expressed his hope in a unified science; one in which “natural science will in time subsume the science of man just as the science of man will subsume the natural science” until there was “one science” (Marx 1975:355 cited in Flyvbjerg 2001:26). Freud in his early career also professed his intention to “furnish a psychology that shall be as the natural science; that is, to represent physical elements as quantitatively determinate sets of

specifiable material particles, thus making those processes perspicuous and free from contradiction” (Freud 1950:295 cited in Flyvbjerg 2001:26). Even though he remained a fervent believer in the natural scientific approach, Freud later on in his career began to question the applicability of this approach in the fields of psychology and psychiatry. Nevertheless, the idealization of the natural scientific approach as the primary one for understanding human affairs has thrived and become even more pronounced after Marx and Freud. Thus, several traditions in the study of human activities, from functionalism, structuralism, cognitivism to neopositivism have all relied on the natural-scientific model as the ideal for understanding human activity and society (Flyvbjerg 2001). In this manner, the social scientist, the political scientist and the economist became concerned with the search for a presumed order of social life (Byrne 1980) by seeking to understand society through the rational-analytical process of establishing regularities between theories and social facts as they occur out there.

Owing to this, the question as to whether or not the study of social and natural/physical phenomena represents two fundamentally different activities has been and remains an extremely controversial one over the years. Flyvbjerg argues that the sustenance of that controversy over the years has hinged not only on the realities of the fundamental methodological implications of the issue, but also on the fact that the questions raised have touched on issues relating to the status of the social sciences in relation to the natural sciences as well as the fear of “ending in relativism and nihilism when one departs from the analytical scientific tradition that has dominated Western science” (Flyvbjerg 2001: 25).

In spite of the arguments leveled against the natural scientific ideal by philosophers of science and some scholars of hermeneutics, and the sometimes costly

and hazardous impacts of some of the technologies generated by this body of knowledge both locally and globally, the ideal continues to maintain a privileged status in knowledge generation. Flyvbjerg offers a convincing explanation for the attractiveness of the approach to scholars over the years:

“There is a logical simplicity to the natural science paradigm, and the natural sciences’ impressive material results speak for themselves: these sciences have an undeniable basis as a means by which we have attempted to achieve mastery over nature, technology and our own conditions of life... The consequence of this knowledge production is a strong, prestigious position for natural science in society” (Flyvbjerg 2001:26)

But can society and human activity be indeed studied in the same manner as the natural sciences? Unlike the natural sciences, the development of the social sciences has not been associated with the establishment of predictive theories, but has rather been in a constant state of reorganization and change. In comparison to the natural sciences therefore, this science is neither relatively stable nor predictive. This has been identified as signifying the relative immaturity of the social sciences in comparison to the natural sciences; a pre-paradigmatic stage in the Kuhnian sense, implying a coming stage of maturity when the social sciences would equal the natural sciences by becoming a paradigmatic normal science. A significant number of social scientists have over the years become actively engaged in redefining their conceptual tools and research methods with the hope of establishing the invaluable natural scientific qualities of stability and predictability in the social sciences (Flyvbjerg 2001).

The effort made by the social science movement to establish the predictive success of its natural science counterpart has been all but successful. Flyvbjerg describes it thus:

“After more than 200 years of attempts, one could reasonably expect that there would exist at least a sign that social science has moved in the desired direction, that is, toward predictive theory. It has not. And when the social sciences are compared with relatively new natural sciences such as meteorology and biology which also struggle with complicated objects of study, it can be seen that the latter exhibit slow, relatively cumulative progress. These relatively new sciences have evolved more complex theories which account for an increasing range of phenomena, while social science seeks to develop theories pertaining to one class of phenomena and then abandons these for theories which include another. The social sciences appear unable to demonstrate the kind of progress which is supposed to characterize normal science". (Flyvbjerg 2001:32).

Anthony Giddens (1982) and Harold Garfinkel (1984) have offered a hermeneutic-phenomenological argument in an attempt to explain the seeming failure of the social sciences to emulate the natural sciences in the methodological sense. According to this argument, critical fundamental differences between the natural and the social sciences make it impossible to subject the two disciplines to the same methodological approaches. In the case of the natural sciences, the objects studied are not self-interpreting entities thus making stability relatively attainable. The social sciences are however involved with the study of self-reflecting humans. Changes in the objects of study's interpretations must therefore be taken into account in social science studies; the object here is a subject. The relation between these self interpretations and the context of those studied is particularly important in understanding why people and societies act the way they do. Coupled with this is the recognition of the researchers own self-interpretations; these and the concepts utilized by a social researcher are also part of a context and must therefore be understood in reference to that particular research context. Thus in the hermeneutic-phenomenological sense, the study of society can only be stable so long as the self-interpretations of the subjects studied remain stable; since these interpretations are

subject to constant change and are barely constant, it is difficult for the study of society itself to be stable as well. This, together with the context-dependence of the researcher's knowledge production process, makes the possibility of pursuing an objective social science very problematic; in fact impossible (Giddens 1982; Garfinkel 1984)

Dreyfus and Bordieu (1986) have also offered the *tacit skills argument* against attempts at generalizing the natural science ideal as the principal means of generating knowledge about human activity in the social sciences. According to the argument, the quest to produce stable and predictive social sciences creates what they have labeled the "impossible theory of human background". This impossibility stems from the centrality of theory to predictability. Whereas theories must be context-free and rule bound, human activities and skills tend to be context-dependent and are irreducible to rules. Context cannot be excluded in attempting to understand human activity whereas context-independence is necessary for the generation of a general theory. There is an open-ended interdependence between context, actions and interpretations which is not amenable to rule based considerations.

It is important to emphasize here that the arguments against attempts to subject the social sciences to natural scientific methodological ideals are not to serve as a criticism of the natural scientific approach to knowledge generation in itself i.e. a criticism of rules, logic, signs or rationality. Rather, it is the universalizing ethos that has become associated with this approach to inquiry, to the exclusion of all others in the modern arrangement which is at issue here. Thus, it would be equally problematic if the natural scientific approach with its underlying rules, logic, signs and rationality were relegated to the background by a singular focus on the particular, on context and

the non-rule-based. Thus according to Flyvbjerg “there are rules and there is the particular...to amputate one side in these pairs of phenomena into a dualistic *either-or* is to amputate our understanding. Rather than the *either-or* we should develop a non-dualistic and pluralistic *both-and*” (Flyvbjerg 2001:49).

Modernity’s confinement of the notion of rationality to a primarily instrumental one and the dominance of this system of rationality in both the natural sciences and the social sciences has been referred to as the Rationalist Turn (Flyvbjerg 2001). The hubris of this Rationalist Turn in the modern project is undeniable as considerations of alternatives which existed before the Rationalist turn or even attempts at articulating present or future non-rationalist ideologies are now difficult to fathom and lie way beyond the scope of modernity’s current vision.

Aristotle on Intellectual Virtues

The Greek philosopher Aristotle considered one of the fathers of science and modern day rationalism (alongside Socrates and Plato), was the first to identify instrumental rationality as *one of* many types of rationalities. This is captured in Aristotle’s considerations of what he calls “intellectual virtues” in *Ethics*. Aristotle identified epistemic science which is based on ‘theories, analysis and universals as one amongst several other intellectual virtues which deal with “context, practice, experience, common sense, intuition and practical wisdom” (Flyvbjerg 2001). He emphasized the usefulness of *all* these forms of rationalities in the pursuit of knowledge.

Aristotle in *Ethics* identifies epistemic science (generally translated as science or scientific knowledge) as emanating from the intellectual virtue he calls *episteme*. *Episteme* is concerned with the generation of invariable context-independent

knowledge and universals through the application of analytical rationality; it is concerned with the generation of theoretical knowledge. The intellectual virtue of episteme is fully expressed in the modern scientific approach of which the natural scientific ideal is most representative. This ideal gained importance and precedence through the work of Socrates and Plato and later during the period of the Enlightenment tradition. It has now come close to comprising the only legitimate view of what a true knowledge entails; other intellectual activities such as the social sciences now feel obliged to establish their legitimacy in terms of the epistemic ideal.

A second intellectual virtue identified by Aristotle, is the virtue of *techne*. *Techne* refers to an art or craft; “a concrete, variable and context-dependent activity...involving the application of technical knowledge and skills according to a pragmatic instrumental rationality” (Flyvbjerg 2001:56). *Techne* is production oriented and is geared towards the achievement of a conscious goal; it is related to technical know-how. Analogous contemporary terms for *techne* include ‘technique’, ‘technical’ and ‘technology’ (ibid).

A third intellectual virtue, *phronesis*, places great emphasis on practical knowledge and practical ethics. Aristotelian *phronesis* does not have an analogous contemporary term but has been translated as prudence and practical wisdom. Phronesis is involved with the “practical wisdom that comes with an intimate familiarity with the contingencies and uncertainties of any particular social practice” (Schram 2012:12). An individual possessing the practical wisdom characteristic of *phronesis* possesses the ability to behave in each particular circumstance in a manner which is not reducible to the knowledge of general truths as characterizes *episteme*. Rational decision making in the *phronetic* sense hinges on the attainment of the proper

order amongst the ends pursued rather than some fixed invariable cosmic order (Flybjerg 2001). The pursuit of the proper order in this sense is therefore not amenable to the pursuit of some decontextualized theoretical axioms. An important component of *phronesis* as an intellectual virtue which distinguishes it from the virtue of *episteme* is deliberation. According to Aristotle, a distinguishing feature of a prudent individual is his ability to deliberate rightly about what is good. However, since it is impossible for one to deliberate about invariable things, this intellectual virtue cannot be said to be a science in the sense of *episteme*.

Phronesis cannot be regarded as an art in the sense of *techne* either since *techne* is involved with production aimed at a defined end. *Phronesis* is involved with actions whose end is doing well; these ends are not predefined ends but ones dictated by context. Unlike *techne*, the application of judgment and skill in *phronesis* is not geared towards production but focuses on analyzing values with respect to things which are good or bad for man as its basis for action, making it the most relevant intellectual virtue to praxis.

Phronesis thus calls for consideration, judgment, choice and above all experience. By focusing on the particular or on specific cases, *phronesis* tends to focus on that which is variable and not amenable to universal rules. Due to its emphasis on the analyses of values, the system of rationality that emanates from a *phronesis* based-social inquiry is referred to as a value-rationality. Aristotle in his own considerations admitted the dire relevance of *phronesis* as an intellectual virtue in the production of knowledge about individuals and societies. He perceived this type of rationality as particularly important in providing a balance to instrumental knowledge as a system of knowing. The focus on context over rules and universals as well as the primacy of the

concrete and practical over the theoretical posits it as an invaluable intellectual tool for social inquiry and for the generation of knowledge about human activities and society. The possibility of adopting alternative and potent methodological postures other than the conventional ones offered by the *epistemic* school thus becomes increasingly clearer. Phronetic inquiry holds promise of ensuring an understanding of human activity and social action otherwise impossible by the application of epistemic approaches alone.

Context, Cases and Exemplars

Social studies of the phronetic variety which focus on practical rationality and judgment benefit from careful considerations of case studies, precedents and exemplars. Case studies—whether experienced or narrated- are particularly significant for understanding practical rationality; likewise the cultivation and communication of judgment is best achieved through the exposition of case studies (Flyvbjerg 2001). Praxis has always derived from context-dependent judgment; from situational ethics. In the pursuit of such contextual studies, there is a focus on both the small local context (from which the immediate meanings of phenomena is derived) as well as the global or international context (which allows the general and conceptual importance of phenomena to be appreciated).

Whereas the knowledge derived from the study of large samples and populations in social inquiry is useful for generating knowledge about prevalence of phenomena and their variation across cases, case studies clarify the nature and depth of such phenomena in a local space; in essence, they provide powerful examples. And according to Kuhn, a discipline without “a systematic production of exemplars is an ineffective one” (Kuhn 1962; Flyvbjerg 2006:27).

Context is itself socially and historically conditioned. Foucault offers that it is this socio-historical conditioning which provides the basis for action. He offers that because “human practice and human history are *made*, they can be unmade as long as we know how it was that they were made”⁸. Foucault, whose work was largely influenced by Nietzsche, adopted Nietzsche’s concept of genealogy in propounding his own methodological approach. For Foucault, genealogy was fundamental to historiography; thus for him “phenomena under study are understood by means of a genealogical account of the way the phenomena can be seen as descendants of those that came earlier and not as developments, manifestations, or appearances”⁹. Through such historiographic considerations, practices and institutions which have been accepted as given and somewhat excluded from change are now successfully portrayed as products of historical development and change. This has implications for praxis; the demonstration of the contingent nature of practices and institutions which are traditionally portrayed as given and unchanging creates an avenue for change.

What an understanding of the historiography of phenomena does is to permit us to obtain deeper insight into the story or stories of which we are a part, making it possible for us to answer the question as to *how* we got where we are; it enables us to understand how current practices have been influenced and conditioned by traditions with deep historical roots. The answer to the question as to how we got where we are is important in pointing us to what we ought to do about our present circumstances. Thus in social inquiry, the historical sense permits us to “give meaningful form to

⁸ Michel Foucault, “Structuralism and Post-Structuralism” Interview conducted by Gerard Raulet in *Essential Works of Foucault 1954-1984*, vol. II, p.450

⁹ Nehamas, Nietzsche: Life as Literature p.104

experiences we have already lived through and provides us with a forward glance, helping us to anticipate situations even before we encounter them, allowing us to envision alternative futures” (Flyvbjerg 2001:137).

The Value of Case Studies

The case study is a research method which provides a detailed account and analysis of one or more bounded system(s) such as an individual or a community (Johnson and Christensen 2008:406). Case studies are found to be appropriate for finding answers to ‘how’ and ‘why’ questions as they pertain to phenomena over which the investigator has very limited control (Yin 1994). Case studies are beneficial for understanding phenomena which are context dependent and cannot be replicated in laboratories or experimental settings. They permit the investigation of a “contemporary phenomenon within its real life context, especially when the boundaries between phenomena and context are not clearly evident” (Yin 1994:13).

Researchers have generally refrained from adopting case studies owing to generally held conceptions (or misconceptions) about the approach as a research tool. It has been generally held that by providing information about a single example of a class of phenomena, the knowledge generated through such studies cannot be easily generalized across a broader class of phenomena (Ambercrombie et al. 1984). This is one of the most popular critiques of the case study approach. There is the notion that because the knowledge derived from the approach cannot be generalized it cannot contribute to scientific development or to the development of knowledge in the social sciences. This stems from the general belief that observations across larger samples of phenomena provide knowledge of generalizable relevance with respect to any particular phenomenon.

Flyvbjerg however perceives the notion of the non-generalizability of case study research as a mere misconception; for him it is just as erroneous to perceive generalizability as the only way to work, as it is to offer that it is impossible to generalize from a single case study. He offers that the ability to generalize from a singular case study depends to a very large extent on the nature of the particular case one is referring to *and even more importantly on how the particular case is chosen*. By selecting what he calls *a critical case*, a researcher can produce knowledge of significance to a larger class of phenomena. Even in the natural sciences, much of the groundbreaking knowledge produced did not result from the scientists' consideration of large classes of random phenomena but emanated from the conduct of single experiments. Thus from Newton to Einstein to Darwin and Marx, much of the groundbreaking knowledge produced were based on the consideration of particular experiments, cases and experience. The careful selection of a case in the social sciences may also greatly add to the ability to generalize from that particular case. For studies aimed at providing as much insight as possible into a specific phenomenon, large samples could prove inadequate in providing the in-depth knowledge needed since these usually capture typical or average cases which may not be the richest in information. On the other hand what may be considered atypical or extreme cases may provide a wealth of information about a phenomenon being studied "because they activate more actors and more basic mechanisms in the situation being studied" (Flyvbjerg 2006:13).

If the aim of a study is to provide a deeper understanding of issues as well as serve as a basis for praxis, it becomes necessary to focus on the structural causes of problems in society as well as their consequences rather than the description of the

general symptoms of the issue under study and their frequency of occurrence. Given such a situation, the knowledge generated from the study of a large sample may prove insufficient in providing the needed level of insight. There may instead be the need to focus on particular cases which have been carefully selected because of their validity in providing the needed knowledge. It is important to indicate that the aim here is not to discredit the relevance of research approaches which utilize large random samples but to emphasize the fact that the nature of some problems may warrant the adoption of research approaches which focus on examining singular cases.

Karl Popper's test of falsification¹⁰ an important aspect of critical reflexivity in social studies can be utilized in the generalization of case studies. If a single observation is found not to fit with a proposition, it follows that the proposition is generally not valid and will need to be either revised or rejected altogether. Critical cases are those 'most likely' or 'least likely' cases; they are those cases which either clearly confirm or clearly falsify generally accepted propositions and hypotheses. Because of the in-depth approach of case study research, it is useful for identifying particular phenomena whose behavior or expression cannot be accounted for by generally accepted propositions or theses.

Flyvbjerg even goes a step further to challenge the acceptance of generalization (whether of singular cases or large samples) as the ultimate means for

¹⁰ For Popper, the strength of theories lay in their capacity to be refuted and not necessarily verified when placed against reality. Falsifiability in this regard becomes an important criterion for ascertaining the truly scientific status of the theory (Popper 1972).

generating knowledge. Formal generalization in his perspective is just one amongst many different methods of generating and accumulating knowledge. He thus offers:

“That knowledge cannot be formally generalized does not mean that it cannot enter into the collective process of knowledge accumulation in a given field or in a society. A purely descriptive, phenomenological case study without any attempt to generalize can certainly be of value in this process and has often helped cut a path toward scientific innovation. This is not to criticize attempts at formal generalization, for such attempts are essential and effective means of scientific development; rather, it is only to emphasize the limitations, which follow when formal generalization becomes the only legitimate method of scientific inquiry” (Flybjerg 2006:227).

Another widely held notion about the case study approach relates to the so-called subjectivity of the approach. It has been argued by some that the case study approach tends to embody a bias towards verification, in that the researcher becomes concerned with confirming his/her own preconceived ideas about the phenomenon under study. Case studies are thus perceived as having less rigor than the so-called objective hypothetico-deductive approaches.

This purported subjectivity of the case-study approach has been widely challenged. Some scholars have offered that subjectivity is embodied in all research approaches including the hypothetico-deductive approaches¹¹. Thus the isolation of

¹¹ Scholars of hermeneutics such as Paul Feyerabend have challenged the natural science ideal of objectivity by offering that natural sciences are historically conditioned and thus require interpretation, even though such interpretation may tend to occur implicitly. What constitutes relevant facts, methods and theories for instance are decided by the natural scientists themselves through some common system of interpretation which clearly delineates what constitutes scientific work and what does not. The training received by a scientist in preparation for his vocation equips him with this interpretive ability which is acquired as a tacit practical skill (Feyerabend, date unknown).

qualitative approaches such as the case study approach as embodying some form of bias is itself problematic. To the contrary, case studies are actually seen by some as being particularly useful so far as bias is concerned. Scholars such as Campbell (1975) have offered that the case study approach, far from being a weak methodological approach tends to embody much vigor as a research method. The approach permits the researcher to ‘close in on real life situations in a way which permits them to pitch

Schumpeter likewise offers that the prevailing social structure and the social location within which scientists operate do condition “their outlook upon reality and hence what they see of it and how they see it” (Schumpeter 1949:270). The ideological context within which the scientist operates influences the nature of the knowledge generated on two levels. It determines what is defined as a problem; the researcher begins his work with a vision or intuition which he has already obtained and which justifies his interest in the problems he chooses to solve and how he chooses to solve those problems (Schumpeter 1949). Likewise his interpretation of the findings he makes in conducting research are also very much affected by the ideological context within which he operates. The scientist thus tends to focus on the set of alternatives which are plausible given the prevailing ideological boundaries.

Other scholars like Shiva have argued that positive science itself arose as an “epistemic response to a particular set of values based on power” (Shiva 1991:22) which were compatible with specific economic and political needs of particular groups of people. This creates inherent inequalities in the way in which positive knowledge is generated and structured, legitimized and employed in the transformation of society. Because science is value laden, its application in the manipulation of the social world cannot be perceived as a value-free activity. Rather, its application should be accompanied with a sense of responsibility for whatever consequences may arise from its application to the social, political (and even natural) orders. This calls for undoing the dichotomy between the world of values and the world of facts that characterizes the natural scientific ideal. For until this is done positive science, having arisen in the word of values becomes separated and placed beyond the any form of social evaluation; such evaluation being located within the world of values.

generally accepted perspectives and ideas about phenomena against their occurrences in reality. Working in close proximity to the phenomena under study, researchers conducting in-depth case studies have acknowledged their constant need to re-define some of their preconceived notions of the phenomena they study; the case study compels them to revise their hypotheses and preconceptions about some essential elements of their research (Campbell (1975), Ragin (1992), Geertz (1995), Wieviorka (1992), Flyvbjerg (1998, 2001)). Geertz characterizes field work as a “powerful disciplinary force: assertive, demanding, even coercive”; one that can easily be underestimated but cannot be evaded (Geertz 1995:119).

What happens in the conduct of case studies is therefore better identified as falsification rather than verification and since the bias towards verification exists in all other forms of knowledge generation, including the supposedly objective ones, the case study approach may actually sometimes have an upper hand when it comes to correcting for this subjectivism; for by working in close contact with the phenomenon under study (rather than objectively observing it from a distance) the opportunity is created for the researcher to correct any misconceptions by the subjects of the study ‘talking back’ in the course of conducting case research.

The Analytical Framework of the Study

Based on the conceptualization of energy poverty developed in this study as well as the research approach adopted, the analytical framework guiding the study can be represented thus.

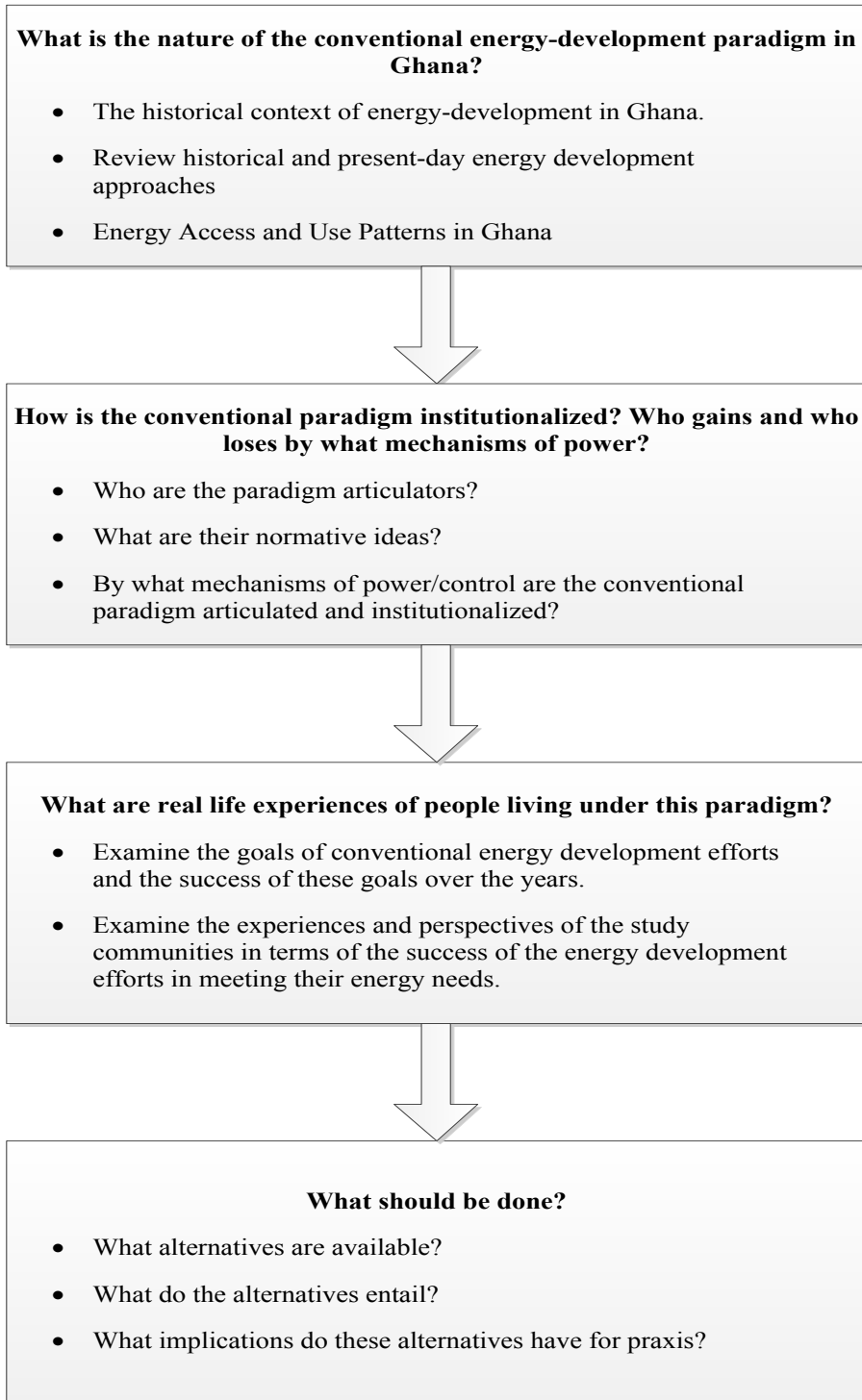


Figure 1 Analytical Framework

There is first and foremost an attempt to understand where present efforts with energy and development in Ghana are headed. To provide a clear picture of this, this study will draw on history to demonstrate how we got where we are. The historical narrative of energy-development relations in Ghana over the years puts an assessment of present day policies guiding energy-development relation in the country in perspective. The historical analyses and the assessment of present-day approaches to the energy access challenge in Ghana, clarifies how the present paradigm came to be institutionalized as “the” authority over decisions and approaches relating to present energy-development relations. There is a focus on unearthing who the paradigm articulators are, the normative ideas that shape their thinking and guide their actions, as well as the mechanisms by which they bolster the institutionalization of the paradigm.

Once the nature of the conventional paradigm has been firmly established, I move on to compare the real-life experiences of people living within this paradigm with the paradigm’s theoretically established expectations. This permits an analysis of the extent to which the experiences of people living under this paradigm conform to the paradigm’s expectations or otherwise. This ultimately leads into a discussion of alternatives, if there is a proven need for such, what such alternatives ought to entail as well as the policy implications of the adoption of such alternatives.

Research Methods

Historical Review

The foundations of energy-development relations in Ghana were examined through a thorough review of literature on pre- and post colonial development initiatives and energy policies in Ghana. The political-economic foundations of these policies are analyzed to serve as a characterization of the macro-context within which energy needs are negotiated in a local spaces in Ghana.

Case Study

The case study presents a detailed exploration of the energy poverty challenge as experiences in a typical local context, Oti, in peri-urban Kumasi.

The Study Community: Oti

Oti is located 40 km south of Kumasi city¹² a few kilometers beyond the Asokwa sub-metro area. It is a peri-urban community with a population of 3179 per the most recent population census (Ghana Statistical Service 2011). Even though originally an agricultural community, the area is now home to other informal economic activity; many inhabitants are petty traders, wage laborers, mechanics amongst others.

A typical peri-urban settlement, the outer periphery of Oti features a patchwork of city-style residential houses. The inner part of the community features makeshift

¹² Kumasi is the capital of the Ashanti Region, one of the ten regions of Ghana. It is the second largest city in the country, second to the capital city Accra.

wooden structures, a few mud-houses and uncompleted buildings which serve as home to many.



Figure 2 A typical housing unit in Oti



Figure 3 A residence at Oti

Oti is home to a large landfill which takes in all the liquid and solid waste generated in Kumasi city. Oti has been connected to the grid but access to other social amenities such as potable water and good roads remains limited. Originally a village community, Oti has undergone much transformation. It however maintains its traditional chieftaincy structure despite coming under greater urban influence.

Oti was chosen for this study because of the opportunity it offered for understanding the inherent contradictions of the modern experience. It is a critical case (Flyvbjerg 2001) because as a typical peri-urban area, (one which has been transformed from a small village community into a transitional peri-urban space) one would expect the residents of Oti to have increased access to urban infrastructure and services. One would expect Oti to be on its way to complete modernization with associated improvements in the lives of its citizens. If the modern experience

embodies contradictions, then peri-urban spaces like Oti are prime areas to study such contradictions. The contrast between what was before modernization and what is in the present arrangement is easily charted in these spaces.

The Interview Process

The primary aim of the field study was to enable direct engagement with residents of Oti who represented information-rich sources about the phenomenon of energy poverty. Thus in defining a study sample, the aim was not to generate a representative sample but to engage with those individuals who could provide the greatest wealth of information about energy poverty as experienced at the peri-urban interface. Aiming for a random representative sample in this case would provide information about the general characteristics of energy poverty, such as its incidence rates etc, but the purpose here was to generate a deep understanding of the complex human dynamics associated with negotiating energy needs amongst the energy poor at the peri-urban interface. In all, 80 households were studied.



Figure 4 Google Earth Rendition of Oti

Source: Google (2014) US Department of State Geographer Image Landsat

Prior to the actual interviewing process, a couple of days were spent engaging with the study community in informal conversations with prospective respondents about their livelihood approaches, energy needs and challenges and how these were managed at Oti. These familiarization visits proved useful. For one, they helped me to re-evaluate some of the pre-conceived ideas I had which had somewhat created for me some perspective of what I expected to people’s experiences with energy choices and use at Oti to be. It thus provided some very useful insights which served as a basis for the revision of some portions of the study instrument.

Based on feedback from the initial community engagements the interviews were designed to focus on issues relating to:

1. Demographics (household size, gender of respondents, household income, occupation, reason for settlement in the peri-urban zone, number of years spent in peri-urban zone)
2. Energy sources and technologies, uses and factors affecting availability and access
3. Livelihood changes in Oti
4. Sources of vulnerability in obtaining energy sources of choice as well as their utilization
5. Knowledge and degree of control over energy sources
6. Impacts of energy use on environmental and social values
7. Perspectives on development

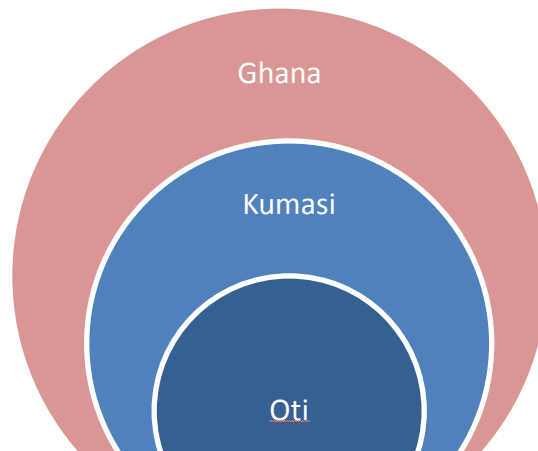
An informal interviewing approach was adopted. The original intention was to utilize focus groups discussions, where a number of households could be brought together and interviewed in one setting. Aside the simplicity that approach would afford by consolidating many individual household interviews into one focus group discussion, it was hoped that the approach would also foster some interaction and discussion amongst participants about their energy choices, needs and challenges. It was however difficult adopting this approach in the Oti. Since 54 of the 80 respondents were women (who are often left to cater for the homes and engage in petty trading whilst the men went into Kumasi's central business district and other peri-urban communities to engage in wage labor) many were unable to leave their household responsibilities to engage in a focus-group style interview. Nonetheless, the house-to-house approach proved equally effective. Since some peri-urban households were significantly large and in some cases were home to two or three different families, interesting group discussions about household energy poverty were successfully conducted.

Chapter 4

THE MACRO-CONTEXT OF ENERGY POVERTY IN OTI: ENERGY-DEVELOPMENT RELATIONS IN GHANA

Human practice and history are made and they can be unmade as long as we know how it was that they were made. Michel Foucault

The methodological posture adopted in this study emphasizes the significance of context in understanding human phenomena and even more importantly, the social and historical conditioning of such context. Thus even though the study attempts to understand the dynamics of energy poverty as experienced in a typical peri-urban setting in Ghana, the Oti experience is not approached as an isolated manifestation of a problem but is understood as descending from preceding historical phenomena; phenomena which are themselves conditioned by the larger paradigm of energy-development relations operative in Ghana on the national level and in Kumasi on the sub-national level. The story of Oti is thus embedded in progressively larger contexts.



This chapter is intended to establish the following:

- That present energy-development relations in Ghana have indeed acquired a paradigmatic status; one rooted in the ideals of the modern project.
- That this paradigm has well defined expectations concerning energy-development relations in Ghana and has served as the basis for praxis on various levels.
- That the paradigm has set into motion a series of dynamics and contradictions which serve as a larger story against which experiences with energy poverty in Oti can be understood.

The Development Context of Ghana

Ghana¹³, formerly called the Gold Coast is located in West Africa, south of the Sahara. The development context of Ghana is explicated through a consideration of

¹³ Ghana has a land area of 239460 square kilometers. Per the most recent population census conducted in 2010, the country's population is estimated at 24 million, with a population growth rate of 2.4%. In 2010, 48.5% of this total population lived in rural areas and the remaining 51.5% in urban areas (World Bank 2011). Ghana is divided into ten administrative regions. Although a comparatively small country, it exhibits a

the ‘eras’ through which the country’s development experience has evolved. It is important to establish from the onset that these eras do not represent isolated and disconnected events in Ghana’s development story; they however highlight some very significant events which have occurred at various points along Ghana’s entire development experience. Ghana’s development story is characterized as comprising four eras:

- The Era of Industrialization and Self-sufficient Development
- The Era of Basic Needs
- The Era of Pro-Market Reforms
- The Post-Reform Era

The value of this presentation of Ghana’s development experience will be fully appreciated in Chapter five where these eras are used to chart what may be called a historiographic experience with energy and development in Oti.

The Era of Industrialization and Self-Sufficient Development

Believed to be the first country to have completed a development plan, planning for national development in Ghana has been a part of the history and tradition of the country. In 1919 the British Colonial Administration developed the *Ten Year Development Plan* under the governorship of Gordon Guggisberg. The plan was intended to be implemented between 1920 and 1930. Even though some referred

very rich cultural diversity. The population is comprised of four main groups of people; the Akan, the Ga-Adangbe, the Mole-Dagbani, and the Ewe. These major groups are further divided into about 60 ethnic groups with very distinct traditions and dialects (Naylor 2000).

to the plan as a public investment program, it represented the first real attempt to “develop” the Gold Coast in the modern sense. Amongst the portfolio of development projects implemented under this scheme was the development of a harbor at Takoradi in the Western Region, the construction of the Prince of Wales College (now Achimota College) and Korle-Bu Teaching Hospital (Huq 1989). From this period until the attainment of independence, a number of development plans were formulated by the colonial office for the Gold Coast; in terms of actual implementation however, most of these projects made little to no headway at all¹⁴.

A major watershed for development planning in Ghana came with drafting of the Seven-Year Plan for National Reconstruction and Development; a plan which has been called the nation’s first comprehensive and integrated development planning policy (IIED 2001). The plan remains to date one of the most influential development

¹⁴ After the implementation of the first Ten Year Development Plan, a second Ten Year Development Plan was drafted to be implemented between 1946 and 1956. This plan had very little impact and has been referred to as barely having a “theoretical existence” (Huq 1989:7). Another Ten Year Development Plan was launched in 1951 and this was to focus on expanding economic and productive services. In this same year, the push for self-government in the Gold Coast led to the election of the first African majority government. Under the leadership of Dr. Kwame Nkrumah, the first Prime Minister of the Gold Coast, the government attempted to implement the Ten Year Development plan within a five-year period by effecting some changes in the existing the plan; the basic structure of the plan was however unaltered. Immediately after the attainment of independence in 1957, the government sought to develop a comprehensive plan for development which would foster rapid economic growth. An interim plan, The Consolidated Plan was developed to be implanted from 1958-59 during which time work on planning a Second Five-Year Plan which was expected to span the 1959-64 period began. This second plan was however aborted in 1961(Huq 1989).

policies and has been referred to as the “blueprint for the nation’s accelerated development” (Ghanaian Times 2013).

Led by the nationalist president Dr Kwame Nkrumah, Ghana’s first post-colonial government saw the Seven-Year Development plan as signifying a break from the past. Colonial planning had focused on the development of aspects of the economy which could somewhat be reached through public investments. This planning approach was “based essentially on an at best imperfectly coordinated ‘shopping list’ of department projects; a concept of planning involving little more than longer-period budgeting for the strictly administrative needs of central governments of a liberal-capitalist type” (Killick and Szereszewski 1969:95).

Unlike the pre-independence plans which focused exclusively on public works, the Seven-Year Development Plan signified the very first attempt by the Ghanaian government to develop a comprehensive plan for growing the economy. The targets and strategies for the seven-year period which the plan covered were developed in the context of a long-term plan for economic development in the country. The development plan clearly outlined proposals for sectoral programs in industry and mining, agriculture, infrastructure, education, manpower and employment, health and housing (Leith 1974). The strategy for meeting the goals of Nkrumah’s Seven-Year Development Plan could be summarized in the one word *industrialization*.

Nkrumah’s development plan was largely influenced by the dominant development theories of the time; the trickle down approach to development as well as the Rostowvian approach. Sir Arthur Lewis, one of the champions of the trickle down approach to development served as Nkrumah’s financial advisor in the early 1950s (Miescher and Tsikata 2010). Economists, like Kuznet and Chenery had also

established some generalizations which specified the expected patterns of structural transformations that needed to be experienced in any country professing to be experiencing economic growth and transitioning from a low to a middle-income status.

The Modernization Model of Kuznet and Chenery

Countries Transitioning from a low-income to a middle-income status were to experience the following:

- Rising ratios of savings, investment and exports to GDP, and a declining excess of investment in other savings
- A rising share of government consumption in total expenditures
- A proportionate shift in the composition of exports away from non-oil primary products towards manufacturing and an increasing diversification of exports
- A decline in the share of agriculture in GDP and employment, and a rise in the shares of manufacturing (and to a lesser extent) services
- Within manufacturing, a proportionate shift away from relatively simple consumer goods (food, textiles and clothing) towards industries producing intermediate inputs (eg chemicals) and later towards the production of certain capital goods(machinery) and durable metal consumer goods.
- A strong relative growth in energy consumption
- Financial deepening: a relative growth of the financial sector and monetization of economic activities
- Declining mortality and fertility rates; increasing urbanization
- The development of institutions and increasing productive utilization of modern technologies
- A growth of formal sector activities relative to the informal sector

Source: Kuznet (1964 and 1966) and Syrquin and Chenery(1989) Cited in Killick (2000)

Influenced by these development thinkers, the task of developing Ghana, for Nkrumah, necessitated a shift from an agriculture dominated system of employment and production to one dominated by non-agricultural activities. Through the modernization of agriculture, surplus labor could be released from the farms to participate in productive industrial work. Thus, whilst agricultural output grew, there would be a corresponding growth in industry. By providing a home market for manufactured goods, the agricultural sector was expected to produce significant savings to finance industrial development. With the modernization of agriculture, the sector would be able to successfully support the expanding industrial worker base, thus obviating the need for food imports to support the industrial class. The industrial sector was expected to produce consumer goods for the home market, organize for the processing of primary agricultural and mining products, produce materials for the local building industry to minimize the cost of construction, develop basic industries for the manufacture of metals and chemicals, and ultimately engage in the production of sophisticated equipment such as electronics in heavy industry. The expansion of the modern industrial sector was also expected to lead to a growth in the national income which would then be used to finance the social services to which the state was committed. Running a system of modernized agriculture and industry necessitated the availability of skilled workers and experts, making education the third sector which had to be transformed in order to make possible the realization of the objectives of the Seven-Year Development Plan (Leith 1974).

The Volta Dam and the Promise of Modernization in Ghana

An entire section of Nkrumah's Seven-Year Development Plan engaged a discussion of the Volta River Project (VRP). The Volta River Project was concerned with the construction of a dam over the Lake Volta at Akosombo for an integrated hydro-electricity-aluminum production scheme. The project also included proposals for the establishment of an irrigation scheme and the promotion of mechanized agriculture in the dam's environs.

For most newly-independent countries like Ghana, modernization came to be viewed as a necessary outcome of the struggle for independence. In its Western conception, modernization was perceived as unlocking for society the capacity to be free from the traditions that bound it, replacing this with personal liberty. Following independence, the governments of the newly independent states were faced with enormous responsibilities relating to socio-economic development and administration of the newly formed states, not forgetting the need to assert their political legitimacy (Unger 2010). Development though modernization came to signify the pursuit of future aspirations coupled with an explicit rejection of the past.

From his appointment as Prime Minister of the country, Kwame Nkrumah was committed to the creation of a heavily industrialized socialist state. Nkrumah was committed to building a new Ghana which would be a modern industrial utopia; one which would be a "metropolis of science, learning, scientific agriculture and philosophy" (Black Power 2009). Nkrumah had a vision of re-creating an African society which would be organized in a manner which allowed what he called the "humanism" of the traditional African society and culture to reassert itself in a modern

technical society (Nkrumah 1967). Nkrumah's drive for the reformulation of the ideological and philosophical underpinnings of post-colonial Ghana was not only driven by his frustration with the syncretism that characterized the post-colonial state but also by his firm belief in the fact that the very essence and purposes of capitalism stood in stark contradiction to the African society and African philosophy of life (Zack-Williams 2006). For Nkrumah, capitalism was a denial of the African personality and conscience. "Not only was capitalism unjust, but it was also unworkable and alien to Africans" (Nkrumah 1964:79).

Nkrumah believed that the attainment of true economic and social development in Africa rested on the ability of the true African to commit to a mandate of socializing the systems of production and distribution. He perceived a new and liberated Africa which would be based on a "new social synthesis in which modern technology is reconciled with human values, in which the advanced technical society is realized without the staggering social malefactions and deep schisms of capitalist industrial society" (Nkrumah 1967).

For Nkrumah, modernization through industrialization was a necessity if the political independence from colonial rule was to be considered complete. Presenting the ideology on which his political party was based in his 1957 *Autobiography* he wrote:

"No race, no people, no nation can exist freely and be respected at home and abroad without political freedom. Once this freedom is gained a greater task comes into view. All dependent territories are backward in education, in agriculture and industry. The economic independence that *should follow* (emphasis mine) and maintain political independence demands every effort from the people, a total mobilization of brain and manpower resources. What other nations have taken three hundred or more years to achieve, a once dependent territory must try to accomplish in a generation if it is to survive.

Unless it is, as it were, 'jet-propelled' it will lag behind and thus risk everything for which it has fought" (Nkrumah 1957).

These same views were expressed during the commissioning of the VRP upon its completion in 1966.

Ghana is a small but very dynamic independent African state. We are trying to reconstruct our economy and to build a new, free, and equal society. To do this, we must attain control of our own economic and political destinies. Only thus can we create higher living standards for our people and free them from the legacies and hazards of a colonial past and from the encroachments of neocolonialism (Nkrumah's speech at the Commissioning of the Akosombo Dam 1966)

Nkrumah sought for economic independence and reconstruction through a rigorous pursuit of an agenda of "a big push" for a centrally controlled industrialization effort in Ghana. Nkrumah's approach was grounded in the primacy of industry as a modernizing force in the transformation of the Ghanaian economy. This development approach has been referred to by some as the 'structural transformation' approach and was grounded firmly in the dictates of the development economics of the 1950s (Biney 2011). The Volta River Project emerged as the central and most important element of Nkrumah's modernization efforts. In the pursuit of a structural development agenda for the country, Nkrumah perceived the Volta River Project as offering the opportunity for diversifying Ghana's economy (which had hitherto depended solely on cocoa) through the production of cheap electricity for driving the industrial engine and electrifying the masses. He saw in the development of a huge hydropower project an opportunity for launching Ghana and the West African region as a whole into industrial development. Speaking at a Legislative Assembly debate, Nkrumah called the Volta River Project "a gigantic project for the industrial development of our country- a scheme which can change the face of our land and

bring wealth and a higher standard of living to our people” (Miescher &Tsikata 2010:19).

At a National Assembly meeting, whilst seeking approval for the final agreement between Ghana and Valco, Nkrumah is quoted as further justifying the project on the grounds of industrialization. He offered that newer nations which are determined to catch up in industrial strength must select large scale industrial advance. “Electricity is the basis for industrialization. That basically is the justification for the Volta River Project” (Miescher&Tsikata 2010).

Nkrumah’s vision for the role of the VRP in the modernization of the country was explicitly made. He envisioned the production of an ample supply of electricity leading to the construction of a national transmission grid system to connect the major towns with the mining centers in the South, the development of a thriving aluminium industry, the promise of saved foreign exchange through import substitution, the construction of new transportation routes, the development of a thriving fishing industry as well as the development of mechanized agriculture. Thus, with the exception of the human resource/education component of his seven year development plan, all the other objectives of the plan were directly or indirectly dependent on the Volta River Project (Miescher Tsikata 2010).

The Institutionalization of the Modern Energy-Development Paradigm in Ghana

Nkrumah’s vision

Through his commitment to modernization, Nkrumah played an all important role in the establishment of the modern energy-development linkage in Ghana. What was novel about Nkrumah’s VRP project was not the production of electricity (for

electricity had earlier on been produced in the pre-independence times¹⁵) nor even the desire for economic increase. Even though some have argued that the colonial regime actually laid the foundation for modern economic development in Ghana, this claim becomes deficient when one considers the broader criterion of a “self-reliant economic development specifically targeted at producing tangible benefits for all members of the population” (Dzorgbo 2001). Under the colonial regime, major economic development primarily in cocoa production was outwardly oriented. Ghanaians were excluded from having any ownership in the mineral wealth of the country; profits generated from the operation of the mineral industry were repatriated to the metropole. The banking and trading sectors of the economy were dominated by foreign capital. Industrial development was non-existent on the agenda of the colonial regime and human development was very limited as well (ibid).

Nkrumah’s vision was for a self-reliant economic and political development and he was successful in laying down the nature of his vision and mandate for Ghana early in his political career. He made this declaration soon after independence.

“My first objective is to abolish from Ghana, poverty, ignorance and disease. We shall measure our progress by the improvement in health

¹⁵ Before the construction of the Akosombo dam, the generation and supply of electricity was carried out using isolated diesel generators as well as some stand alone power supply systems. These were mainly owned by the mines, institutions such as hospitals and schools and factories. Public electricity supply was first started in Sekondi in the western coast of the country in 1914 and was managed by the Gold Coast Railway Administration to support the operation of the railway systems and its associated facilities (RCEER 2005).

of our people; by the number of children in school and by the quality of their education; by the availability of water and electricity in our towns and villages; and by the happiness which our people take in being able to manage their own affairs. The welfare of our people is our chief pride, and it is by this that my government will ask to be judged” (*The Great Ten Years 1951-1960*, 1960).

Nkrumah’s conflation of the development of large scale electricity and a systematic plan for economic growth through the big push for industrialization for a self-reliant development of Ghana was a novel phenomenon. The Volta River Project successfully consummated the marriage between energy and development in Ghana. For the very first time, there was a commitment to the singular aim of harnessing the power of the Volta for the betterment of the economy and the lives of the people of Ghana (and not for imperial benefit). The modern energy-development complex assumed a paradigmatic role. It now represented the overarching worldview within which the aims and conditions of Ghanaians were to be negotiated. It clearly defined what was a desirable end and what was not, it defined what true political and economic freedom meant and how it could be attained and above all it defined what the energy experience ought to look like in a truly liberated and developing Ghana.

The Mass Media

The state-run media played a significant role in propagating the promises associated with Nkrumah’s modernization vision. Popular headlines of the period included ones like these: “*Volta River Project will benefit all*”; “*Akosombo reflects Ghana’s glorious future*”. These headlines ensured that the reading public was continually reminded of the potential for growing the nation’s economy and improving the quality of the livelihoods of the citizens. On the day of the commissioning of the dam, the Evening News, linking the Akosombo Dam with the Aswan Dam, described

the two projects as signifying the “beginning of the electrification of the continent” and serving as “an inspiration to Africa” (Miescher and Tsikata 2010:21). Consistent with Nkrumah’s ideology of the path African development would take, media reports emphasized that Ghana’s industrialization would not simply take after the development patterns of the west but would follow a unique trajectory which would make it particularly appropriate to the local context.

The Volta River Authority

Another important articulator of Nkrumah’s modernization vision was the Volta River Authority (VRA). Parastatals have usually been perceived as the logical institutional mechanisms for both the planning and implementation of large dam projects and other large scale infrastructural river basin projects (Scudder 2005); this was no different in the case of the VRP. The VRA was instituted in 1961 with the enactment of the Volta River Development Act of 1961 by the Ghanaian Parliament. The Authority was to be a body corporate charged with the responsibility for the “creation of a lake by the damming of the River Volta; the construction of a dam and power station near Akosombo; generating electricity by means of the water power of the river Volta,... and of supplying electricity through a transmissions system¹⁶; for administering certain lands liable to be inundated... and dealing with the resettlement of the of people living in the lands to be inundated” (VRDA 1961). The Authority was

¹⁶ The Electricity Corporation of Ghana (ECG) was established in 1967 to replace the Electricity Department which had been created in the early 1960s under the Public Works Department of the Ministry of Works and Housing. The ECG was tasked with purchasing bulk power from the VRA for onward distribution to all manner of consumers across the country with the exception of VALCO, the mines and the Akosombo Township (Edjekumhene et. al 2001)

also charged with the task of instituting arrangements for training Ghanaian citizens in “administrative, technical, managerial and other capacities’ necessary for the operations of the Authority” (VRDA 1961).

The Volta River Development Act mandated the appointment of a VRA board by the president of Ghana. The board was to comprise a chairman and seven other members, one of whom was to be the Chief Executive Officer. Two of the remaining members were to be representatives of the major consumers with the remaining four representing the general public. The Chief Executive officer was to be in charge of the general day to day administration of the Authority. The external financiers of the project played a significant role in the selection of the candidate for the Chief Executive role. With the reason that qualified senior staff with the experience needed to manage a project of this nature could not be recruited in Ghana, the financiers of the project advised that expatriate staff be recruited for this position and retained for a while (World Bank 1961). As part of the loan agreement with the World Bank, it was agreed that the approval of the Bank would be sought in the appointment of the first *and* subsequent Chief Executives of the Authority. In order to ensure the maintenance of proper accounts in accordance with what the Bank considered “sound financial practice”, the Authority was mandated to retain “independent public accountants, satisfactory to the bank” (World Bank 1961:3). Nkrumah was mandated to confer with the president of the United States and the International Bank for Reconstruction and Development when it came to the selection of a suitable candidate for the position Chief Executive of the VRA. In this way, the VRA, the icon of Ghana’s modernization project came to bear a deep Western imprint. By the time the construction of the dam officially began, the VRA had metamorphosed into something entirely different from

what Nkrumah had originally purposed. Nkrumah had a utopian vision of a Ghanaian owned and managed mega hydro project; one that would signify true political and economic liberation from colonial and neo-colonial influences. Contrary to this, The VRP came to be shaped by powerful political and economic forces at each and every stage of the project's development.

As is usually experienced with single-purpose project authorities, the VRA became the most powerful and most successful parastatal in the country. Nkrumah's decision to commit the management of the dam to a parastatal is believed to have been influenced by the United States TVA¹⁷ (Tennessee Valley Authority) model (Scudder 2005). According to Scudder, in addition to the ardent political support enjoyed by parastatals, such corporations also tend to "attract the best available staff, who are drawn by what are usually higher salaries and better conditions of service as well as by the development vision which brought the agency into existence" (Scudder 2005:).

Shaped by a group of modern technocrats, the VRA was instrumental in promoting Nkrumah's promise of modernization. The Authority produced information booklets and pamphlets, produced scripts for radio broadcasting as well as movies

¹⁷ The Tennessee Valley area (which comprises areas of the United States drained by the Tennessee River and its tributaries, Tennessee, Kentucky, Virginia, North Carolina, Georgia, Alabama and Mississippi; the largest portion of the valley is however in Tennessee) was one of the areas most hard hit by the great depression. In 1933, the US Congress created the Tennessee Valley Authority as an independent government corporation to be led by a board of directors. The Authority was given the mandate of developing the Tennessee River system for navigation, national defence, flood control and electricity generation. Through the regional planning mandate of the Authority, President Roosevelt sought to promote economic growth in a poverty stricken part of the US by modernising the otherwise predominantly

promoting the Volta River Project and boasting the hopes of this mega development project. Officers from the Authority visited schools, giving talks and making presentations in support of the project. They also hosted visitors to site.

The Authority oversaw the organization of a travel exhibition which was seen by over a million people. The exhibition which emphasized the significance of the Volta River Project for development was seen in every district of the country by Chiefs and their subjects (Moxon 1969). This was probably one of the most successful efforts at publicizing the modernization prospects of this never-before-seen mega project to the people of Ghana.

As the agency charged with the resettlement of the communities affected by the construction of the dam per the VRDA of 1961, the VRA highlighted the development prospects embodied in the relocation process. The Seven Year Development of Plan, of which the VRP was core, presented the resettlement of communities as “an exercise in positive economic development...designed to transform the areas and the lives of the people involved” (Ghana 1964:210). In a booklet published by the VRA addressing the resettlement of the affected communities, the authority reiterated the opportunities for development that the resettlement process presented in shifting the affected communities from traditional societies into modern ones. The booklet stated that “although homes and lands would be destroyed, this very destruction could be turned to a good account if better living conditions and more efficient farming methods could be provided instead” (Jopp 1965:9).

The Dam and Beyond

The dam was finished on the 22nd of January 1966. There was a massive nationwide celebration to commemorate the official opening of Ghana's largest modern project. Dignitaries from home and abroad were invited to join in celebrating Ghana's achievement. But all this was happening against the backdrop of a country which was now deeply steeped in debt generated by the crash in cocoa prices and general fiscal mismanagement by Nkrumah's government. There was a growing sense of disaffection amongst the general public whose lives were now being impacted by Ghana's failing economy. A month after the commissioning of the dam, in the early morning of hours of February 24th 1966, Nkrumah's regime was overthrown in a coup d'etat; the coup won enormous popular support from Ghanaians who were at this time convinced that Nkrumah had failed in delivering on the promise of modernization. (Black Power 2009).

The governments that came after Nkrumah demonstrated their continued commitment to the development by industrialization ideal. Obviously, the prevailing development orthodoxies at the time had successfully instituted a paradigm of modern-energy development relations which clearly dictated what development ought to look like. Thus whereas Nkrumah's Seven Year Development plan committed up to 20% of the country's total investment budget to the development of the industrial and trade sectors, the Stabilization Plan of 1967-1969, initiated after Nkrumah's overthrow committed 56.8% of the country's total investments to the expansion of these same sectors (Aryeetey and Harrigan 2000). In fact, this fascination with the development by industrialization ideal could be found all across the African continent. Governments of African countries were more than willing to jump on the

industrialization wagon provided they could situate a financier. The differences only lay in who controlled the investments, whether state or private capital (ibid).

Summary

Guided by the dominant development orthodoxies of the time the era of industrialization and self-sufficient development was instrumental in establishing the modern pattern of energy-development relations as a paradigm of its own in Ghana. The characterization of what development meant to Ghana was established during this period. The expectations of the modern paradigm included:

- Rapid economic growth driven by the productive utilization of modern technologies in an industrial society.
- Rapid urbanization
- Greater access to urban services such as electricity
- Strong relative growth in energy consumption
- A radical shift from the traditional forms of energy to modern forms.
- Growth of formal activities relative to the informal primarily due to the transfer of populations employed in sectors of economy where the marginal productivity of labor is considered to be negligible, zero or even negative (...as seen in the traditional agricultural sector, casual jobs, porters, petty retail trading) to the formal sector where they engage in the modern industrial economy.

The significance of this era of Ghana's development experience thus relates to the era's success in firmly establishing what development meant to Ghana as well as the central role of modern electricity in the realization of this pattern of development. This is particularly important because the dominant expectations of this era have been carried on into subsequent ones. Thus whereas there were attempts in subsequent eras

to modify the approach to development, the notion of development, what it means in the Ghanaian context as well the expectations of the modern development paradigm have remained unquestioned. In the analysis of energy poverty in Oti in Chapter five, I will draw on the established paradigm expectations birthed by this development era to ascertain the extent to which the experience with modernization in Oti has succeeded in meeting the paradigm expectations of this dominant paradigm.

The Era of Basic Needs

The period following Nkrumah's overthrow was one of political instability and great economic uncertainty for the country. The results of the development by industrialization efforts pointed to a number of problems. Even though the dam worked well, the industrial utopia which had been anticipated to accompany the dam failed to materialize. Not only did factories and manufacturing plants fail to show up all over the Ghanaian landscape, but it became increasingly clearer that in spite of the commitment of the governments who adhered to the development by industrialization paradigm to raise the standard of living for the entire Ghanaian population in 'both rural and urban areas, and among different economic groups, the patterns of development that had emerged tended to concentrate development in a few economic sectors and in a few cities. What the development by industrialization paradigm had succeeded in birthing was a system of dichotomous development characterized by "wide and growing disparities in income and access to basic social and economic services, leading to growing political unrest" (Aryeetey and Harrigan 2000). The same was true with the promise of a totally electrified Ghana. Even inhabitants of some of the resettled communities who lived just a few miles from the dam site did not have access to electricity; neither was there any significant economic development

in the area. Frustrated by the financial difficulties of the time, some men in the resettled communities, who had lost their sources of livelihood with the construction of the dam, turned to alcoholism whilst the remaining moved out of the area in search of greener pastures.

Obviously, the actual experience with the industrialization experiment run directly contrary to the paradigm expectations of the modern project to which the post-independence government had been deeply committed. This pointed to the existence of an anomaly in the paradigm and like scientists in a normal scientific tradition, the government of Ghana embarked on a puzzle-solving expedition in an effort to resolve the anomaly of the modernization paradigm.

That development was a desirable end for the country remained untouched and was not questioned. Rather, as a logical next step, there were efforts to approach development differently by systematically attacking poverty through direct redistribution. There was a proliferation of “new” development concepts the central theme of which was “planning to meet basic needs” (Stewart 1985). The focus was shifted to the implementation of large integrated development projects whose aims were to ensure that the basic needs of the population were met. As part of efforts to reduce the gaping inequalities between rural and urban areas, the government of Ghana initiated a rural electrification program to promote economic development in rural Ghana. Because rural communities were unable to pay for the extension of these services to their areas (they were only made to pay 1% of the total capital cost), the government was to subsidize the electrification program for all communities with populations between 1000 and 5000. A rural electrification fund was to be set up for the running and maintenance of the electricity systems; the fund would comprise

resources from ECG dividends paid to the government, surplus from the VRA as well as any interests on foreign loans for power projects (Barfour 2009).

Summary

The era of basic needs represented the first real efforts to deal with the emerging challenges associated with the industrialization era which preceded it. A central element of this era was the focus on supplying modern energy directly to poor rural communities outside of the larger industrialization efforts. Rural electrification programs which aimed at specifically providing electricity for poor households were birthed during this period.

The Era of Pro-Market Reforms

By the early 1980s the impressively healthy Ghanaian economy of the early 1950s¹⁸ had deteriorated immensely; the economy was in shambles with large fiscal deficits. This was attributed to “inappropriate macroeconomic and institutional development policies” in the previous development eras, together with various external shocks. Government intervention in the economy together with the expansion of the public sector was believed to have served as a disincentive for the accumulation of private capital. In addition to this, distorted exchange rates and a shortage of foreign

¹⁸ Ghana was the world’s leading exporter of cocoa in the early 1950s. The average output of cocoa was 370000 tonnes per annum and cocoa alone accounted for 50% of the country’s GDP (Dzorgbo 2001). Even though the cocoa economy was a peasant one, it is believed to have brought much improvements in living standards such that before the Second World War, “Ghanaian farmers in the cocoa-growing areas were judged to be better off monetarily than the majority of peasants in South-Eastern Europe” (Rimmer 1992:2). Judging by per capita income, Ghana was a middle income country and was one of the richest countries in Sub-Saharan Africa (Dzorgbo 2001)

exchange was believed to have contributed to a significant decline in the growth of real per capita income. Most of the educated labor force emigrated from the country to neighboring African countries in search of greener pastures (Aryeetey and Harrigan 2000).

1983 was the nadir of Ghana's economic story. In January of that year, Nigeria announced the expulsion of all undocumented alien workers from its territory. An estimated 900000-1.2 million of these aliens were Ghanaians who had migrated to Nigeria in earlier years to seek greener pastures; these represented about 8.5% of the Ghanaian population at the time (Brydon and Lygge 1996). The government of Ghana was faced with the enormous responsibility of providing food, healthcare, transport and other incentives to enable these people reintegrate into the Ghanaian workforce. Given the very poor support the international community offered to the Ghanaian government's petition for dealing with this influx of people, assisting these groups of people placed an enormous strain on the country's already ailing economy (ibid).

With the support of the World Bank, the International Monetary Fund and some bilateral and multilateral donors, the government of Ghana embarked on an Economic Recovery Program (ERP) in 1983. The aim of the program was to salvage the Ghanaian economy from further decline through the adoption of comprehensive reform measures and policies aimed at the restructuring the fiscal, monetary and trade sectors. Like all structural adjustment programs, Ghana's ERP sought to stabilize the country's economy in a manner which ensured that it was able to successfully adjust to both internal and external shocks so as to promote sustainable growth and development (Aryeetey and Harrigan 2000). Reform orthodoxy called for a more

effective management of resources in the public sector, the liberalization of trade and exchange sectors as well the adoption of a flexible exchange rate policy (ibid).

Adjusting the Energy System

That same year (i.e. 1983) a series of natural disasters plagued the country. In March of 1983, massive bush fires ravaged the interior of the country; swathes of farms were completely destroyed leading to enormous food and cash crop losses. The 1982-83 dry season was particularly severe and long and the rains were late (Brydon & Lygge 1996). It was at this time that the Akosombo dam encountered a problem which had hitherto not been envisaged by the VRA. The drought and subsequent low rainfall in the catchment area of the Akosombo seriously compromised electricity production from the dam; the nation was faced with its first power crisis. The architects of the Volta River Project had not foreseen this problem. If anything, they had been more concerned about possibilities of flooding; for the dam was equipped with twelve floodgates (Miescher & Tsikata 2012). By December of 1983, a power rationing program was instituted. With the exception of essential public services such as hospitals, water stations and some government offices, power cuts were initiated throughout the country.

A National Energy Board was also formed in 1983 to define a comprehensive plan for the development of energy resources in the country. The NEB began actual operations in 1985 and grew to become an important agency for energy planning and policy analysis (Brew-Hammond 1998). It was finally dissolved in 1991 due to growing institutional conflicts (Brew-Hammond 1998).

An important offshoot of the Economic Recovery Program was the establishment of the National Electrification Program (NEP). In addition to the ERP's

focus on economic development in the agricultural and mineral resources sectors, the program was also committed to stemming the problem of rural-urban migration which the basics needs had of the early 1970s had unsuccessfully attempted to address. The Government of Ghana saw improvements in the livelihoods of rural dwellers as pertinent to stemming the rural-urban drift. The government identified the extension of modern electricity to rural areas as a core element in promoting socio-economic development in these areas, hence the establishment of a National Electrification Scheme (NES); the scheme clearly outlined a policy for universal electrification in Ghana by the year 2020 (Abavana 2004). All communities with populations above 500 were eligible for electrification under this national program. At the inception of the program in 1989, 4221 communities in Ghana had reached the 500 threshold. Out of these, only 478 had access to electricity. As a country struggling to emerge from a devastating economic downturn, the NEP was to serve the function of alleviating poverty and improving the standards of living for the poor and the general socio-economic conditions of the country. Detailed plans were laid down for the construction of new generation and transmissions facilities as well as the reinforcement of existing ones. The purpose of the program was to facilitate the productive uses of energy in the recipient communities by promoting the development of indigenous industries and improving the performance of relevant sectors of the economy such as agriculture, health, education and tourism (Abavana 2004).

At the start of the NEP in 1990, national electrification stood at about 28%. Rural access to electricity was at this time estimated to be less than 5% in spite of the ambitious rural electrification program which had been instituted earlier on in the early 1970s. The NEP was scheduled to progress in two phases. The first phase

focused on the electrification of all 110 district capitals in the country. At the start of the program, 46 of these district capitals were connected to the grid. The second phase was to focus on the electrification of communities, with precedence given to the most economically viable projects. Communities with potentials for the development of small-scale industries, those which served as or had the potential to serve as commercial market centers as well as those with tourism potentials and historical relevance were prioritized over those communities which did not have these advantages (Vanderpuye 2010).

After the NES took off in 1990, the government of Ghana initiated a complementary electrification program, the Self Help Electrification Program (SHEP) to speed up the electrification process. Under this program communities which were willing to “help themselves” by facilitating the electrification of their communities received support from the government to speed up the electrification process in their communities. The program was aimed at encouraging communities to embrace and offer their full support to the government’s effort to extend grid electricity to all by 2020. To qualify to participate in the SHEP communities were to be located within 20km of an existing 33KV or 11KV sub-transmission line, should have procured all the poles needed for the low voltage distribution network within the community and have a minimum of 30% of the houses in the community wired and ready to receive electricity service (Abavana 2004). Once these conditions were satisfied, the communities received the support of government in completing the electrification process much earlier than would have been realized under the original NES timetable (Vanderpuye 2010).

Overhauling the Power Sector

About a decade after the droughts of 1983 which led to serious curtailments in power production at country, the Volta Lake was hit by another drought in 1993-1994 which severely affected electricity production in Ghana. As of this time up to 99% of the country's electricity was being solely generated from the Akosombo and Kpong hydrodams¹⁹. Electricity demand was growing. The economy was gradually picking up from the slump in the 1980s. The NES had also increased the number of Ghanaians who had access to the grid, leading to a steady growth in demand. The government of Ghana recognized the need to diversify Ghana's electricity sources as a buffer against future droughts, to make up for the increasing domestic demand and to satisfy contractual obligations to VALCO as well as the export market. This demanded substantial financial investments into the power sector by the government of Ghana. It was projected at the time that about \$1.5 billion would be required to finance infrastructural development in the electricity sector and another \$1.2 billion for the addition of new generation capacity in order to satisfy the growing demand and build up a reserve margin of about 25% (Power Sector Reform Committee 1994). In addition to this, about \$200 million was needed for the expansion and reinforcement of transmission networks and the improvement of distribution infrastructure (Opam and Turkson 2000).

The traditional financier of power projects in Ghana, the World Bank, had however at this time demonstrated its unwillingness to further finance the

¹⁹ The VRA reinstated the Tema Diesel Generating Station in 1990. It provided some 30MW of power to supplement what was being produced by Akosombo and Kpong (Obeng et al. 2009).

development of power projects in developing countries unless those countries showed some commitment to reforming their power sectors which the Bank considered to be seriously defunct. The Bank's reform mandate consisted of several components. The power sector was expected to demonstrate a greater level of transparency in power generation through the institution of regulatory and legal frameworks that limited interference by the government in the day-to-day operations of power companies. Developing country governments were also encouraged to import power expertise from the developed countries as a means of improving the efficiency of power sector management in the country. The Bank also mandated the commercialization of the power sector and the encouragement of private sector participation in power production in many developing countries (Edjekumhene et. al 2001).

With an ailing power sector and a dire need for financial resources, the government of Ghana embarked on a program to reform its power sector. A Power Sector Reform Committee which comprised representatives from the Ministry of Mines and Energy, the VRA, the ECG and the private sector, was established to work out the modalities of the reform process (Edjekumhene et. al 2001). The reform process led to significant changes in how electricity generation, transmission and distribution was structured, the institutional and regulatory framework that guided it as well as the players in the power sector (See Appendix for details on reform process).

Universal Electrification in an Age of Reform

Ghana's universal electrification was a government driven initiative which was largely funded by government resources. What happens to this government driven initiative in an age of reform? Obviously, it is impractical for private actors in the power sector to provide electricity to all consumers in their distribution zones simply

on demand. Consumers had to be able to demonstrate an ability to pay for electricity services. The government thus enacted a mandate that required private distributors to provide service on demand to urban centers and areas covered by the district capitals electrification program as well as those communities that qualified for electricity connections under the SHEP.

The implementation of the power sector reforms led to significant tariff hikes in May 1997. This was greeted with much national dissatisfaction, leading government to temporarily suspend the price increases. A Public Utilities Regulatory Commission (PURC) was established in 1998 to review electricity tariffs. The revised electricity tariffs still showed an increase of about 300% (Edjekumhene et al. 2001). A subsidy system was developed to cater for low income residential consumers, the “lifeline supply tariff”. The lifeline consumption was an estimate of the basic electricity requirements for rural and poor urban households. It was estimated at 50kWh/month and attracted a flat rate of 4000cedis (now 4GHC) (Edjekumhene 2001). Some later studies have found these subsidies to largely ineffective owing to the fact the 50kWh/month had proven to be insufficient since the targeted population mostly dwell in communal houses with multiple families (ESMAP 2003). There has thus been general dissatisfaction with the tariff increases that accompanied the reform process especially as most people put it “this has not been associated with any increment in the money that comes into their pockets”. On the other hand the utilities and some bilateral and multilateral agencies have been pressuring the PURC for further increases in tariffs since they claim the present rates are uneconomic and do not permit the recovery of the full cost of electricity service provision (Edjekumhene 2001).

Summary

The era of pro-market reforms was intended to rectify the failures of the preceding eras; efficiency was the *alter ego* of this era. Efficiency was pursued through the dual effort to systematically engineer both the economic and political systems of Ghana. A National Electrification Program was instituted during this period. Ghana's power sector was also re-structured to promote more efficient outcomes. In Chapter five this era will be revisited to provide an understanding of how these broader level transformations conditioned economic, political and energy experiences both on sub-national levels like Kumasi and in local spaces like Oti.

The Post-Reform Era

By the year 2000 Ghana's ambitious electrification program had been running for well over a decade. By this time up to 60% of the communities targeted to be covered by the NEP had been connected to the grid. What this rate of electrification achieved however were modest improvements in the welfare of the recipient communities, particularly in the areas of health, education and water supply. The anticipated socio-economic development and the transformation in the standards of living of the recipient communities were not realized (Abavana 2004). This has been attributed to the fact that the electricity supplied to the communities was not utilized in activities which could be characterized as "productive" in an economic sense, hence there was no creation of jobs and other income-generating activities for the recipient communities. Rather electricity was largely used for domestic purposes, particularly for entertainment. This has been identified as the biggest failure of the NEP (Abavana 2004).

In the economic arena as well it became increasingly clear that the structural adjustment of the nation's economy had not had the desired impact. Performing an assessment of the impact of liberalization policies of the ERP on the Ghanaian economy, Aryeetey et al. offer that:

“The performance of Ghana's financial system has not differed greatly between the interventionist and liberalized policy regimes. While the range and competition of financial institutions are undoubtedly greater today than in the 1970s, the system remains fragmented, financial depth has recovered little from the sharp decline of the early 1980s, short term liabilities and assets continue to dominate and high spreads do not betoken improved efficiency. Ghana's experience demonstrates that, on the one hand, interventionist financial policies are largely ineffective in facilitating the growth of priority productive sectors, and on the other hand, simply liberalizing restrictive policies is not sufficient to stimulate a deeper, efficient, more integrated financial sector”.

(Aryeetey et al. 2000)

Killick expresses similar sentiments about the effects of Ghana's so-called economic reform. He conducted an extensive review of the impact of the Economic Recovery Program on various aspects of Ghanaian socio-economic life by assessing changes in these between 1960 and 1994. He concluded that the Ghanaian economy remained fragile despite structural reform efforts and describes the situation as a “muted response of the economy to the measures introduced since 1983” (Killick 2000:65). Speaking of the post-reform Ghanaian economy he identifies the weakness of the structural aspects of the reform program:

The relatively unchanging nature of the economy and the near absence of the types of economic resource allocation looked for in adjustment programs...the too-low levels of savings and investment and the apparent absence of financial deepening suggest a still limited flexibility in the economy, as also, we would suspect, do the very limited technological capabilities in agriculture, industry and elsewhere in the economy' (Killick 2000:65)

By 2001, Ghana had opted to join the Highly Indebted Poor Country (HIPC) initiative. The initiative which was spearheaded by the World Bank and the International Monetary Fund was aimed at creating a framework for the poorest and most heavily indebted poor countries to secure debt relief from their creditors (including multilateral creditors). The debt relief provided was to help create an environment that promotes economic growth and poverty alleviation in those country whose indebtedness placed constraints on their ability to effectively develop (Afoom 2011).

In keeping with the requirements of the HIPC initiative, the Government of Ghana developed the Ghana Poverty Reduction Strategy. The Strategy defined a comprehensive set of policies which clearly outlined the country's road map for sustainable economic growth and poverty alleviation for its medium-term development from 2003-2005²⁰ (Afoom 2011). The country's poverty reduction strategies have been targeted at a number of thematic areas: macroeconomic stability; the promotion of competitiveness in Ghana's private sector; agricultural modernisation and sustainable resource management; agricultural modernization and sustainable natural resource management; oil and gas development; infrastructure, energy and human settlements development; human development, productivity and employment; transparent and accountable governance (IMF 2012).

A careful consideration of the components of the poverty reduction strategy reveals that there has not been much change in the elements of development being

²⁰ This plan was succeeded by the Growth and Poverty Reduction Strategy which covered the period from 2006-2009. This was also succeeded by the Agenda for Shared Growth and Development (2010-2013) (IMF 2012).

pursued by the country presently as compared to the components of Nkrumah's development efforts over a half century ago. With the exception of the commitment to a transparent and accountable governance system and the development of the oil and gas industry (which is a rather recent addition to Ghana's economic profile) all the remaining objectives of the poverty reduction strategy remain clearly identical to Nkrumah's original development commitments. Development as economic growth through industrialization remains the ultimate aim of Ghanaian governments, academics and development experts.

Energy in Ghana's Poverty Reduction Strategy and Beyond

With the adoption of the poverty reduction strategy, the government of Ghana adopted an official energy policy; access to adequate supplies of energy was seen as pertinent to attaining the goals of the poverty reduction strategy. There was a focus on the provision of high quality energy for promoting industrialization, cost-recovery pricing of electricity services (taking into account the protection of the poor from high tariffs), a continuation of the ongoing rural electrification efforts, as well as the promotion of energy efficiency and the use of renewable energy sources in rural electrification (Obeng et al 2009).

In 2006, the Energy Commission developed the Strategic National Energy Plan (SNEP). Guided by ten broad objectives²¹, the plan set out a comprehensive strategy for the efficient utilization and management of the country's energy resources for the promotion of economic growth across all sectors of the economy. The Energy for Poverty Reduction Action Plan (EPRAP) was also a policy document developed for

²¹ See Appendix

the Ministry of Energy in Ghana. It also had the objective of promoting access to electricity and other modern forms of energy to facilitate the provision of social services and socio-economic development in poor communities (Obeng et al 2001). Although not formally adopted by the government of Ghana as binding policy documents, the SNEP and the EPRAP nonetheless re-echo the perceived centrality of modern energy to development efforts in Ghana even in present times.

Since the institutionalization of the energy-development paradigm by Nkrumah as the guiding principle for the advancement of modern Ghana, there have been over five decades of interventions aimed at maximizing the benefits of this paradigm. The results of these interventions can be at best described as modest when these are compared to the prevailing challenges and those that potentially lie ahead. The dream of extending access to cheap electrification for industrialization and for domestic consumer needs has not been realized. As the year 2020 draws closer, there is increasing doubt as to whether Ghana can actually achieve the target of universal electrification by 2020 as originally espoused under the NES. It has been offered by some that radical shifts in the current trajectory of the electrification process will have to be made if Ghana is to meet its universal electrification target by 2020 (Akuffo 2009).

The challenges to the modern energy paradigm have not succeeded in shifting the country's focus away from mega energy projects. For example, despite the failure of Akosombo to deliver on its promise of energy for all, the government of Ghana has proceeded to build a new \$790 million 400 MW hydro dam across the Black Volta at Bui in the Northern belt of the country. Like Akosombo, the Bui dam is also expected to contribute to socio-economic development through improved agriculture and water

access as well as the creation of jobs. To date, seven communities, with more than 1200 residents have been relocated due to flooding caused by the construction of the dam. The first power was generated on the 3rd of May 2013 from one of three generating units, adding 133MW of electricity to the national grid. The full project was commissioned in December 2013 (Bui Power Authority 2014).

Bui promised to increase the country's generation capacity by 20%. But by mid-June 2014, Ghana was deeply steeped in an energy crisis which resulted in a national load shedding exercise. At the height of a national energy crisis, the Bui Power Authority announced the closure of two of its three turbines due to low water levels (Bui Power Authority 2014).

The commitment to megaprojects is even better appreciated when one considers Ghana's pre-occupation with regional energy projects as the panacea to present energy problems. The West Africa Gas Pipeline (WAGP), a 678 kilometer pipeline stretching from Nigeria through Togo and Benin, and then to Ghana is expected to provide purified natural gas for power plant and industrial uses in Ghana and the other countries. In Ghana, 85% of the natural gas transported through the pipeline is expected to be channeled into power production in the VRA's Takoradi Thermal Power Plant with the rest being channeled into industrial activities. Ghana received its first supply of natural gas from the West Africa Gas Pipeline in December 2008 (WAGP Company 2014). Yet, the project made no difference in Ghana's crisis prone energy condition.

Ghana has also elected to participate in the creation of the West African Power Pool (WAPP). A brainchild of the Economic Community of West Africa States (ECOWAS) the WAPP project aims at integrating "the operations of national power

systems of ECOWAS member countries into a unified regional electricity market, which will, over the medium to long term, assure the citizens of ECOWAS Member States a stable and reliable electricity supply at competitive cost.” (WAPP 2014). It is unknown if the studies in support of this project even attempted to consider past experiences with megaprojects such as the Akosombo or the WAGP, which saw the investment of millions of dollars with no appreciable results for Ghana’s economy and power sector.

The failure of the modernization paradigm which has guided energy-development relations is now evident to many and efforts at articulating alternatives are already emerging from certain quarters. There has been a call for a shift of concentration from centralized electricity grids to off-grid options such as solar PV in poor remote communities (Obeng et. al 2002). Though isolated solar PV systems have been lauded as viable and cost-effective alternatives for low-voltage applications in rural and off grid areas, their adoption has been limited as well. Some of the problems which impeded access to grid electricity are also affecting the adoption of these non-grid options. The low rate of adoption of off-grid solar PV systems has been attributed to the lack of local markets, financing and the high costs of installed systems (Obeng et al. 2009).

Summary

The post reform era depicts the prevailing environment within which energy-development relations are presently experienced in Ghana. The contradictions experienced in energy-development relations in all previous eras seem to be culminating into one large contradiction in the era now operative. This study perceives energy poverty as one of many dimensions of this huge contradiction. The era is

however successful at establishing the entrenched commitment to the modern ideal in Ghana, in spite of the contradictions experienced. The era accepts the modern ideal as given and situates the solutions to the observed contradiction in the further articulation of the paradigm. In Chapter five parallels are drawn between these broad contradictions with energy development relations on the national level and that experienced in the local space, Oti. Can the problem of energy poverty in Oti be rectified on the basis of the prescriptions of the post reform era?

Chapter 5

ENERGY POVERTY IN OTI

Oti in History

Even though the exact time of its actual formation is unknown the history of Oti is believed to be traceable to the early to mid 1900s when a group of families migrated from a neighboring village Asaago, and resettled in an area across the Oda River in the Ashanti Region of Ghana; this area is now Oti. Located by a river bank, Oti was a prime location for agriculture and quickly became established as a thriving agrarian community. There was an effective trade system between Oti and neighboring villages. Like other surrounding villages Oti had an economic connection to Kumasi city very early in its formation. Kumasi was 40km north of Oti and by the mid-1900s colonial activity in the city, particularly the construction of a railway linking Kumasi to the Coast, established the city as a major center of commerce in the Gold Coast. The urban concentration and infrastructural development engendered by colonial activity in the region encouraged in-migration from the neighboring towns and villages into Kumasi city. The agrarian community of Oti took advantage of the growing market in the thriving city center for its agricultural market.

Oti in the Era of Industrialization and Self-Sufficient Development

By the attainment of independence in Ghana, Oti was a well established village community with a thriving agrarian economy. Firewood was the primary energy source. This was perhaps a reflection of the general energy situation in the

country at the time; biomass converters were dominant energy sources for residential communities. Electricity use was particularly dispersed and confined to the mines and principal government offices. Electricity supply was unreliable and there was very little growth in consumption. In fact with the very first switch on of the Akosombo hydroelectric station the country's total recorded power demand was 70MW (RCEER 2005)

The singular commitment to industrialization for economic growth on the national level during the era of industrialization generated significant changes on sub-national levels and thus in places like Kumasi; this eventually translated into changes local places like Oti which had strong connections to the big city. An integral element of Nkrumah's post independence effort to modernize Ghana focused on transforming the cities of Ghana into centers of industrial production. In Kumasi, a planning scheme was developed in 1963 and this served as a blueprint for the development of the city. The scheme comprised clearly defined plans for the development of the industrial, commercial and residential areas of the city.

Even though Nkrumah professed a commitment to the development of an egalitarian state, devoid of the inequalities that characterized the colonial regime it was only a matter of time until it became apparent that the so-called new industrial pattern of development was closely mimicking that of the colonial experience. Industrial development became concentrated in what has been called the "golden triangle": Kumasi, Accra-Tema and Sekondi-Takoradi. 59.5% of all the industrial settlements were located in Accra-Tema, 16.5% in Kumasi and 10.5% in Sekondi-Takoradi (Songsore 2010). Like the colonial period, there was also a concentration of administrative government roles in these cities. Urbanization increased very rapidly

during this period stimulating a corresponding growth in the size of the urban population; there was a 7.8% growth in the urban population between 1921 and 1960 (Adarkwa 2012).

As early as the 1960s the Ashanti Region of Kumasi was already placed as the second most urbanized region in the country and has remained so over the decades. Accounting for about a third of the total population of the Ashanti Region, Kumasi is said to have maintained an urbanization level above the national average since the 1960s (Songsore 2000)

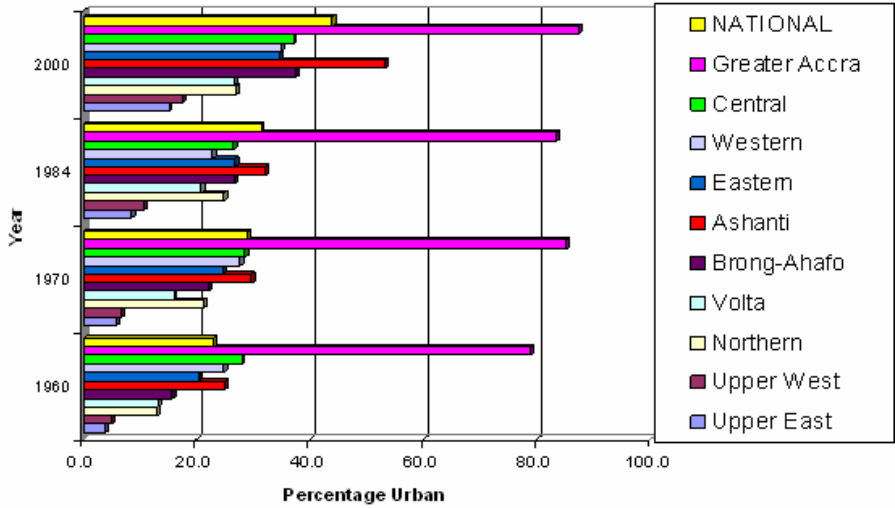


Figure 5 Regional Urbanization Trends in Ghana (1960-2000)

Source: Songsore, 2010

As one of Ghana’s established central cities, the rapid growth of Kumasi attracted much migrant labor and school leavers respectively to the city. Kumasi began to grow and with it, the aerial expansion of the city was set in motion. This initial

spatial expansion of Kumasi city did not alter Oti's own spatial boundaries in any way. Rather, it provided a thriving market for the now expanding agrarian economy of the Oti village.

If Nkrumah's development plans for the country, which were embodied in the expectations of the era of industrialization were realized, then rural communities like Oti were set for significant transformations, not only in their economic structures, but in their social and infrastructural composition as well. As a typical agrarian community, the era of industrialization was expected to bring to a community like Oti, massive transformations in their system of agricultural production which was to become increasingly mechanized. Much of the agricultural labor force who would be "freed" from agriculture owing to its increased mechanization would be expected to be absorbed into the anticipated industrial sector which would be birthed through Nkrumah's push for industrialization. The construction of the Akosombo dam and its promise of providing ample supplies of electricity for industrialization and the electrification of communities meant for the people of Oti, the promise of a future where modern electricity rather than the present biomass converters dominated their energy mix.

Oti in the Era of Basic Needs

By the beginning of the early 1970s, Nkrumah's industrialization experiment had been running for well over a decade. The dam had been built and Ghana had commenced production of its own modern electricity. The pursuit of a clear agenda for economic growth that would transform the lives of each and every Ghanaian was already in motion. But the economic, social and infrastructural experience of Oti remained pretty much the same as it was at the start of the era of industrialization.

The respondents interviewed for this study had lived in Oti anywhere from a few months to over twenty years.

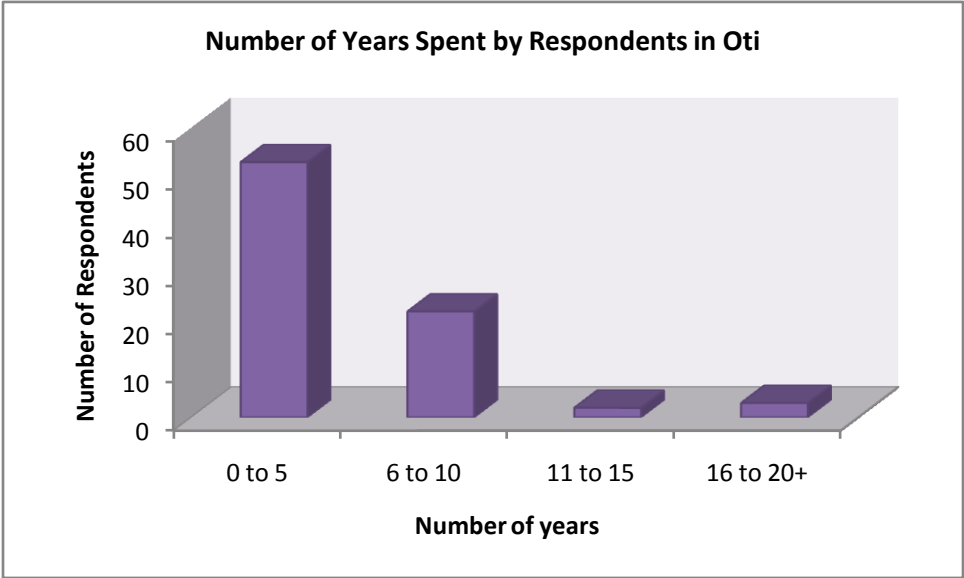


Figure 6 Number of years spent by respondents in Oti

The perspectives of respondents who had been in Oti during the era of basic needs were thus captured. These respondents recounted that the community was still completely agrarian during the era of basic needs. Firewood was the sole source of energy during this period as well. It must be borne in mind that with the onset of this era, the first state-supported rural electrification efforts had been set into motion. Oti was undoubtedly left untouched by these early electrification efforts. In fact, it is interesting to note that four decades after this era, the energy use dynamics of this particular group respondents shows a continued dependence on biomass converters as primary energy sources.

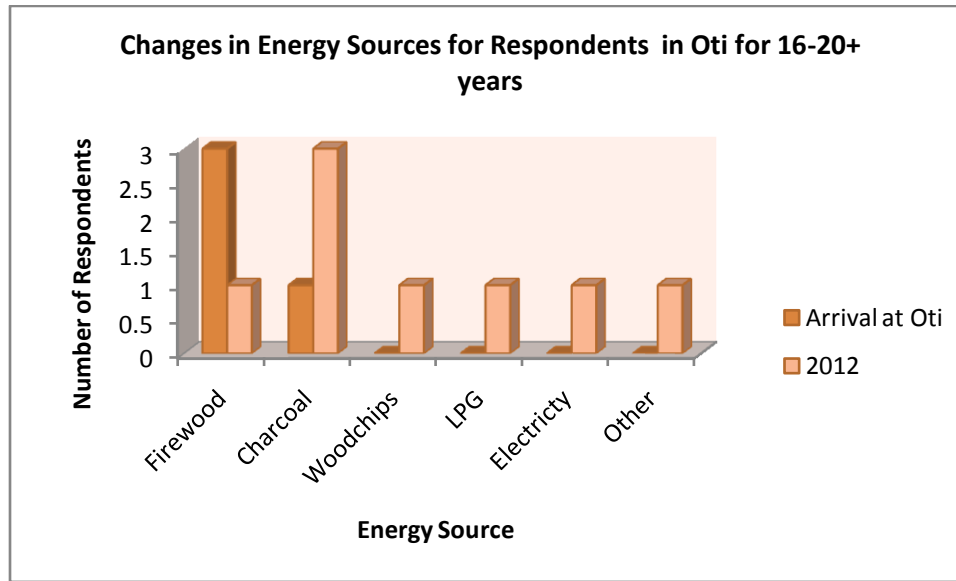


Figure 7 Changes in Energy Sources for Respondents in Oti for 16-20+ years

There has been a replacement of firewood with charcoal as the primary energy source but traditional biomass in general remains the most important. In terms of income generation, all the respondents in this group reported that they had been involved agriculture in their early years at Oti. Only one of them remains in small scale agriculture presently; the others have moved on into wage labor.

Box 1

Kwame was born in Oti. He is forty years old now. He grew up in a family house which basically housed his entire extended family. Believed to be one of the very early families to have moved into the Oti area, Kwame’s family was well known for their agricultural prowess. His great-grandparents cultivated huge swathes of land in Oti. Today, Kwame works as wage laborer in Oti. Land values in are rapidly changing. Private companies and individuals are acquiring and developing the land in the area at an unprecedented rate. A typical day in the life of Kwame involves waking up early and making it to the construction site by six o’clock; on a good day he could be hired by 9 o’clock when the foremen normally arrive.

Kwame recounts how the agricultural legacy of his family was brought to an abrupt end when his family was informed that an area of land which his family had cultivated for years had been acquired by the Kumasi Metropolitan Assembly²² (KMA). The tradition in the area was that lands which were acknowledged as belonging to the village could be cultivated by members of the village they being considered as having usufruct rights to such land. It was only when they showed up on their farm one fine day to see huge tractors surrounding the area that they learnt that the area was going to be developed into a landfill site by the KMA which at this time was running out of space dealing with the enormous amounts of waste being generated in Kumasi. Today, the area which once secured the livelihood of a family over generations serves as a landfill site for the city of Kumasi.

Since his birth, Kwame's family depended on firewood for the satisfaction of their energy needs. This was obtained for free from the farm. Kwame's family has had to shift to the use of charcoal since the abrupt end of their agrarian livelihood. Even though the electricity grid has been extended to much of Oti now, Kwame's family does not have access to electricity. Much of their energy needs are met with charcoal. Electricity is way too expensive for them to afford and given the erratic nature of his income, he couldn't afford paying monthly bills. What matters to Kwame now in terms of his energy needs is using an energy source which is cheap, reliable and accessible.

Oti in the Era of Pro-Market Reforms

It was not until the late 1980s into the early 1990s that Oti began to experience transformations in its spatial economy; a ripple effect from the rapid urbanization and expansion of Kumasi city. The process was very gradual at first; there was a slow trickling in of migrants, mostly from the northern region and the south-eastern border of the country and later from Kumasi city itself. By this time, Ghana's economic

²² The Kumasi Metropolitan Assembly (KMA) represents the highest political authority in the Kumasi Metropolis. It directs all other forms of administrative authority in the metropolis. It is charged with promoting socio-economic development for the improvement of the livelihoods of inhabitants of the metropolis (KMA 2011) <http://www.kma.gov.gh/kumasi-metro/page/5102/about-us>

recovery program had been set in motion. The nation’s ambitious national electrification program had also been instituted. Oti, had at this time reached the 500 person threshold required of communities to participate in this national scheme.

By the end of the 1990s, a whole decade after the institution of the NES Oti still had no access to electricity; in fact the dynamics of energy use at the interface was not too different from what had been experienced in the era of basic needs as indicated in Figure 7 below; biomass converters remained significant energy sources in Oti.

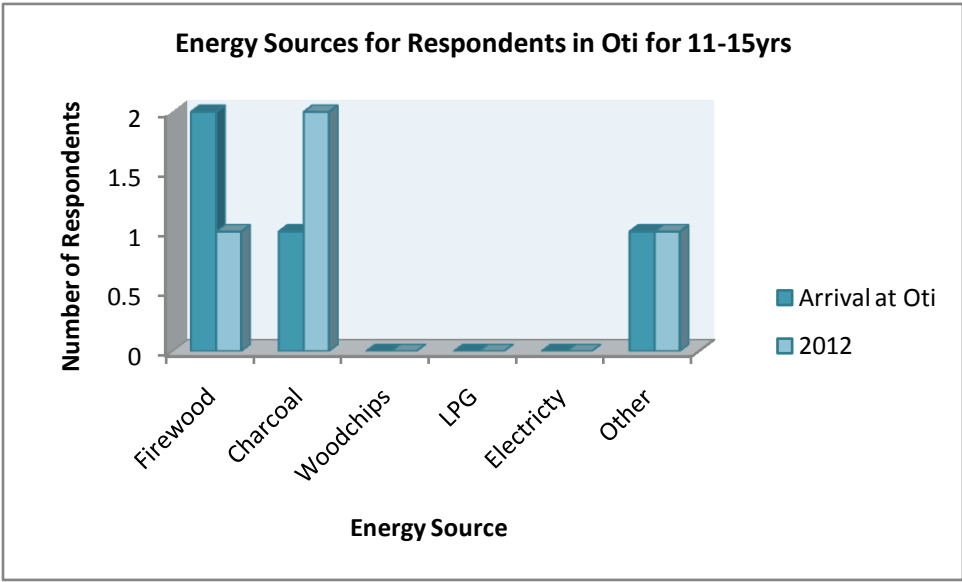


Figure 8 Energy sources for respondents in Oti for 11-15 years

Communities like Oti were in mind when the SHEP was instituted under the NES, but Oti was unable to take advantage of this program to speed up the electrification of the community. Talking of livelihood changes in Oti over the years, respondents who had been in the area during the era of pro-market reforms reported

significant transformations in the community during the period; there were changes in the community's political, economic and social structures and these seem to have driven by broader changes on the national scene.

As mentioned earlier, the reform that swept the Ghanaian landscape in this period was not only an economic one; it was a political one as well. As part of Ghana's ERP, a decentralization program was instituted. A local government law, PNDCL 207 in 1988 established a decentralized system of governance through a system of district assemblies together with a number of lower level local governance structures. These had direct implications for political organization on sub-national and local levels like Kumasi and Oti respectively.

In the main urban centers like Kumasi, the local governance structures were called metropolitan or municipal assemblies (Devas and Korboe 2000). According to reform orthodoxy, the creation of the local governance structures would generate outcomes which were more *efficient, effective, sustainable and equitable*. By shifting away from the central government system to local governance structures, it was believed that these local governments would be more democratic and accountable, closer to and more responsive to the needs of the local people through participatory approaches to development and would be best positioned to provide the high quality services needed for the development of local communities (Naab 2005). The Kumasi Metropolitan Assembly was established as the primary institution for local governance in Kumasi City. The KMA further comprises 4 sub-metropolitan councils, 24 town councils and 403 unit committees (Devas and Korboe 2000). The many convolutions in the governance structure of Kumasi in the name of effective democratic governance were not without consequence for the community of Oti. Kumasi and its conurbations

were brought under the jurisdiction of the KMA. Originally a society in which traditional chieftaincy structures were solidly ingrained with a well defined system of interaction between chiefs, sub-chiefs, lineage and clan heads, and well defined systems for redress, this re-organization of governance structures had significant implications for the people of Oti.

The adoption of democratic decentralization brought with it an almost complete erosion of the power of chiefs as traditional authorities in Ghana. This erosion of the political power of traditional authorities had already begun with Nkrumah after the attainment of independence. The political authority of traditional chiefs had earlier been entrenched more deeply with the introduction of indirect rule by the British in the administration of the Gold Coast from 1878 to 1951. The colonial government ruled indirectly through native authorities i.e. the chiefs and some other traditional elders in local communities. According to Nkrumah, what the institution of the system of indirect rule did was to replace the “downward accountability of the chiefs to the people with an upward accountability to the colonial authorities; the democratic ideals underlying chieftaincy in Ghana, which made chiefs accountable to their peoples, began to suffer as the recognition by the central government was more crucial to the chief than the support of his people” (Nkrumah 2000:55).

Linking traditional chiefs to the colonial system, their power was seen as a threat to Nkrumah’s effort to build a centralized state. Thus, one of his earliest efforts after independence was targeted at stripping these traditional authorities of their political power. Chieftaincy practices such as enstoolment and destoolment which for a long time had remained the preserve of the populace and elders of the communities over which these chiefs ruled saw significant interference from the state. Chiefs

however continued to retain their legitimacy through the significant roles they played as custodians of land, culture and as the spiritual heads of their communities.

Democratic decentralization in its western conception has been based on rationalism, individualism and a technocentric approach to social organization. Traditional chieftaincy structures on the other hand were originally based on communalism, consensus building and the promotion of a peaceful coexistence between the communities over which they ruled (Taabazuig 2010). Even though such chieftaincy structures have been retained, the authority of chiefs has been questioned as these are considered non-democratic institutions with little or no place in a democratic arrangement. Thus, the institution of formal local governance structures with democratic decentralization has led to the operation of two parallel systems of local governance; for in many cases the differences in ideology between the formal governance structures and the traditional governance structures stand in the way of them co-operatively working together for the good of the local populace.

Because the formal local governance structures gain their legitimacy and power from the central government authorities, they, like the chiefs in the colonial era tend to place their accountability to the president and the ruling political party over the needs of the local people in their jurisdictions. At the same time, the formal nature of these new decentralized government structures has also embodied a form of exclusion where the poor, marginalized and uneducated are sidelined and unable to relate their grievances for redress in this formalized elitist system. These are the everyday people who are traditionally represented by chiefs and other traditional rulers; thus alongside the drowning of the voices of the traditional rulers, the voices of the common people they represent are drowned as well.

In order to regain some political legitimacy and make up for their declining authority some chiefs have realized the need to embrace modern development roles in addition to their more traditional roles. Traditional rulers are coming to terms with the appeal of development in the modern arrangement; their roles as development brokers are becoming increasingly significant (Olivier de Sardan 2005). Thus, whereas chiefs are officially not permitted to engage in party politics in Ghana, the role of chief as development broker now necessitates his forming allegiances with the political elite in order to access development projects for his community. The role of chiefs as development brokers has however in some cases resulted in the alienation of these authorities from the real life concerns of the people over which they exercise their authority.

The continued blurring of the role of the chief in the modern arrangement has been experienced in various ways at Oti. In one such instance, residents recounted how their chief, without consulting the local community, entered an agreement with the KMA to build a landfill site in an area which was otherwise a large farm land cultivated by locals like Kwame whose story was earlier presented. Electricity was to be generated for the Oti community and beyond from the municipal solid waste collected from the landfill. Respondents who lived in the area through this period, reported the seeming emasculation of the authority of the chief and his increasing allegiance to the “big men up there”. They explained that it was difficult to ascertain what the exact role of the chief was in the present arrangement and where his allegiance lay in the so called modern arrangement. For many in Oti, who depended on the traditional mode of governance to protect their interests, the progressive

blurring of the role of the chief and the conflict of allegiance that has now come to characterize his office has created a growing sense of powerlessness.

If the reorganization of governance systems had introduced a layer of complexity to life in Oti, then the growth of the migrant population in the area was to introduce an even thicker layer of complexity which would challenge communal life and hinder the progress of initiatives like the SHEP, which depended on a sense of community to thrive.

By the mid-1990s the spatial and demographic composition of Oti was seeing a rather rapid transformation. From a village of a few families, Oti had grown into an established peri-urban community which was home to a diverse group of people mostly migrants from rural areas of the country seeking employment in the growing informal economy both in Kumasi and in Oti. According to Gugler and Flanagan, most of these rural-urban migrants tend to live in what they call a *dual system*. “They are urban residents loyal to a rural home, part both of the towns they live in and of the villages they have come from. Their ultimate economic security remains in the rural areas, and their identity and emotional satisfaction are to some degree derived from there; a less than complete adaptation to the urban environment is thus required” (Gugler and Flanagan 1978:74). These migrants thus tend to participate in the urban or in this case the peri-urban community, in just an economic sense; they maintain their rural allegiances. So with the influx of migrants, Oti had come to be a somewhat hybrid community in terms of its institutional arrangements and the existence of rural versus urban oriented allegiances.

Thus if it was necessary to organize the Oti community for a SHEP electrification project, this was going to be in the context of a community whose

institutional arrangements were not clearly defined and understood and which had also become home to a community of residents with mixed loyalties; some to Oti and others elsewhere. Thus the reported failure of attempts to organize the Oti community for electrification from within to benefit from the SHEP could be understood within the broader context of the uncertainty that had come to accompany its system of political organization as well as its broken sense of community.

Oti’s Energy Challenges in Era of Pro-Market Reforms

By the early 2000s energy use in Oti still displayed a dominance of biomass converters. Some households had at this time adopted LPG for cooking but the community still had no access to electricity.

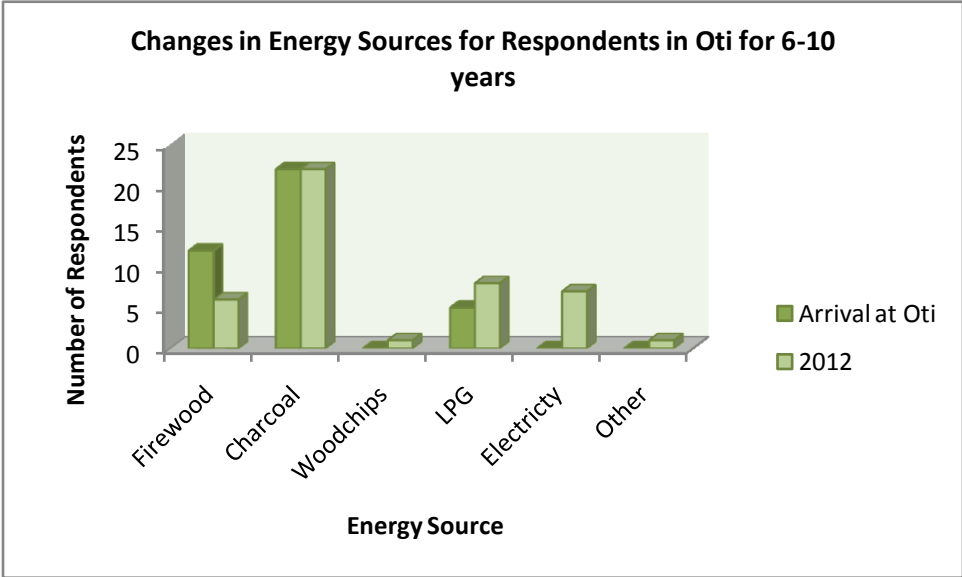


Figure 9 Changes in Energy Sources for Respondents in Oti for 6-10 years

Charcoal was fast replacing firewood as the dominant energy source. Most respondents who had been in Oti during this period reported that the switch to charcoal had been necessitated by the increasing difficulty of accessing firewood. Originally firewood could be gathered from farms and other forested areas in Oti for free but changes in land uses with the surge in building construction and the associated reduction in agricultural activity in the area placed constraints on access to this free resource. A market had already developed around firewood; it was collected and sold in bunches. Respondents recounted that charcoal and firewood prices had been increasing steadily since their arrival in Oti to the present period. They said that charcoal shortages had been popular when they first moved into the area.

Perhaps these experiences of the inhabitants of Oti in the early 2000s were a reflection of broader dynamics at play on the national level. The institutionalization of pro-market reforms in the electricity and petroleum sectors led to staggering increases in electricity and petroleum fuel prices in 1997. Even though electricity prices were revised by the newly formed PURC, the revised prices still reflected an increase of over 300% (Edjekumhene et al. 2001).

According to a study by King and Ahenkorah (2002), these price hikes did not affect the cost of electricity and petroleum products alone. On the national level, prices of firewood went up by 90% and charcoal by 82%. They offered that in some urban settings some charcoal sellers had to pay for the cost of transporting charcoal from their production sources to retail centers. Since petroleum prices were also high at the time, this meant increased transportation costs and an overall increase in the price of charcoal by the time it reached the consumer (King and Ahenkorah 2002)

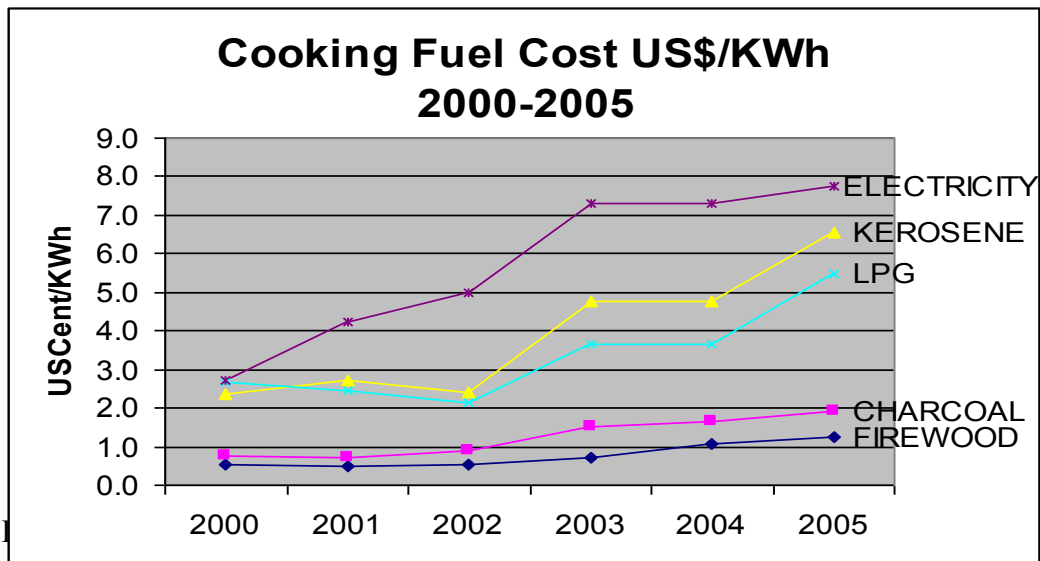


Figure 10 Cooking Fuel Cost in Ghana (2000-2005)

Source : Ahiataku-Togobo 2007

On the national level, high electricity tariffs and petroleum prices were driving switches to alternative energy sources, primarily of the biomass variety.

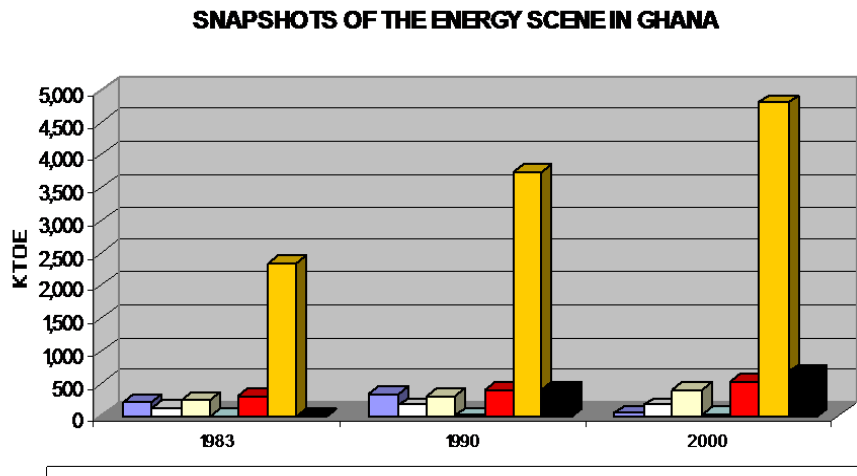


Figure 11 Energy Scene in Ghana 1983-2000

Source: Ahiataku-Togobo 2007

The residential sector which was the highest end use sector during this period relied primarily on traditional biomass sources for the satisfaction of the most important energy need, cooking. And this was not too different from what had been in the early 1990s.

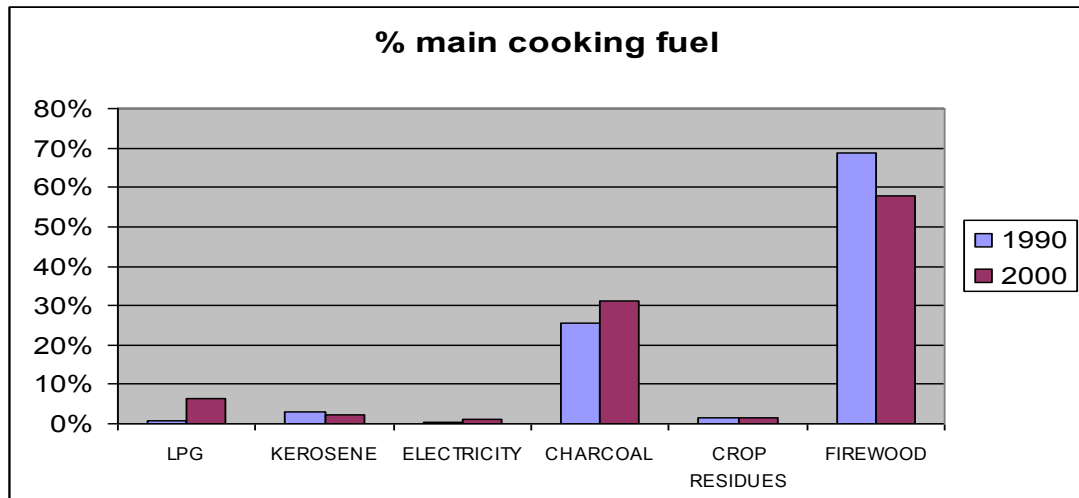


Figure 12 Residential Energy Use Dynamics in Ghana 1990-2000

Source: Ahiataku-Togobo 2007

That electricity was not playing a significant role in meeting the primary energy needs of the most significant end use sector was thus apparent, not only in the Oti experience but also on broader national scene as well. In places like Oti, which were already almost solely dependent on biomass, rising electricity and petroleum prices made it increasingly difficult to access these resources.

Box 2

Akosua is a mother of six. She has lived in Oti for ten years. Akosua moved to Oti with her family when her landlord unexpectedly threw her family out of their rented room. The rent for their former residence had been increasing steadily for some months leading up to their eviction; property costs were rising in the area and her family simply could not keep up with the increasing cost of housing. Today Akosua occupies an incomplete building at Oti with her family.

Akosua first came to Kumasi from Northern Ghana. She had heard of the promise of the good life that was associated with living in the big city. Many of her friends who had moved into Kumasi to work as head porters had returned after some years, some with sewing machines to start their dressmaking businesses, others with one or two hairdryers to begin their hairdressing businesses and others with capital to start their petty trades. This was the new face of success in her village. Picking shea-butter from the wild for sale on the local market was no longer a lucrative business and Akosua was sure she would not be able to attain the heights her peers had attained if she remained in the shea butter trade.

With six young children to take care of, Akosua is now a stay-home mother. She conducts her petty trade from home; she sells charcoal to her neighbors. Charcoal is Akosua's only source of energy at home which she uses with a traditional coal pot. She uses a kerosene lamp for lighting at night until the family retires for the night. By all modern definitions of energy poverty, Akosua Mansa is energy poor.

Akosua went on to explain that the most pressing challenge for her when it came to energy was that of access to charcoal, the increasing commercialization of its distribution network and the increasing costs of consumption. Charcoal was very difficult to access especially in the rainy season. She was also faced with the increasing costs of the charcoal. A bag of charcoal which cost just about 6GHC (~3USD) the previous year now cost about a 10GHC (~5USD). With the near doubling of the price of charcoal over a one year period, the supplier of the charcoal now tends to favor the richer clients who are able to invest in bulk charcoal purchases over the poorer ones like Akosua with very small businesses.

In the interim, Akosua adopted a number of strategies during periods of shortage. Since the primary use of energy for her was cooking, Akosua would switch to foods which required less cooking in the periods of scarcity. Sadly, on some occasions, Akosua's family has gone to bed hungry because charcoal was too difficult to access or because they did not have the means to purchase it.

Oti in the Post-Reform Era

By 2010, the connection of Oti to the grid had begun. This was a direct offshoot of the commitment of the Kumasi Metropolitan Assembly to address problems of poverty and underdevelopment in urban and peri-urban spaces like Oti. The Assembly's Urban Poverty Reduction Project, financed by the African Development Bank (AfDB) was aimed at improving the livelihoods of the poor in urban and peri-urban spaces by promoting access to quality basic services such as electricity and other infrastructure for the promotion of social development. This was expected to stimulate the creation of jobs and create income-generating activities in poor urban settlements and peri-urban zones (KMA 2013). A more recent strategy, the Comprehensive Urban Development Plan, a Japan International Cooperation Agency (JICA) funded program, which now serves as the blueprint for the development of the Greater Kumasi Area and its conurbations is focused on economic development, natural/urban environment and preservation, transportation, electricity supply, water supply, waste and disaster management, social development and poverty reduction and communications (JICA 2014)

Today, the 'majestic' image of electric poles on the street junctions and the intricate array of wires that run from these into some homes is a testament to the fact that modernity has finally visited Oti.

The Significant Uses of Energy in Oti

Cooking was identified as the most important use of energy in Oti. In 77 out of the 80 households interviewed, cooking was identified as a significant use of energy. Other identified uses of energy included water heating, mechanical activities, economic activities as well as entertainment.

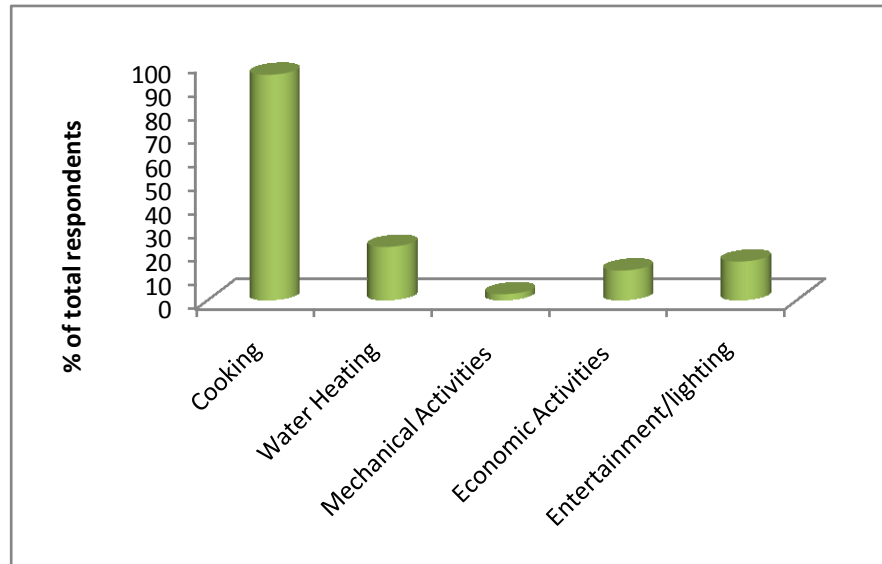


Figure 13 Energy Uses at Oti, Kumasi

In spite of the fact that some parts of Oti had access to grid electricity, actual connections to homes remained very limited so that electricity consumption remained significantly low. 28%²³ of the 80 households included in the study had electricity connections. Out of these, up to 70% of the households, even though connected and equipped with prepaid meters were not using electricity for their daily activities. Charcoal surfaced as the most important energy source in Oti. 73 out of the 80 households involved in the study utilized charcoal either as a sole energy source or in combination with some other source(s) for meeting cooking needs which was identified as the most significant energy use. Some households also had liquefied petroleum gas (LPG) cylinders most of which they did not use.

²³ The numbers indicated for electricity and LPG use include all interviewees who have electricity connections in their homes and liquefied petroleum gas cylinders, irrespective of whether or not they utilize them for meeting their regular energy needs.

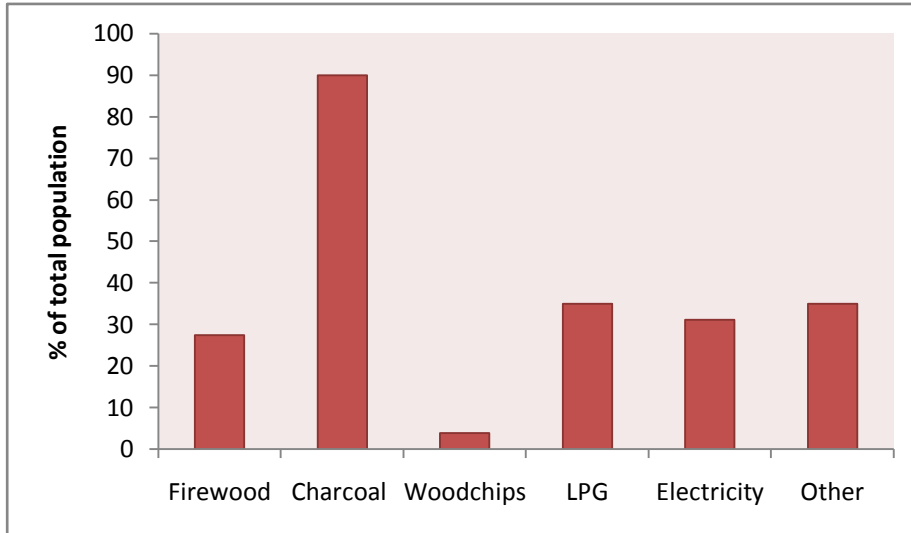


Figure 14 Household Energy Sources in Oti, Kumasi

It is worth mentioning here that even in households where modern forms of energy such as LPG and electricity have been adopted to some extent, these households combined these with other energy sources, mainly those belonging to the “traditional” category.

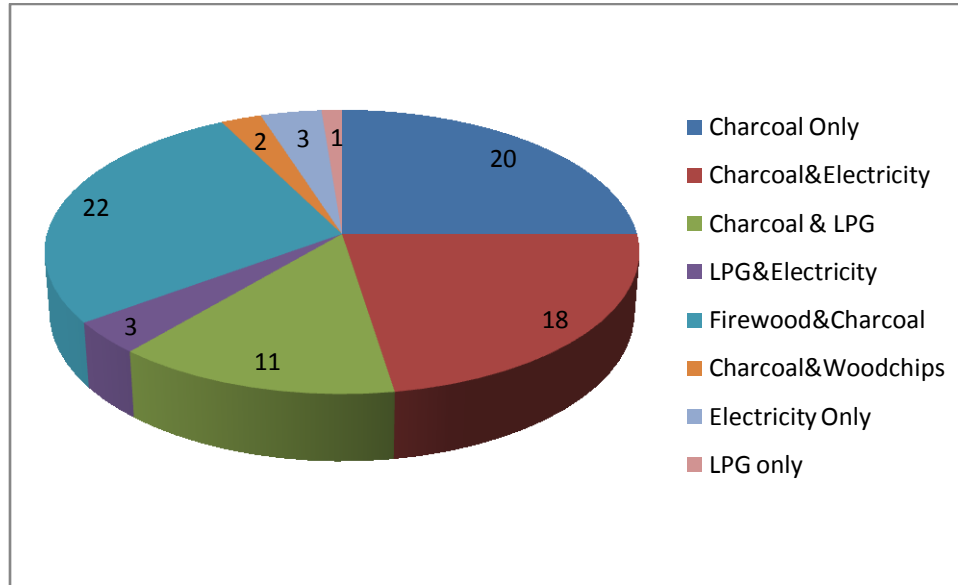


Figure 15 Primary Household Energy Sources in Oti, Kumasi

Determinants of Energy Choices at Oti

The selection and use of energy sources is a complex one determined by a myriad of factors which were identified as including the end use of the energy source, the cost of the energy source, availability and ease of access, the ability to withstand shocks, and ease of storage amongst others.

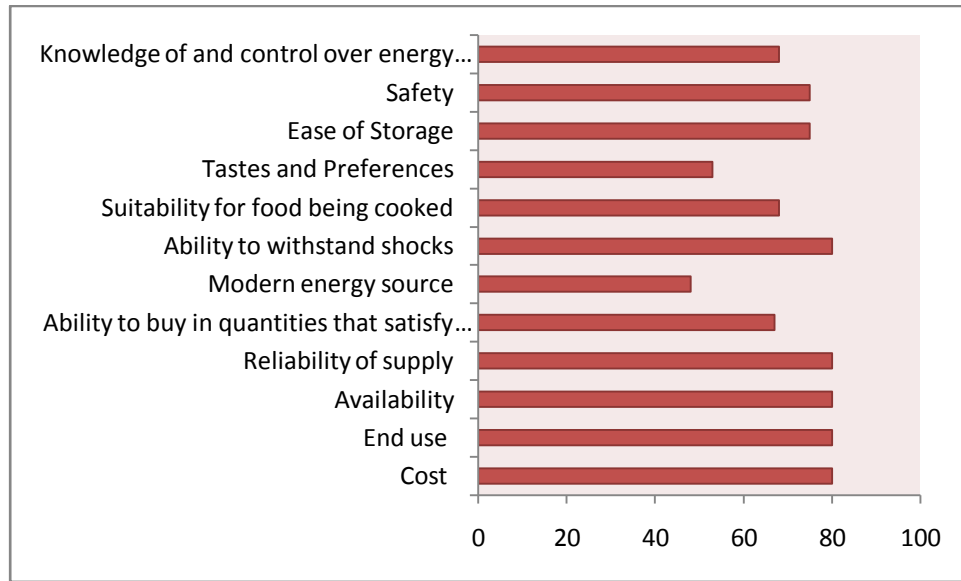


Figure 16 Determinants of Energy Choices in Oti

Charcoal was considered a comparatively cheap source of energy. Even though the price of a bag of charcoal was reported to have increased markedly from about 6GHC the previous year to about 10GHC at the time the interviews were conducted, this represented about a seventh of the average monthly earnings of the typical peri-urban dweller interviewed. A bag of charcoal would usually be sufficient for meeting the cooking needs of a household size of 5 for about month. A similar family size would typically pay anywhere between 50-80GHC for electricity per month.

The accessibility of charcoal also made it a preferred energy source. With a well established distribution network, charcoal could be purchased in bulk from local suppliers or from street vendors and petty traders. Some of the interviewees actually reported that when they did have access to transportation, they sometimes travelled some distance to surrounding villages to purchase charcoal from wholesalers for about half the price in Kumasi (~5GHC per bag). On the other hand, others identified

charcoal as a preferred source because it could be purchased in smaller quantities. Charcoal could be re-bagged in quantities from 1-2GHC. This was more appropriate for the erratic nature of the income flows for most peri-urban dwellers employed in the informal sector. The dominance of charcoal in the energy profile of Oti resulted from how uniquely placed it was in providing what most of the peri-urban dwellers looked for in an energy source of choice.

Firewood was considered an even cheaper source of energy for cooking than charcoal. It was also a preferred energy choice, particularly amongst food vendors who offered that using firewood for cooking was not only faster but turned out higher profits on their businesses. Firewood was also the fuel of choice when it came to preparing certain meals like beans and other staples which needed substantial amounts of time to cook. Until the recent surge in the construction of residential buildings in much of peri-urban Oti, firewood was gathered from farms and forested areas in the locality. Recent changes in land uses in Oti have however increased the scarcity of firewood. For commercial food vendors, woodchips from the Sokoban wood village have served as an alternative to firewood. This was expressed by a food vendor interviewed.

“We face a major challenge now with our business. We were originally using firewood but that is so difficult to access these days with buildings springing up everywhere. In times past we would walk over to the Sokoban wood village and collect the waste wood for free. An elaborate market has now developed around the acquisition of what was previously a free resource. This has greatly increased production costs for us and now poses a monumental challenge to the viability of our business”. *Interview at Oti, Ghana July 2012*

Peri-urban dwellers who utilized firewood for household cooking have however switched to charcoal which they consider their next best alternative. Yet still, others have shifted to the residue from palm fruits as energy sources for cooking.

Even though some 30% of the households had liquefied petroleum gas cylinders at home, less than 5% of them used them for cooking. The prohibitive cost of LPG served as a deterrent to its use for cooking on a day-to-day basis. This, coupled with the frequent shortages in supply made LPG an unattractive source of cooking energy for many in Oti.

For the households which had access to it, electricity was mainly used for lighting and entertainment. Electricity was used for cooking in only three households and these were all single person households. In multi-family households with access to electricity, cooking needs were satisfied with another energy source, primarily charcoal; electricity use was limited to lighting at night when needed or was not used at all because of its cost-prohibitive nature.

Most respondents interviewed did not see any immediate connection between having access to electricity in their homes and improvements in their economic status. Peri-urban dwellers did not recognize the availability of electricity in their homes as pertinent to their economic activities. Most of the employed respondents belonged to the informal economy and worked as wage laborers, petty traders, food vendors and iced-water vendors. A wage-laborer commuting to the central business district or nearby peri-urban areas for daily work did not see how access to electricity could impact his economic activity. Even iced water vendors reported that they did not need to have direct access to electricity to participate in the business. Most of the iced-water sellers reported that they could not afford to buy their own refrigerators for chilling

and storing their water, even if they could have access to electricity. Already chilled ice water was bought from wholesalers, transported and sold in coolers.

Constraints to the Adoption of Modern Energy in Oti

The study also explored what the perspectives of peri-urban dwellers were on the factors that presented constraints to their adoption of modern energy sources i.e. what makes them energy poor in the conventional sense.

Some of the respondents offered that they did not think they needed electricity given the nature of their energy needs. Since cooking was a significant energy use, the respondents offered that it made much more economic sense to meet these needs with charcoal rather than electricity or LPG which cost so much more. For some the highly “technical” nature of electricity and the specialized knowledge required to understand it discouraged them from its use. Using an energy source of which one had such limited knowledge and control could present safety concerns in their homes. One interviewee expressed her concern:

“I don’t think I need electricity. I don’t think having access to it will make much of a difference in my life now. Charcoal works perfectly for me. I believe energy should always be a servant in the home. I therefore do not believe in utilizing an energy system that I have absolutely no knowledge of nor any capacity to regulate. I have six children at home and I think it will be a totally irresponsible decision to bring in an electricity connection which puts my children at risk because I have little knowledge about its management. But I have total control over charcoal use. I know how to select charcoal that burns well and gives me the best for my money. And you see this little girl, my three year old, she is already learning how to stoke the fire. I couldn’t risk that with electricity!” *Interview at Oti, Ghana July 2012*

Electricity was also mostly used for entertainment and lighting. Whereas some regarded this as beneficial in terms of helping children to study at night and providing

some sort of entertainment for the home, others argued that electricity was not necessarily needed for lighting and entertainment. Some of them had battery powered TV sets which they believed served them well without the need to pay for the high costs of electricity. A popular trend in Ghana now is the use of rechargeable lamps. With a one-time investment of about 3-5 GHC, peri-urban dwellers could now have access to good lighting in their homes at night. Because many peri-urban dwellers travel to the central business district of Kumasi and some of its more proximate peri-urban centers to engage in wage labor, petty trading etc, they are able to re-charge the electric lamps in these places for use at home by night. The same applies to mobile phones, most of which are charged when the owners go into the city center to work.

The uncertainty associated with life at the peri-urban interface impacted most of the important decisions they made; not least, decisions about energy. Peri-urban areas have been described as areas of very rapid change over time. The poor in peri-urban areas are usually people who have relocated to these areas because they are unable to afford higher rents either in the big city or in other peri-urban areas whose values may be increasing as they are brought under greater urban influence. Urban influence at the peri-urban fringes and its ability to radically transform these in terms of land and property values, rent and the availability of infrastructure progresses at different rates; it may take anywhere from a few years to even over a decade. Once a peri-urban area is brought under greater urban influence the cost advantage which attracted the poor to these areas is lost leading them to migrate to other newly developing peri-urban areas, even much farther away from the central city center. In line with the uncertainty surrounding the settlement of the peri-urban dweller, he preferred to utilize those energy sources which could easily be moved around and

required minimum investments. Most peri-urban dwellers were either tenants, occupied uncompleted buildings or lived in temporary style structures. There was no incentive to invest in an electricity connection in a housing unit which one was sure to vacate in a few years with the greater encroachment of the city.

There was a section of the interviewees who had a preference for modern electricity even though they were not connected at the time the study was conducted. They however reported that the high cost of getting electricity connection was prohibitive. Because electricity is prepaid, users needed to pay their electricity bills upfront before having access to electricity. With what was described as the constantly deteriorating socio-economic conditions in the country and the uncertainty surrounding the income flows of many of these people, using electricity on a daily basis would remain a challenge even if their homes were connected. There were no refill centers for prepaid meters at Oti. Electricity users thus had to travel all the way to central Kumasi and areas closer to the big city to purchase refills for their meters. This was a huge inconvenience. In addition to this, the refill centers were closed on weekends so that customers who ran out of electricity over the weekend had to wait till the start of the new week to have electricity running again. Frequent power outages also made the reliability of electricity as an energy source questionable. One interviewee lamented about his experience with the unreliability of electricity supply. He said:

“After many years of trying to get electricity into my home, I finally got connected two months ago. There have already been about four power outages, each one lasting several days. It’s very disappointing”

The Peri-Urban Condition as an Anomaly

Having charted the story of Oti through the lenses of the eras of energy-development relations in Ghana, this section attempts to further explain the observed patterns of energy-development relations in Oti. The energy challenges in Oti may appear typical to the researcher/development expert conversant with issues of urban and peri-urban energy access. There certainly is a supply-side issue, a demand side issue and other issues relating to knowledge and institutional capacity. Thus the obvious responses to these challenges would definitely require the adoption of approaches which focus on making electricity and other modern forms of energy more affordable, promoting the productive uses of energy, educating the peri-urban dweller about modern energy forms and their uses etc.

These approaches are extremely relevant and have played a very useful role in addressing energy poverty. However, in this dissertation, their sufficiency is questioned; for rather than addressing what may well be the root cause of the problem of energy poverty, these approaches tend to address their symptoms alone. In proposing a new characterization of the problem of energy poverty, I turn to Kuhn in an attempt to explore what his paradigm approach could offer when it comes to making sense of the experiences with energy and development in Oti.

In Chapter four, the meaning of development in the Ghanaian context was firmly established. Let us try to picture for a moment a Ghanaian community in which the predictions of the dominant theories which have guided development efforts and the organization of the modern energy system in the county have been fully realized. Such a community would possess the following characteristics:

- Rapid economic growth driven by the productive utilization of modern technologies in an industrial society.

- Rapid urbanization
- Greater access to urban services such as electricity as providers of these services take advantage of the economies of scale associated with urban expansion.
- Strong relative growth in energy consumption
- A radical shift from the traditional forms of energy to modern forms.
- Growth of formal activities relative to the informal primarily due to the transfer of populations employed in sectors of economy where the marginal productivity of labor is considered to be negligible, zero or even negative (...as seen in the traditional agricultural sector, casual jobs, porters, petty retail trading) to the formal sector where they engage in the modern industrial economy.

In the coming section the experiences in Oti over the decades are placed against these dominant paradigm expectations to ascertain the extent to which the experiences in Oti have fulfilled these expectations the dominant modern paradigm.

The Place of Oti in the Modern Project

In spite of the many decades of development efforts both in terms of economic growth and the expansion of the modern energy system, the experiences from peri-urban Oti tend to stand in diametric contradiction to the expectations of the dominant theories guiding the modern development paradigm.

On the sub-national level, Kumasi has experienced rapid urbanization in response to the modernization experiment. As the capital of the Ashanti region, the second most urbanized region in the country, Kumasi has maintained a level of urbanization above the national average since the 1960s. The urbanization experience in Kumasi has however differed markedly from those experienced in the developed

regions of the world which have served as models for the promotion of urbanization in places like Kumasi. Development theorists promoted cities and urbanization for the positive economic benefits they could potentially offer. With the dense networks of people, cities ensured economies of scale in production and promoted innovation. In addition to industrialization, the urban economy was also believed to be capable of stimulating the development of other activities such as commerce and industrialization via backward and forward linkages (Potts 2014).

Kumasi's urbanization experience has not been associated with much change in the city's production systems; industrialization has been limited and so has the modernization of other sectors of the economy such as agriculture. Rather, the urbanization of Kumasi has been a largely demographic one driven by in-migrations from surrounding regions, principally from Northern Ghana. This pattern of migration had itself been driven by the dichotomous pattern of development in Ghana which resulted in a complete neglect and exclusion of the country's Northern belt from broader development efforts. The population expansion in Kumasi resulting from these patterns of migration has resulted in the outward growth of the city and the transformation of much agricultural land in the fringe areas into residential spaces. Because of the close linkage between cities and their peri-urban fringes what happens in Kumasi is not of little consequence for its peri-urban settlements. Kumasi's peri-urban interface to which places like Oti belong is now home to many poor migrants as well as poor urban dwellers seeking to take advantage of the lower livelihood costs in these areas.

With its increasing significance as the home of the poor, bringing development to the peri-urban interface has been a central focus of urban planners and developers

as they strive *to regularize* the peri-urban condition and extend the benefits of modernity to these areas. But the very existence of the peri-urban condition should raise very fundamental questions about the success of the urbanization experiment itself.

Trickle down theorists such as Arthur Lewis had offered that economic modernization in developing areas like Ghana would result in the attraction of surplus labor from the rural traditional sector of the economy into the modern industrial sector with the progress of urbanization. Once labor was no longer surplus, workers would now be said to have transitioned from the traditional sector with its subsistence wages to the modern sector. Income disparities and inequalities were only expected to accompany the very initial parts of the process; these inequalities were to be resolved once the dual nature of the economy was undone.

The experiences in Oti put these propositions into question. In fact, they permit the identification of Kumasi's urbanization experience as an anomalous expression of the modern development paradigm. Even though the city has grown significantly and there has been the attraction of rural migrants into the city, the absorption of these into the formal modern economy has been very limited. What has happened in its stead is the concentration of poor migrants in peri-urban spaces like Oti and other informal urban settlements. And these migrants are not participating in an industrial economy; the informal economy, which comprises those occupations which were conventionally characterized as being of a traditional variety, today stands as the most significant economic sector. The distribution of employment for respondents in this study offers evidence in support of the dominance of the informal economy in Oti.

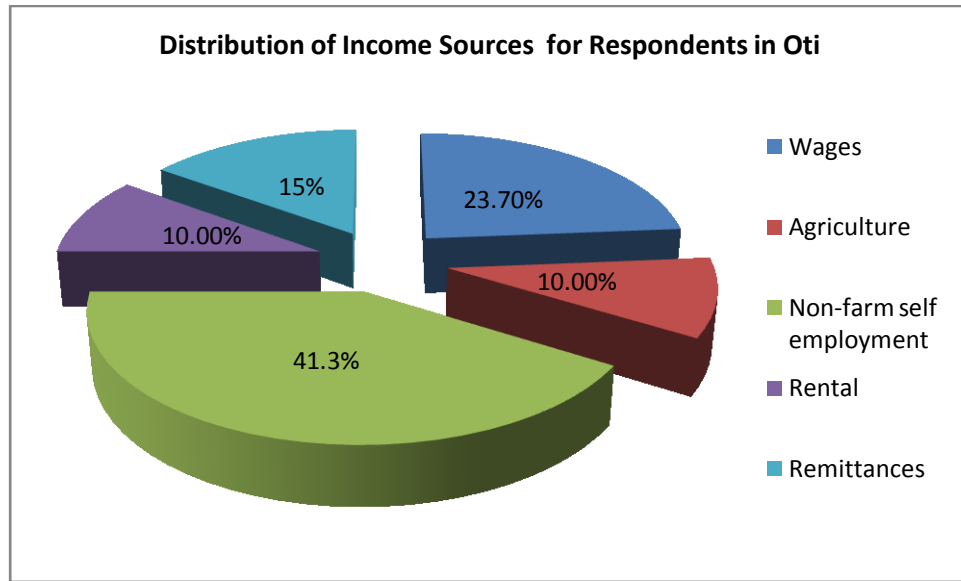


Figure 17 Distribution of Income Sources for Respondents in Oti

Over 50% of respondents were engaged in agriculture and non-farm self employment. All those in agriculture were small scale farmers utilizing the same agricultural methods they had utilized many decades earlier. Over 50% of those receiving wage incomes were also not employed in formal industrial sectors but worked mostly as drivers' mates and laborers. The dominance of informal economic activities in Oti can be rightly perceived as a reflection of the dominance of this activity in Kumasi city itself. And this in turn can be traced to the workings of the eras of basic needs and of pro-market reforms.

Even though Kumasi had remained an important commercial center in the post-independence era with trade and commerce remaining important contributors to the city's economy, like other large cities, the period between 1970 and 1982 brought with it a significant surge in the number of urban dwellers employed in the informal economy (ILO 1995). This was a 'survival strategy' adopted by much of the populace

in response to the decline in real wages and employment in the formal sector. Urban dwellers in Kumasi and other large cities were engaged in various types of informal economic activity either on part-time or on full time basis (Yankson 1992). From this period onwards, the informal sector came to be the most important sector of Kumasi's economy. Kumasi is home to Suame Magazine, an indigenous conglomeration of small engineering based firms who produce a wide range of products and are believed to be no small contributors to the city's economy. The informal sector also has a thriving woodwork industry in Anloga (now in the Sokoban wood village). The handicraft industry includes the wide array of informal works encompassing basket weavers, potters, wood carvers and cane weavers (KMA 2013). Other significant activities in the informal sector include food processing and vending, textile and leather works, metal fabrication, general repair services and auto repairs, as well petty trading (ILO 1995). Even though agriculture now makes a rather modest contribution to the economy of Kumasi, it remains an important employment sector for some living in the peripheral areas of Kumasi (KMA 2013). The informal economy has no doubt become a significant sector of the Kumasi economy. It was the 'safety net' to which all persons that had either failed to enter the formal economy or been laid-off from it had to turn.

The implementation of the SAPs under Ghana's Economic Recovery Program directly impacted the all important informal sector in the Kumasi economy. Even though the response of the informal sector to the SAP in general may at best be described as mixed, the impact on small-scale entrepreneurs in the informal economy in Kumasi could be characterized as negative. In a comprehensive ILO (1995) study which examined the impact of the ERP on businesses in the informal sectors in three

major cities in Ghana, Kumasi and Accra-Tema, it was observed that even though some of the comparatively large informal industries reported increases in economic productivity with the implementation of SAP policies, the majority of small-scale informal business owners were adversely affected by the implementation of the program.

For instance, even though the liberalization of trade improved the availability of imported inputs for the informal economy, the high rates of inflation in the early 1990s led to escalated prices so much so that the inputs were not accessible to many in the informal economy even if they were widely available now. The liberalization of trade also led to the flooding of local markets with cheap imported goods which competed with the indigenous manufacturers in the informal sector who produced on smaller scales and could not turn out their products at those low prices (ILO 1995). The deregulation of the market led to constant increases in the prices of raw materials, finished products as well as services. This impacted the informal economy adversely both on the supply and demand sides. Small scale manufacturers of soap and footwear in Kumasi experienced increases in the costs of inputs and very low demand for their finished products. In the wood processing industry, a salient sector of the informal economy of Kumasi, the demand for export escalated the prices of logs and sometimes led to their complete unavailability (ILO 1995). Not least was the difficulty in accessing credit in the informal economy. The credit policies that emanated from the ERP tended to discriminate against the small and microenterprises in the informal economy (Elkan 1987). These business owners thus tended to have to fall back on more traditional lending streams from family and friends. However with the very high interest rates and the general inaccessibility to credit, there was a general shortage of

money so that even the informal avenues of credit were in many cases unable to assist such business owners (ILO 1995). With the cuts in government expenditure and the subsequent retrenchment of public sector workers, most of the now redundant workers entered the informal sector in the absence of no alternative and adequate means of subsistence. This created even greater competition in the informal sector.

As the dominant economic sector in Kumasi, migrants to the area mostly have no choice than to engage in the sector and when such migrants move to peri-urban spaces like Oti, they carry their economic activities with them. Income from the informal activities in Oti was significantly low. The mean annual household income in Oti is significantly lower than national and regional averages; it sits between the lowest and second quintiles of the mean national household income distribution.

Quintile	Mean Annual Household Income (GHC)
Lowest	728
Second	1,020
Third	1,098
Fourth	1,263
Highest	1,544
Oti	850
Ashanti Region	1149
Ghana	1,217

Table 1 Comparison of Mean Annual Household Income in Oti with National and Regional Averages

Sources: Ghana Statistical Service 2008 and Field Study

Thus what seems to have happened with the attraction of the rural classes into Kumasi city can be best described as a transplantation of the so-called traditional rural economy to an urban location in a physical sense and not the transition from a

traditional economic system into a modern one. Hence, the duality of the economy, the foundations of which were first laid during the colonial period and later deepened through the dichotomous and unequal development policies pursued in the post-colonial period remains. Whereas the center-periphery dynamics of dichotomous development once existed primarily between areas classified as typically rural and urban, its expression is now seen in the relationship between urban centers like Kumasi and their surrounding peri-urban areas like Oti.

Today, Oti plays a very significant role in the functioning of Kumasi city. Serving as the linkage between the central city and the unambiguously rural areas beyond its peripheries, Oti plays a role in the provision of food, energy, building materials and a sink for the disposal of waste generated in Kumasi. Oti plays a critical role in the management of solid and liquid waste from central Kumasi; the community houses the largest landfill site in the Ashanti region today.

It is important to emphasize here that the dichotomy in development between rural and urban areas from the pre- through the post colonial period was necessary to maintain the pattern of urban development that the modern paradigm espoused. In order to maintain the productivity of the urban centers, there was the need to ensure that the rural centers remained centers for the production of raw materials, food and other materials needed for the proper functioning of the urban cores. Today, experiences in places like Oti point to the fact that the peri-urban interface is replacing rural areas in the provision of such services and has become indispensable to the functioning of the modern center. It plays a crucial role in maintaining the center-periphery model so pertinent to the operation of the modern city. The income inequality which was expected to accompany the trickle down approach to

modernization, as a necessary part in the early stages of the process has now come to represent a permanent condition; people find themselves trapped in this condition which now has come to signify the new reality within which they attempt to negotiate their needs.

So herein resides a contradiction. Whereas the peri-urban condition represents an anomaly in the modernization paradigm, it has now become a necessary condition for maintaining the system of urbanization that the modern paradigm promotes. This calls into question the efforts of urban planners and development experts to transform the peri-urban into an urban form by extending urban services to these areas. And perhaps this also provides an explanation for the almost elusive nature of the peri-urban condition. For as the city expands and encompasses more of its fringe areas, the peri-urban zone only tends to shift outwards rather than being fully engulfed into the urban system, defying all development efforts.

The experiences in a peri-urban setting like Oti also challenge the propositions of development theorists like Rondinelli who perceive the locations of communities in relation to urban centers as pertinent to their development. For Rondinelli, the strategic positioning of cities in ways which make it possible for rural communities to have access to cities and the services they provide are critical to development. The proximity of rural communities to cities and the services they offer such as markets for agricultural goods as well as social, health and educational services was critical for the development of the undeveloped rural areas. With the growing concentration of poor people in peri-urban areas, one would expect that such people would experience some socio-economic development since their proximity to the city would secure for them access to the services and opportunities provided by cities.

The experiences from Oti provide evidence to the contrary. Access to modern services like electricity remains limited and even where it is available it has been proven that people do not always have the economic power to utilize these urban infrastructure and services. What Rondinelli's theory does, however, is that it permits questions to be raised about the persistence of energy poverty in peri-urban spaces like Oti. It allows questions to be raised as to why the peri-urban energy poor have been unable to access and utilize the services provided by cities, energy included, for their benefit. If development is attainable through the increased interaction of cities with surrounding areas, why has this dynamic not effected development in peri-urban areas? Rondinelli's theory thus provides theoretical support for the identification of peri-urban energy poverty as a contradiction of the dominant energy and development paradigm; it permits questions to be raised about the failure of peri-urban communities to benefit from the energy and development advances of their proximal urban areas.

The experiences with energy at Oti also contradict the notion of a linear and deterministic development of energy systems embodied in the modern paradigm. Modernization has not resulted in the widespread adoption of electricity as a primary energy source. Energy sources conventionally characterized as belonging to the traditional variety still play a significant role in the energy use patterns of people dwelling in Oti despite the fact that the area now has access to the grid. The physical proximity to the grid as well as the economies of scale created by the densification of the Oti population have not significantly transformed the demand dynamics of electricity in these spaces contrary to the expectations of dominant model.

Linking Agency to Structure

The contradictions with the modernization of energy-development relations in Oti can thus be summarized into three theses:

- The intergenerational rather than transitional nature of the peri-urban condition.
- The persistence of the traditional and informal economy.
- The co-existence of traditional energy infrastructure with modern energy infrastructure rather than the replacement of the former with the latter.

These three contradictions owe their existence to political-economic structures whose very foundations can be situated in the nature of the modern paradigm itself. In earlier sections, I discussed how the modern pattern of urbanization, by thriving on the existence of a center-dichotomy model has re-created peri-urban areas as the new peripheries on which the functioning of the urban center now thrives. Pertinent to the survival of the modern urban city, the peri-urban condition cannot be a transient one, it has come to represent a permanent condition and along with it the permanence of the informal economic system associated with this informal urban settlement.

In the conventional sense, the problems presented by the residents of Oti, will necessitate the adoption of efforts which focus on making electricity and modern energy more affordable and ensuring that these are channeled into productive uses such as small scale businesses. On the basis of the earlier discussions however, two fundamental challenges to these approaches can be identified. In a system guided by market based efficiency and growth, the provision of affordable modern energy services to the so-called energy poor will only occur if the provision of those affordable services does not challenge the economic efficiency of the system as well as its ability to generate profits for growth. Energy poverty will thus remain a normalized condition of modern development until it becomes economically efficient

to extend energy services to the so-called energy poor populations. Likewise, in the promotion of the productive uses of energy for development, it is also important to recognize the fact that the small-scale businesses that are usually the focus of these approaches, are like, every other occupation in the informal sector, competing against a liberalized economy in Ghana which is itself deeply steeped in the global market economy. The liberalizing policies which have been adopted in Ghana are ones which tend to “favor big businesses and strengthen the power of organized capital whilst at the same time draining capital from small producers and depressing the wages and living standards of the working class” (Haque 1999:156). Over time, the sustainability of the small-scale businesses promoted in the name of productive uses of energy and their ability to bring any value-added remains largely dependent their ability to survive the great competition at play in both the national and global economic space into which all communities, including Oti, have now been inadvertently integrated. If the experiences to date with many of such small scale businesses in a place like Kumasi are anything to go by, the promise of promoting electricity and other modern energy sources for productive uses may be bleak as well.

It has also been discussed how democratic decentralization has interfered with traditional forms of governance blurring the role and identity of these. The transformation of once homogeneous villages like Oti into places of mixed character as experienced in its present peri-urban expression has also been shown to have resulted in the erosion of the sense of community. The erosion of a communal sense of existence in Oti and its replacement with a more individualistic arrangement now challenges development efforts like the SHEP predicated on a communal sense of living.

Is the Oti Experience an Outlier?

In the presentation of the methodology for the study, I presented an argument in support of my adoption of a singular case study in attempting to understand energy poverty; an issue with a widespread expression. In this section, I attempt to provide an answer to critics who might argue that the experience at Oti is merely an outlier. This is not to say that the value of the approach is compromised even if Oti was indeed an outlier. Karl Popper's test of falsification, one of the conceptual foundations of the approach used in this study offers that if a single observation is found not to fit with a proposition, it follows that the proposition is generally not valid and will need to be either revised or rejected altogether (Popper 1963). Thus given that fact that the modern paradigm together with its prescription and expectations has been universalized across communities and cultures, the existence of a singular contradicting experience offers enough grounds to question this approach.

However, to reinforce my argument of the persistence of energy poverty as a contradiction of the modern paradigm, I present below very short summaries of two other studies whose findings further reinforce the persistence and pervasiveness of the contradictions in modern energy-development relations in a typical developing country context like Ghana. These studies are used to show that the three theses of the contradictions of energy-development relations in the modern paradigm experienced in Oti can be located in other places as well.

The Experience in Moshie-Zongo

Researchers from the Kwame Nkrumah University of Science and Technology in Ghana conducted a study examining the linkages between energy and poverty in a densely populated community in Kumasi, Moshie Zongo.

Moshie Zongo was formed in the 1950s by a group of migrant settlers from the Northern region of Ghana and from Burkina Faso. Even though the area is technically identified as a slum community, being located within Kumasi city itself, the original settlement was located on what was then the urban fringe of Kumasi city; hence it was a peri-urban settlement in its original formation. The expansion of the city gradually engulfed the community until it became a part of Kumasi city itself. Thus in comparison with Kumasi, Moshie Zongo has been brought under great urban influence and this for a longer period of time (Bannister 2002).

All the inhabitants captured in the Moshie Zongo study were employed in the informal sector primarily in dressmaking, hairdressing, palm kernel oil production, pottery and corn milling. Those engaged in wage labor were drivers, laborers and security men. Access to amenities in the community was poor; access to pipe borne water was irregular and the water was usually heavily contaminated since the pipeline serving the community was running through a contaminated stream (Bannister 2002).

Moshie Zongo has been connected to the grid. The study was conducted about eight months after there had been significant increases in electricity tariffs; as was experienced during the period which this study has characterized as the era of pro-market reforms. The findings of the study revealed that in spite of the fact that the community had access to electricity, most of its inhabitants were using other sources of energy mainly charcoal for the satisfaction of their most important energy needs. Even though the widespread switch to charcoal had resulted in price increases for that fuel as well, it was still a cheaper energy source than electricity. Since incomes in Moshie-Zongo were generally low and had remained so for a long time, the increase in energy prices had generated ripple effects on other aspects of their livelihoods

unconnected to energy. With the percentage share of energy costs increasing for the same income, inhabitants had resorted to adjusting their expenditure on food, education and health to accommodate the increased expenditure on energy. Most households cut down on their consumption of protein rich foods such as milk and eggs, replacing them with cheaper staples like maize. Hospitals visits were also replaced with visits to local drug stores (Bannister 2002)

The Experience in Amui Dzor

In another study examining energy challenges in an informal urban settlement in Accra , Amui Dzor, similar experiences with energy access and use were reported. One of the oldest communities in the Ashaiman municipality, Amui Dzor initially developed after the manner of a typical peri-urban community with the expansion of Accra city. The initial settlers were either out-migrants from the city of Accra or migrants from other regions of the country seeking to tap into the market and other social services Accra city provided. Amui Dzor has been engulfed into the urban sphere with the expansion of the Accra city and is now characterized as a slum community.

Electricity access is very low in Amui Dzor in spite of the encroachment of the urban system on the city. According to the authors, the aggregation of communities like Amui Dzor into broader urban statistics of energy access tends to mask the reality of the energy situation in such places. They offer that communities such as Amui Dzor which have been fully incorporated into the urban system tend to represent what they call “pockets of poverty” within the larger urban metropolis (King et al. 2012)

Amui Dzor is home to a population largely engaged in the informal economy. Petty trading, grinding mills, groundnut paste production, shoe repairs and operating

commercial bath facilities are amongst the popular occupations in the community. The significant energy sources in Amui Dzor include firewood and charcoal. Residents preferred these energy sources because of their availability and cost effectiveness as compared to electricity or LPG. Electricity supply was irregular and houses which had access were plagued with frequent and unannounced interruptions in supply.

Households and businesses which had no access to electricity attributed it to this to the high upfront cost of obtaining a meter. Others were excluded because of their lack of building permits making illegal connections a popular occurrence (King et al. 2012).

Lessons from Moshie-Zongo and Amui Dzor

The results of the studies in Moshie Zongo and Amui Dzor offer some real support to the intergenerational persistence of the peri-urban experience. Even though its characterization may change with the greater encroachment of the city, its salient characteristics vis-à-vis its economic structure, patterns of energy use and other indicators of socio-economic development remain essentially unchanged. And for communities like Moshie-Zongo which have been in existence since the 1950s, the persistence of the peri-urban condition is made even clearer; the locations of peri-urban locations may change in a physical sense, their definition may change, but the experiences of people living within the zone remain essentially unchanged. Thus placed side by side the experiences with energy and development in Oti, Moshie-Zongo and Amui Dzor do not vary much. Traditional energy sources remain the most important energy sources in all three communities for both residential and commercial uses. In all three communities the informal economy remains critical to sustaining the livelihoods of inhabitants. That there has been a deviation between where these

communities were intended to be and where they are now is evident and these are sentiments shared by many in Ghana.

Is Ghana a Failure Story of the Modern Paradigm?

Examining what he calls the “ups and downs” of the Ghanaian economy since independence, Dovi (2010) presents this view from an interview with a man named Victor Adams in Shiashi, a once fringe area of Accra, which is now one of the most highly priced residential communities in the Accra metropolitan area.

“When the church bells rang across the city of Accra to signal the birth of modern Ghana, it was a period of hope and optimism for a better future. Victor Adams was in his home village of Shiashi, a suburb of the Ghanaian capital. At the time, in 1957, Shiashi had no electricity, roads or piped water. "There were only eight of these houses in the entire village," recalls Mr. Adams, as he points to a mud house.

"This part of the village was bushy and we farmed the land," he says of what is now one of Accra's high-priced residential areas. Today a tract of land measuring 100 metres by 80 metres can fetch the equivalent of US\$65,000, according to Mr. Adams, who manages the family-owned land. Prices are being pushed further up by the exponential expansion of the nation's capital.

Shiashi and its surrounding areas have been transformed since independence. But signs of underdevelopment still abound, including poor sanitation, unpaved roads and makeshift homes. In a way, the story of Shiashi reflects Ghana's uneven economic and social development over the years. Mr. Adams, a middle school student at the time of independence, says, "Our country could have done better." It is a feeling shared by many Ghanaians” (Dovi 2010)

So of what significance is this deviation between where we are and where we ought to be? The modern paradigm itself provides an answer to this question.

The economies which have been classified as development success stories in the modern arrangement attained rapid industrialization and economic growth over very short periods of time. South Korea²⁴ for instance was one of the poorest countries in the world by the beginning of the 1950s by modernity's own standards, owing to effects of the Korean War. Its gross domestic product was \$1.5 billion and per capita

²⁴ It is important to note that the use of the South Korean case here is not to promote the pattern of development in South Korea as an exemplar worthy of emulation by Ghana. It is strictly used here to show that judging by modernity's own metrics of what a development success story is or ought to look like, Ghana's experience can be considered a failure. Some scholars (Hart-Landsberg et al.(1993); Lie (1992); Lie (1998)) have written extensively on how the promotion of South Korea's development experience as a success story of the modern paradigm has clouded the contradictions that have been associated with capitalist development in the region. Hart-Landsberg et al.(1993) have offered that whereas both neoliberals and statist economists have, in advancing their respective positions on development, intrinsically accepted that development is possible under capitalism and touted South Korea as a success story of modern capitalism, both camps have failed to recognize the price South Koreans had to pay in the process. They offer that by neglecting history and political economy, there has been a general neglect of the fact that South Korea's economic growth was fully grounded in unique historical conditions a la a powerful state and a supportive international economic environment and that the dictatorship and deep exploitation which was associated with these conditions deeply impacted the lives of many Koreans negatively.

Lie (1998) supports this stance when he offers that the so called South Korean development "miracle" is a façade. He offers that that the particular environment within enabled South Korea to shift from an agrarian economy to an industrialized one was created by the convergence of a very unique set of historical circumstances (a system of land reform which basically forced children and landlords into cities, very cheap labor and the threat of North Korea) which cannot be replicated elsewhere. He also offers that South Korea's development experience can only be considered a development success if the costs that were associated with this form of development in terms of the exploitation of the labor force, undemocratic politics and the environmental degradation are excluded from our consideration (Lie 1998).

GDP was \$74. Agriculture accounted for 40-50% of the nation's economy whilst manufacturing accounted for 10-20%. By the end of the 1960s, manufacturing and agriculture had balanced out with both of them contributing 30% to the country's industrial structure. The quality of the light industrial goods produced by South Korea had already reached international standards (Heo et al. 2008) - and all this *within a decade*. Today South Korea is a high income country with a GDP of \$1.130 trillion in 2012. Electrification as would be expected is 100%. (World Bank 2014). Using the modern paradigm's own metric of what constitutes a development success story and the rapidity of such change as experienced in South Korea there ought to be questions raised about Ghana's over 50 years experiment with the modern paradigm.

Ghana had a middle income status and was one of the richest countries in Sub-Saharan Africa in the early 1950s. A decade after the institutionalization of modern energy-development paradigm as the guiding framework for Ghana's development, the country had moved from a prosperous nation to one ridden with debt. Ghana is today a lower middle income country with a GDP of 40.71 billion. Ghana's population still struggles with access to basic infrastructure, energy included; electrification in the country stands at 72% (World Bank 2014). If the rapid rate of transformation experienced in a place like South Korea is what enables its characterization as a success story per the modern paradigm's own definition, then there is reason to be concerned about the experiences in Ghana.

Chapter 6

LIVING IN THE LABYRINTH OF MODERNITY'S PROMISE

The experiences with the modern experiment in Ghana leave ones with more questions than answers about the promises of modernity. But these questions are not confined to the African context alone. In Latin America, urban poverty surpassed rural poverty in the early 1990s. Between 1980 and 1999 the absolute number of poor people in Latin America increased from 136 million to 211 million. 63% of the poor lived in large cities by the early 2000s, up from 46% in 1990 (World Energy Council 2006). In the Latin American and Caribbean region, 45 million people still have no access to so-called modern energy sources; traditional biomass remains the significant energy source for cooking and heating in these regions (OFID 2010). A World Energy Council (WEC) study of urban energy poverty in Buenos Aires reveals challenges similar to those experienced in Ghana. In 2002, 10 million Argentines were living below the poverty line. 88% of these were located in urban areas. 42% of the 13.4 million inhabitants of Buenos Aires live in poverty (WEC 2006). According to the report, there has been a systematic increase in structural poverty resulting from unemployment and inadequate income since the 1980s. Even though *temporary* improvements have been experienced during “short periods of economic prosperity and the recent recovery of industrial output” (WEC 2006:5), these are said to have had very little impact on structural poverty in Buenos Aires. Over 75% of the working class is comprised of unskilled labor (WEC 2006).

With the privatization of Argentina's electricity sector in the early 1990s, regulations were successfully adopted to deal with the most pressing challenges of illegal electricity use and the non-payment of bills in urban areas. But since customer arrears have been on the rise from 1999, the gains made through these reforms are threatened. The general observation has been that "even when the poor are willing to pay for electricity services, inadequate electricity services, inadequate income and the lack of genuine and stable employment makes it difficult for them to afford these public services" (WEC 2006:5)

A recent study conducted by the Asian Development Bank has revealed that the impressive economic growth experienced in the Asian region in recent times has been progressing alongside widespread poverty and deepening income inequality. According to the report, "overall growth has failed to translate into improvements in average living standards" as reflected in relatively weak household consumption for a large number of the population (ADB 2014). A study by the Philippines Institute for Development Studies has shown that energy poverty in the modern sense, remains a significant challenge in South-East Asia. About 134 million people in the region, representing about a fifth of the population, do not have access to modern electricity. Dependence on so-called traditional biomass sources is still significant for about 280 million people (Philippines Information Agency 2013). In these areas, urban energy poverty is dominant, with up to 30% of the urban population unable to meet their basic energy needs primarily due to low incomes and high fuel prices (Belkacem 2012).

Thus on other continents across the globe we see the reproduction of some of the contradictions identified in the Ghanaian experience. The gradual replacement of rural poverty with the urban variety and the persistence of this form of poverty as well

as the predominance of unskilled labor in the economies of these regions attest to this fact. In the same vein, we see the co-existence of modern energy forms with so-called traditional forms, rather than the displacement of the latter by the former.

The Labyrinth

The almost global expression of the contradictions of the modern experience point to one conclusion: that rather than economic prosperity and social progress for all, what has been created by the global effort to move developing countries along a unilinear trajectory of progress can at best be described as a *labyrinth*²⁵; a complicated and complex maze within which both policy makers, communities and individuals alike attempt to make sense of the challenges that confront modern energy-development relations. Attempts to make sense of this labyrinth only lead to a deepening of its complexity; for not only has the modern enterprise succeeded in creating the problems presently experienced but it also attempts to address the challenges in ways which hardly affect the structural basis of the problems.

The intellectual atmosphere which has conditioned the paradigm and directed its operation has only succeeded in deepening the complexity of this labyrinth. There is an epistemological empiricism associated with the modern approach to energy-development relations. What this empiricism facilitates is the focus on “tangible and quantifiable economic criteria to know the extent of development” and energy access (Haque 1999:130). This has led to the gravitation of the modern society towards the technical rather than the social in defining the aims and tools of development. By

²⁵ The use of the word labyrinth here is inspired by the term “labyrinth of technology” coined by Willem Vanderburg (2000).

limiting knowledge generation to the technical, the modern paradigm tends to exclude locally constructed and shared knowledge as a valid basis for guidance of the development process

But this generates an analytical reductionism; one which drives modern energy-development relations to focus on a singular domain, the techno-economic domain, in the pursuit of development. Social phenomena which cannot be accounted for in the technical sense tend to be marginalized in the modern arrangement (Byrne, Glover and Martinez 2002). With the dominance of modern pro-market reforms in modern development efforts for instance, there has been an “overemphasis on the atomistic interaction of self-seeking individuals” (Haque 1999:155) leading to the exclusion of communal institutions and social systems from the considerations of the modern development enterprise.

The parochial focus on the modern reductionist market model as the ultimate avenue for the pursuit of progress has created a normative indifference in the operation of the paradigm. Driven by the quest for efficiency, the paradigm has excluded from its operational domain all moral and ethical discourse. Thus even though development is purported to be for the good of the masses, many governments and development agencies are now so committed to the “market based efficiency and growth that their responsibilities for people’s basic needs have been forgotten” (Haque 1999: 156; Sachs(2002); Byrne and Hoffman (2002)). Efficiency, productivity and growth have been faithfully pursued to the neglect of issues relating to equality, justice and fairness (Ellul 1964). In the area of energy, the plight of the energy poor is sacrificed on the altar of efficiency in energy provision.

This has led one researcher to observe that “modern civilization has decided that technological and economic growth is the answer and no longer seems to know what the question is” (Vanderburg 2000:5). Existing approaches at understanding energy-development relations can thus be said to be self-sealing: the answer is known and there is no need to question its validity. Blinded by its own beliefs, the paradigm has failed to provide answers to some of the deep questions relating to development and the satisfaction of basic needs such as energy. It has rather succeeded in creating in its wake a string of contradictions; a labyrinth with no clear way out of the problems it manifests and creates.

The contradictions of development “success” along technical dimensions while the peri-urban experience of persistent poverty and inequality persists underscores the inability of “more-of-the-same” to address the anomalies of modernity; it represents a crisis which calls for extraordinary research in search of viable alternatives. The puzzle-solving activities of development experts within the prevailing paradigm have obviously proven insufficient in addressing the challenge. In the conventional frame we set to work trying to articulate the paradigm rather than questioning the basis of the paradigm in light of its actual poor performance. But it is only when the paradigm is questioned that we can perceive the problem of energy poverty as a contradiction whose resolution will necessitate a fundamental paradigm shift.

Extraordinary research needs to explore a new paradigm; a new intellectual and policy agenda that fundamentally challenges the dominant orthodoxies of the prevailing paradigm; its concentration on an epistemological empiricism, its analytical reductionism, its normative indifference and its universalizing ethos.

This concluding chapter responds to the challenge by exploring an alternative posture for effecting a paradigm shift in energy-development relations.

Envisaging Alternative Futures: The Need for Paradigm Shifts

One can ask in the African context generally, and specifically in Ghana's recent history under the leadership of Kwame Nkrumah, why societies and their leaders failed to recognize the energy poverty conundrum and why governments which claimed to be anti- and post colonial adopted de facto an energy-development paradigm which was Western. The failure of Nkrumah to develop institutions which challenged the pre-independence ones can be understood in the context of what his vision for a post-colonial Ghana entailed.

Nkrumah perceived Ghana's independence as a turning point in the history of the country. There had been a radical political break with the past and he sought to extend this to the economic and social spheres of the Ghanaian experience. In the mind of Nkrumah a new paradigm had been birthed and he sought to negotiate Ghana's future within this new paradigm. What was questionable about this so-called new paradigm however was that it maintained a marriage with the old. Even though Nkrumah sought the development of a new Ghana; one grounded on the new ideological basis of being a humanized technical society, Nkrumah sought to borrow from the existing paradigm, one built on liberal capitalist ideals, in constructing his new paradigm. In the Kuhnian sense, this did not represent a paradigm shift. The two paradigms were not necessarily incommensurable.

The modernization theory which guided Nkrumah's vision for the transformation of Ghana derived from the works of social scientists whose work focused on the development of the Third World in the post Second World War period.

These modernization theories were inspired by the nineteenth century European experience with the great transformation which essentially transformed typically agrarian societies into industrial and complex ones (Dzorgbo 2001).

Even though Nkrumah sought to harness the power of the industrialization component of the modernization approach *alone* for Ghana's economic development, the approach he was borrowing from represented an "all-encompassing process involving not only economic, but also cultural, psychological, social and political dimensions" (Dzorgbo 2001:8). On the economic plane, modernization sanctioned industrialization, urbanization and the "technological transformation of traditional modes of production. Socially, it necessitated the expansion of education, the weakening of traditional ties and the ascendancy of achievement over ascription criteria as the basis of individual progress. In political terms, modernization necessitated the shifting of loyalties and orientations from the local peripheries to the national centers mediated through bureaucratic legal domination, liberal democratic institutions and values. Culturally it meant the increasing secularization of societies, predicated upon the spread of scientific knowledge and technology. And in psychological terms, modernization was seen as primarily the acquisition of *a state of mind* by people, which included expectations of progress, the need for achievement and a readiness to adapt to change" (Dzorgbo 2001:9). Modernization as it stood was thus not merely a strategy for maximizing economic growth. It represented a worldview and in the Kuhnian sense it was a paradigm of an operative kind.

Yes, the plan for industrialization being pursued by Nkrumah was backed by his own ideology²⁶, that of a humanized African development but “it possessed a logic

²⁶ Nkrumah in his *Autobiography* identified himself as a Marxist socialist with his intellectual influences including Karl Marx, Lenin and Mazzini (Nkrumah 1957). Much of Nkrumah’s ideals were thus seen as closely mimicking the approaches adopted by the Soviets. But this introduced some interesting undertones to Ghana’s modernization experience; one which would only be uncovered in a matter of time. What was not very apparent at the time was the fact that the Soviets themselves had, from the very beginning been locked in an unresolved dilemma. Mounting up a strong defense against capitalism meant one thing; “industrializing to create the preconditions-or supposed preconditions of socialism, or fail; first amongst these preconditions was to catch up with the most developed capitalist economies” (Debeir et al. 1991). For classical Marxists, any level of productivity which was well below that of the levels of productive capitalism would be ineffectual in establishing a truly socialist state. These Marxists identified the transition to socialism as residing “within the fundamental conditions created or developed by European civilization culminating with its industrialism” (ibid:163). Re-creating, importing and copying the technologies that gave the West its power for its own industrialization project was thus unavoidable for the Soviets. Lenin, in the early years after 1917 codified the nature of Soviet energy policy; his representation of communism as *Communism = Soviets + Electrification* firmly established the central role of energy in the industrialization of the Soviet Union. Gigantic development projects specifically the development of large hydroelectric projects became the hallmark of the new society (ibid). All these were necessary for the creation of the self-sufficient society that the Soviets aspired to attain. In the end, the energy systems developed by the Soviets since 1917 have not been too different from those developed by their industrialized capitalist rivals (ibid).

A perusal of Nkrumah’s modernization approach shows that it clearly mirrored his Soviet influences. And like the Soviets, when Nkrumah committed to the creation of a socialist modern technical society, he was committing himself to pursuing a system of development which rivaled the existing capitalist forms; and this necessitated him catching up with these capitalist economies. His drive for the creation of a self sufficient Ghana which was the center of industrialization made it necessary for Nkrumah to “re-create, to import and to copy the technologies which gave the West its power” (Debeir 1991:161). Even though he sought to establish a new social order, the nature of this new society required that he borrow from the older social order; in essence, he had to be capitalist in order to become socialist.

of its own and this logic was independent of any theory or ideology” (Debeir 1991:160). Irrespective of whether or not Nkrumah was aware of this, the modernization approach that he was embracing came hand-in-hand with economic, cultural, psychological, social and political transformations associated with the liberal capitalist mode of production. It was a paradigm in itself; one guided by a well defined system of values, experiences and methodological postulates. So Nkrumah must have been committed to his own ideals, but by borrowing from what he considered an old paradigm, Nkrumah was positioning Ghana as a country which would “insert itself deeper into the mercantile universe of world capitalism, becoming more strongly subject to all the imperatives of industrialization and therefore tending to create within itself contradictions analogous to those of the capitalist mode of production and technology” (Debeir 1991:163). It is this lack of a fundamental paradigm shift which offers an explanation for the failure of Ghana’s post-colonial government to embrace a fundamentally different development strategy and develop new institutions

Towards a New Development Agenda

The increasing sense of dissatisfaction with the modern paradigm is now becoming evident in the numerous academic and social critiques being presented against the modern experience (Esteva 1992; Haque 1999; Mehmet 1995; Sachs 1999; Shiva 1991; Byrne 2008). This dissertation serves as a contribution to this growing body of literature, arguing for change in the present arrangement. In this study, it has been proven that the pursuit of economic growth, technological and social modernization in a typical developing country context does not necessarily lead to improvements in the lives of people. This study has also shown that by focusing on economic growth and efficiency, contradictions have been created in the modern arrangement;

contradictions which are so deep-seated that their resolution now calls for a paradigm shift. The nature of the paradigm shift we need necessitates an approach which extends its reach beyond the parochial focus on economics, technology and efficiency to embrace a new development strategy which will not reproduce the contradictions of the present paradigm. To qualify as a real paradigm shift, such an approach must be fundamentally radical and challenge the very basis on which the present paradigm is grounded.

In Chapter Two of this dissertation, I examined how modern energy-development relations came to assume a paradigmatic position in the present arrangement and how the modern notion of progress became synonymous with the pursuit of economic growth through technological advancement in a modern industrial economy. I explored how the industrial mode of production, even though just one “amongst many forms of social life, came to represent the terminal stage of a unilinear mode of social evolution” (Esteva 1992: 9). It was also discussed how modern energy came to be central to the realization of the goals of this new progress paradigm and how the marriage between modern energy and development was established with the very foundations of the modern paradigm. Any effort to re-define the interaction between energy and society will thus have to begin with a re-consideration of the notion of progress or development; for its role in conditioning energy systems cannot be overemphasized.

Pursuing Development as Freedom

In formulating an alternative to the dominant paradigm this work draws on Amartya Sen’s seminal work on *development as freedom*. Sen in this work, challenges the dominant development approach which emphasizes the maximization of wealth

and income. He offers that economic growth cannot be pursued as an end in itself since “development has to be more concerned with enhancing the lives we lead and the freedoms we enjoy” (Sen 1999:14)²⁷.

For Sen, development ought to relate to the substantive freedoms that an individual has to *lead the kind of life that he or she has reason to value* (Sen 1999). This view of development renders acutely insufficient the narrow view of development which associates it with the growth of gross national product (GNP), individual incomes, industrialization, technological advance or social modernization (Sen 1999). He offers that whereas all these factors may have some role to play by serving in as *means* to expanding the freedoms of individuals within a society, there are other factors which also serve as determinants of freedom. These factors include social and economic arrangements (as relates to facilities like education and healthcare), as well as political and civil rights (as relates to the ability of persons to actively participate in public discussions and scrutiny). A focus on development as freedom thus shifts attention from the means to development (which has so far remained the sole focus of the modern development movement) to the overarching objective which makes development worth pursuing- the objective of freedom.

The underlying cause of underdevelopment in this sense cannot be incomes or wealth alone but can be situated in those things which deprive the individual of his or

²⁷ Sen’s work in this volume was an extension of the Capability Approach he had earlier developed in the early 1980s. He first introduced this approach in his Tanner Lectures on *Equality of What?* (1979). His writings in the 1980s and 1990s served as further elaborations of his basic approach (O’Hearn 2009). Sen identifies Aristotle’s understanding of ‘human flourishing’ as the fundamental inspiration for his approach. He also identifies conceptual connections with Adam Smith and Karl Marx (Sen 1999).

her basic *capabilities* to fully maximize those substantive freedoms. In some instances, underdevelopment may relate directly to economic poverty, which denies people the ability to meet some of their most basic needs such as food, shelter, health, water, energy and sanitary conditions. But other sources of unfreedom may be found residing in the lack of public and social services, the lack of political and civil liberties and the lack of effective institutions to safeguard peace and order in society (Sen 1999). The instruments needed for securing the freedom of individuals are thus diverse. Sen classifies the very many components of freedom into five major categories; political freedoms, economic facilities, social opportunities, transparency guarantees and protective securities (Sen 1999).

There have been several critiques to Sen's capabilities approach. By focusing on the individual, the approach has been criticized for being excessively individualistic to the neglect of considerations of social goods relating to communal ways of life and values. Some have argued that Sen's focus on individual freedoms leads him to consider "states of affairs and social arrangements in terms of how good or bad they are for an individual's well-being and freedom" (Gore 1997) to the exclusion of those social goods which cannot be approached as properties of individuals such as shared language or social norms. Another closely related critique of Sen's approach has argued that the almost narrow focus on individual freedom leaves untouched considerations relating to how the freedom of one individual may impact others negatively (Nussbaum 2003). In response to the social goods critique Sen has argued that his approach is not anti-community. He offers that social goods actually do enter the capabilities approach in an instrumental sense and also as part of the lives people choose to lead as valuable to them. He however acknowledges the fact

that social goods must remain dependent on the reflective choices of those involved; should those involved decide that they no longer have use for a social good, the rights of those individuals, and not the continued existence of the social goods in themselves should serve as the basis for action (Sen 2004).

Offering a counter critique to the position that the focus on individual freedoms in Sen's approach could generate invidious freedoms (Nussbaum 2003), Wells(2012) offers that Sen is clear in establishing the difference between the ability to make choices on the one level and the actual value of those choices. By emphasizing the abilities of persons to live lives they have reason to value, an ethical evaluation is incorporated in "the content of their options" (Wells 2012). Alkire's (2005) operationalization of Sen's approach which will be discussed later presents one way in which this ethical valuation is done. Thus, the capabilities approach does not merely focus on increasing "freedom-as power" but links these with an ethical consideration of how such power should work.

Some (O'Hearn 2009) have also criticized Sen's approach for being neglectful of the underlying social relations and historical roots of the inequalities which create unfreedom in the first place. A counter-critique to this position has been offered by Wells (2012) who proposes that by adopting a posture which attempts to incorporate aspects of human well being which had hitherto been excluded from conventional development approaches, Sen had to adopt some methodological approaches in presenting examples in support of his case. His adoption of situational and sociological analysis of some phenomena which were pertinent to explaining his capabilities approach focused on "tracing the causal pathways of specific deprivations,

with how exactly different people are able or unable to convert resources into valuable functions” (Wells 2012).

In spite of these critiques, many scholars have found Sen’s proposition valuable and have attempted to operationalize it for many different purposes. Based on Sen’s capabilities approach, Alkire (2005) developed a framework for a participatory approach in development practice and the evaluation of development programs. Extending her focus beyond the conventional focus on financial cost-benefit analyses of development programs, Alkire developed a framework for justifying and measuring the success of development programs on the basis of their ability to enhance the capabilities that the target group has reason to value and the extent of that capabilities enhancement (Alkire 2005). Her framework embodies a two-step process; in the first philosophers reflexively identify “the basic spheres or categories of value” by applying practical reason²⁸. Once this is done a second stage is engaged in which the local community deliberates about what their needs are and what they consider the most effective way to meet those needs. Alkire’s approach thus attempts to establish some intrinsically important dimensions of the human experience and allows the scope of those dimensions for any particular group to be determined locally by the people involved based on their historical context, cultural provisioning and personal values. Employing her approach to development initiatives in Pakistan, Alkire realized that even the most materially destitute individuals can and do on many occasions value

²⁸ Alkire adopts the practical reasoning approach of John Finnis for identifying the basic elements of human well-being. The important question asked is “why do I/others do what we do? until one comes to recognize the basic reasons for which no further reasoned justification can be given” (Alkire 2005).

things other than material well-being, such as social participation and religion (Alkire 2005).

Alexander (2008), basing his work on the capabilities approach has also theorized the significance of understanding freedom as non-domination in what he calls the Republican perspective. He draws on the strength of the capabilities approach, particularly its emphasis on the real freedoms of people, as against the conventional understanding of freedom as the absence of constraints. His approach does not stop at understanding whether or not people are able to achieve certain functionings in society but further explores whether or not the achievement of those functions originate from an individual's own power and rights or emanate from the goodwill of other individuals or groups of people. Alexander's Republican Perspective offers that the ability of a truly free individual to achieve his social functionings must be independent of context and must take the form of for instance a guaranteed legal right to be recognized as true freedom (Alexander 2008).

A Framework for Development as Freedom

In proposing an alternative to the modern development paradigm, this study draws on the five instrumental freedoms identified by Sen and adds on a sixth dimension; that of environmental sustainability. The central role of the environment in providing the natural capital that supports human life cannot be overemphasized. It has been offered that some of the most fragile environmental conditions can be found in poor developing countries; and the significance of this observation relates not only to the fact that many livelihoods in these places are directly dependent on their immediate environment, but also to the fact that such countries more often than not do not have the financial, political and managerial capacities to deal with the scale and

magnitude of some environmental problems (UNFPA 2014). The framework for the capabilities approach employed in this study can thus be represented as below.

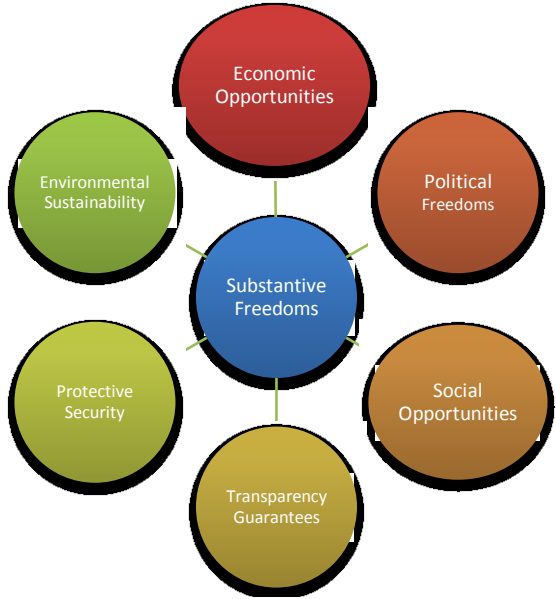


Figure 18 A Framework for Development as Freedom

Adapted from Sen (1999)

It is important to state that these freedoms tend to supplement and in some cases reinforce each other. For instance social opportunities such as education and access to healthcare can both contribute to economic development as well as to reductions in mortality rates. This may in turn reduce birth rates, which may in turn reinforce education especially female education (Sen 1999). The interconnectedness of the various aspects of human development is very crucial to this new approach to development because as will be later realized, it will form a foundation for challenging the reductionist approach to development embodied in the dominant paradigm.

In the pursuit of development as freedom, development initiatives can only be judged on the basis of their ability to enhance the substantive freedoms that people have and this is dependent on the free agency of people. “Expanding the freedoms that we have reason to value not only makes our lives richer and more unfettered but also allows us to be fuller social persons , exercising our own volitions and interacting with-and influencing- the world in which we live” (Sen 1999: 4).

Sen’s perspective of freedom does not only relate to the actual opportunities people have to act and decide, but also relates to the *processes* which either permit or impede the ability to exercise those freedoms of action and decision. Thus development will not only entail the creation of opportunities that permit individual actors to act as free agents, but will also include removing those processes that inhibit the free agency of individuals and replacing them with those that promote such free agency.

From the Modern Development Paradigm to Development as Freedom

Earlier sections of this dissertation have attempted to explain and clarify the failures of the modern paradigm. These were identified as residing in the paradigm’s focus on one model of social change as the singular one for organizing society. By serving as an overarching framework for guiding action, problems encountered within the modern paradigm have been defined in a particular way, specific ways of addressing identified problems have been privileged over others, which in turn has necessitated the inclusion of specific groups of actors in addressing the problem whilst simultaneously relegating other actors to the background (Sachs 1999). This approach has resulted in the exclusion of other determinants and actors of social change in the

development process and resulted in a general neglect of considerations of context in designing development solutions.

For a long time, development policy and planning have pressured countries to follow rigid models. The Structural Adjustment Programs and the many policies which have emanated from them are perfect examples of modernity's rigid approaches. On the contrary, the developed countries which pressure countries to adopt rigid models did not follow the same path in their own development. Geyer and Rihani (2010), offering a critique to the modern approach to development posit that the rich nations of today which serve as models that inform development interventions in the developing countries, did not "adopt slavishly orderly and immutable principles on their way to the top. On the contrary, their eclectic process followed diverse and uncertain rules. The only notable attempt at a rigid orderly model was adopted by the Soviet Union which ended in utter failure" (Geyer and Rihani 2010:130).

The present approach to development, with its parochial focus on economic growth, technological development and social modernization as the end of development as well its tendency to encompass a diverse number of people under the common umbrella of modernity, can thus be said to be incommensurable with the approach to development as freedom; for this approach has as its end substantive freedom which can be achieved in a diversity of ways depending on the particular context. The perspective of development as freedom permits us to return to the original meaning of development which focuses on the process through which the "potentialities of an object or organism are released, until it reaches its natural, complete full-fledged form" (Esteva 1992:8)...it has to do with the transformation

towards an appropriate form and not a perfected form. What an appropriate form is in one context may not be in another; and that is the essence of development as freedom.

In proposing a new paradigm, I recognize that any paradigm, once it achieves paradigmatic status becomes a potential barrier to the next generation of ideas unless its articulators purposely and actively not only advocate a critical analysis of the new paradigm, but support a community engagement with multiple theories and even multiple social paradigms. In this way, the new paradigm will avoid assuming the position of the “new universalizing ethos” of energy-development relations. It is hoped that the alternative paradigm being offered here will enable a critical approach to the premises it offers, will serve as an entry point for effective dialogue in the ongoing attempts to address the challenges of present energy-development relations and may actually facilitate the birth of new theories and paradigms.

The New Role of Energy

In the new paradigm of development as freedom, energy assumes a new social role. Rather than bolstering the transcendence and quantitative logic of modern development, energy will now come to mediate a pattern of development that focuses on expanding the substantive freedoms of society. This new role of energy is already being recognized in some recent approaches to development which have extended their reach beyond the sole economic focus to include some of the other factors necessary for the pursuit of development as freedom. The Millennium Development Goals focus on extreme poverty and hunger, universal education, gender equality, child mortality, maternal health, infectious diseases, environmental sustainability and the promotion of partnerships. Energy has been identified as the crucial link to the attainment of these goals (Modi et al. 2006)

The importance of energy in creating opportunities for the realization of freedom should not however blind us to the *process* aspect of energy. By process, I mean how energy can be attained in this new order in a way which prevents it from creating unfreedoms in its wake. It has been established in earlier sections of this study that modern energy-development relations have created in their wake a string of contradictions; which can here now be safely characterized as unfreedoms. The specialized technologies of centralized grids have necessitated specialized management by technocrats. Non-experts are automatically alienated from the management of these centralized structures. In typical developing countries like Ghana, the operation of large utilities has been associated with little transparency and accountability despite the attempt to address these through power sector reforms (Edjekumhene et al. 2001). In the name of efficiency, energy poverty has also been normalized under this old paradigm. With economic efficiency as the main driver of energy interventions energy has been made accessible to communities only when it makes economic sense to do so.

The framework of instrumental freedoms that facilitate the pursuit of development as freedom (see Fig 1) once again presents us with a useful starting point for rethinking what the nature of an alternative energy regime should look like. Drawing on this framework, this dissertation offers an alternative approach for energy interventions under this new paradigm. An energy regime that powers the paradigm of development as freedom should necessarily be one which allows for the protection of civil liberties, enables individuals to utilize economic resources, is transparent, has in-built structures for protective security and promotes environmental sustainability.

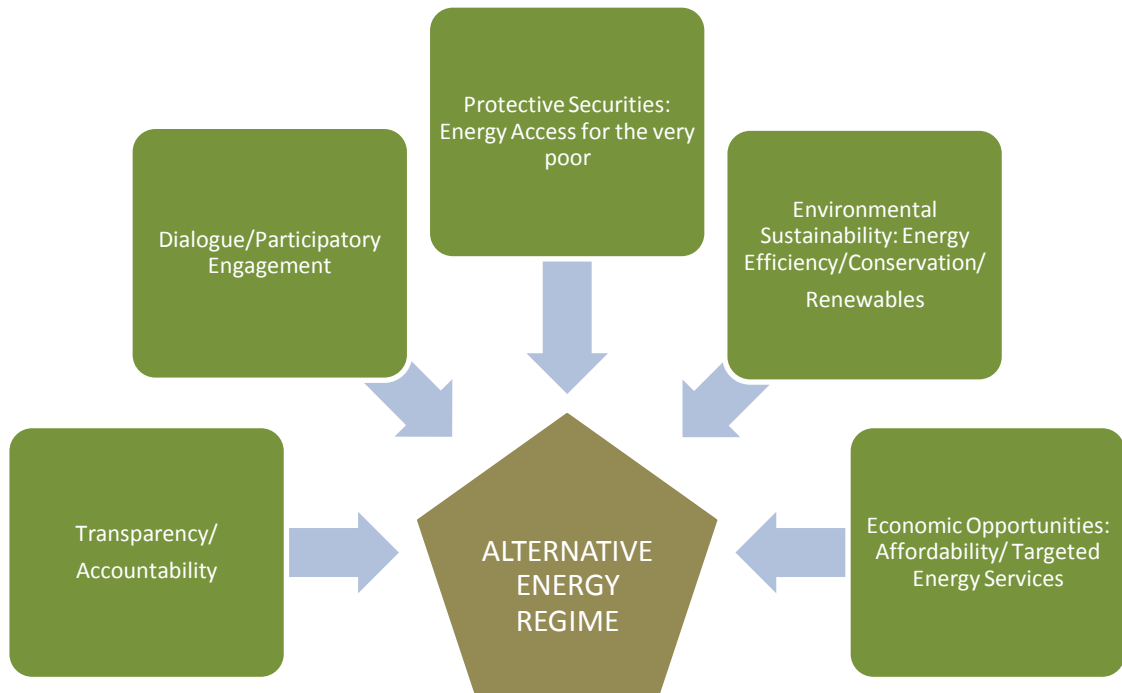


Figure 19 Components of An Alternative Energy Regime

If energy indeed serves as a crucial enabling factor for the satisfaction of basic needs and helps create conditions which permit the pursuit of development as freedom, then creating an enabling environment that permits individuals to have access to energy and energy services is crucial. Equally important is ensuring that energy needs are not met in ways which impede the realization of some or all of the other instrumental freedoms.

Some more recent approaches to energy provision are already embracing new postures. One such approach, the Sustainable Energy Utility (SEU), provides some very useful lessons for understanding the role of energy in the new paradigm of development as freedom.

A Freedom Perspective of Energy-Development Relations; Lessons from the SEU

The idea of a sustainable energy utility (SEU) has been conceived as an alternative to traditional energy utilities. The conceptual basis of the SEU is grounded on a critique of the modern energy regime and its articulators. It offers that the modern political economy with its over-reliance on “obese energy resources and obese energy organizations” stands at variance with the pursuit of environmental sustainability and a commons political economy. The SEU serves as a direct response to these concerns; the intention of creating the SEU was to create an institution which had the “explicit purpose of enabling communities to reduce and eventually eliminate use of obese energy resources and reliance on obese energy organizations” (Byrne et al. 2009:88)

The SEU promotes an alternative energy regime that focuses on reducing overall energy use, and when needed, using renewable energy for the satisfaction of energy needs. The SEU achieves this through the creation of what has been called a commonwealth economy; a commonwealth whose foundations rest on the “mutual promise to share the cost of building an energy scheme that uses less and supplies renewable sources organized locally for and by the community when use of energy is required” (Byrne et al. 2009:8). The SEU also emphasizes community trust; a new form of energy governance that emanates from the society itself and not from technocratic institutions and values as characterizes the traditional utility of the modern paradigm. The SEU model also brings decision making down to the community itself. Decisions as to who governs the SEU, in terms of goals setting, rules enforcement, monitoring and evaluation are made by the community themselves (Byrne et al. 2009). By creating a new locus for energy decision making which has as its end the common benefits of the community, the SEU defines a new pattern of energy-environment-society relations which serves as a means to maximizing the

quality of life sought by communities. “In this way, community values, instead of commodity values determine policy direction” (Byrne et al. 2009:89); this correlates with the core message of the freedom perspective of development.

That the SEU model actually embodies those principles pertinent to the attainment of development as freedom makes it particularly relevant to this study. By focusing on the satisfaction of basic energy needs and an equitable approach to satisfying those needs and by adopting a participatory, transparent and environmentally sustainable approach to meeting energy needs, the SEU has indeed come to represent a perfect example of an approach to energy which maximizes freedom.

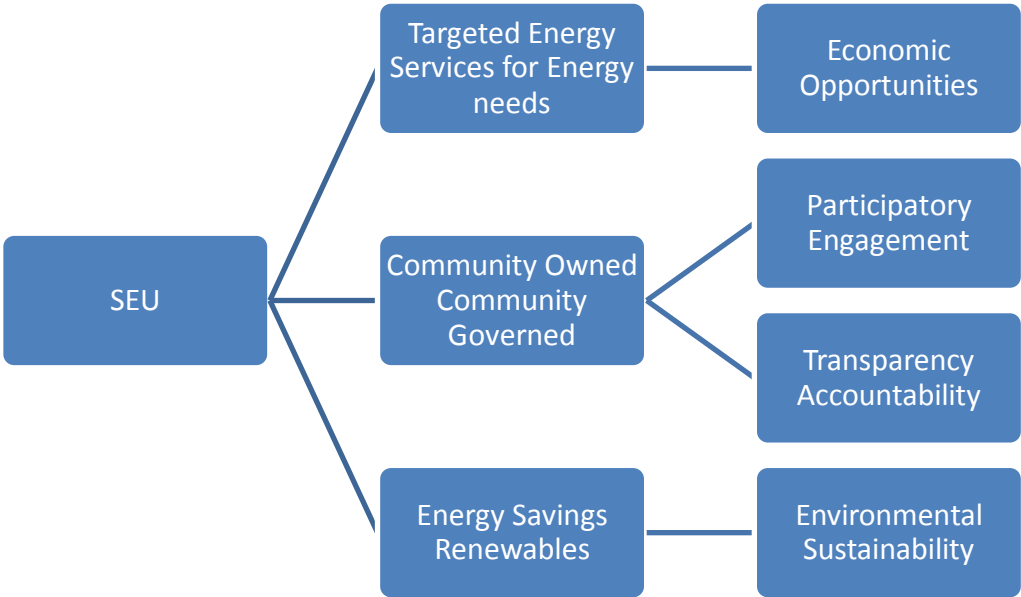


Figure 20 The SEU Through A Freedom Perspective

Adapted from Byrne et al.(2009)

There could be benefits for an SEU-like energy development approach in developing countries where conventional energy-development approaches have failed

to yield the expected results so far. And in proposing the consideration of this approach, I do not suggest the complete destruction of traditional utilities and their replacement with SEUs. The institution of the SEU will however present to individuals and communities an opportunity to choose the particular energy regime which they find beneficial and appropriate to the satisfaction of their needs.

In fact, the approach of development as freedom emphasizes the basic value of permitting individuals and communities to decide what they wish to follow. The choice as to which energy regime an individual or society can be a part of will thus be a product of a participatory resolution. Rather than forcing a unilateral rejection of one for the other, individuals and societies can be made to decide what energy regime they want and that they have reason to accept.

Traditional utilities may have reasons to evolve in the process. If individuals and societies themselves choose an alternative energy regime over the traditional regimes on the basis of the freedom that the alternative regime offers, traditional utilities may also recognize the need to redefine their purpose and move towards energy approaches that are grounded in principles of freedom. In brief, the focus would be on creating the enabling environment that gives people the power and ability to make these choices. Empowering communities to pursue participatory freedom in shaping the goals, content and nature of energy needs is an essential step in shifting the energy-development relations paradigm. Having an institution such as an SEU which is purposed to work on and continually address the challenges of shifting the paradigm will be key to realizing an actual shift.

Re-conceptualizing Energy Poverty

The freedom perspective of development also informs a new conceptualization of energy poverty. Energy is a basic need; a social opportunity which influences an individual's ability to live better. But beyond the benefits of energy in the private lives of people, it also permits them to engage for instance in economic activities which is also a pertinent aspect of freedom. This is the *opportunity* aspect of energy poverty; and it relates directly to ensuring that energy is available for use by individuals and communities in a physical, economic (affordability) or social sense (applicability to actual needs). Conventional definitions of energy poverty have basically been locked into this level of creating opportunities for people to have access to energy (particularly modern energy) for the satisfaction of economic and social needs. But the perspective of freedom always calls for a consideration of '*process*' as well; that is to say a consideration of the processes which challenge the capabilities of individuals and communities to actually make use of energy sources in ways which promote their substantive freedoms. So there are two dimensions to the problem of energy poverty; the opportunity dimension which deals with actual availability of energy for the satisfaction of various needs and the process dimension which deals with the structural factors that impede the abilities of individuals to make use of energy even when it is available to them in a physical sense. The conventional approach to energy poverty, by focusing on tangible and quantifiable elements such as the extent of grid penetration for instance, tends to neglect the consideration of the structural factors which define the patterns of energy use for individuals and impede their ability to make use of some energy sources.

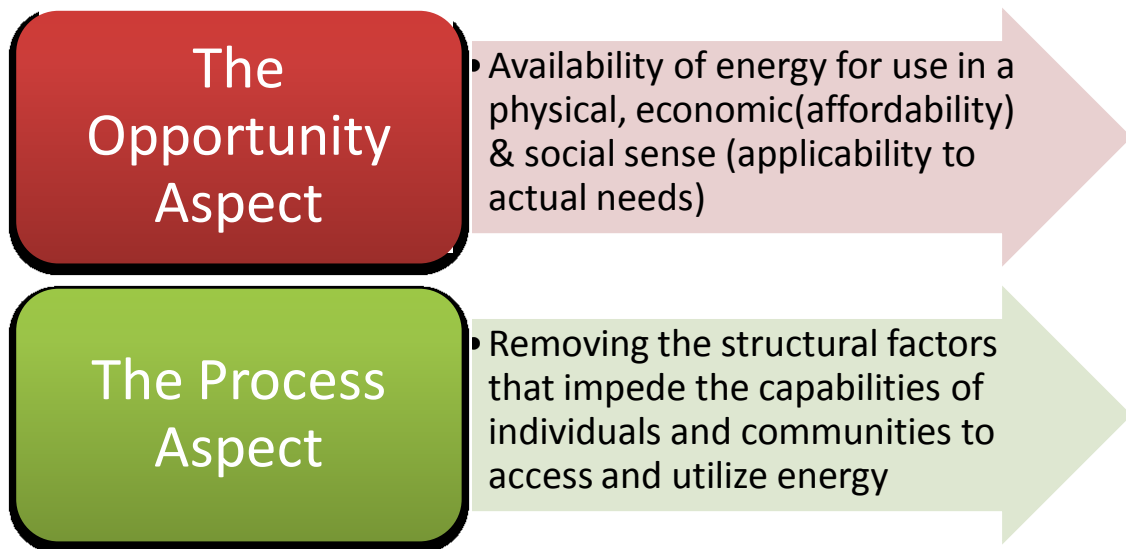


Figure 21 A New Conceptualization of Energy Poverty

The strictly technical approach of the dominant paradigm is important but is not sufficient for addressing the problem at hand. To be successful and effective, approaches for addressing energy poverty must act on both dimensions of the problem. Understanding the structural factors which challenge the capabilities of individuals to access and use energy requires asking a totally new set of questions and turning to subjective introspection as source of knowledge. That is what the praxeological research approach advanced in this dissertation presents. It moves beyond observing patterns of energy use à la the use of traditional versus modern energy sources to focus on understanding why those particular patterns of energy use exist in the first place. Understanding the sources of unfreedom that challenge the abilities of people to have access to and use energy sources demands a research approach that reaches to the

bottom to learn from the perspective of people themselves, what makes them energy poor. People's life stories contain a wealth of information about the factors that inhibit their ability to develop in the modern sense; factors that cannot be accounted for by empiricist approaches alone. And as this dissertation has sought to prove, the answer to the problem of energy poverty is not always a technological or an economic one; more often than not, its roots can be situated in the historical and political-economic foundations of the modern paradigm. An approach of inquiry which excludes the value of the knowledge derived from subjective introspection promises to be deficient in its quest to address the challenges it sets out to deal with.

It is also important to mention that even in the pursuit of the opportunity aspect of energy poverty, the freedom perspective necessitates changes. Individuals and communities have been classified as energy poor because of their dependence on energy sources which are considered traditional as opposed to the desired modern energy forms. In the freedom perspective, energy sources are not rejected because they are traditional but because they do not ensure the satisfaction of all elements of freedom. If energy sources satisfy all other freedoms but that of environmental sustainability for instance, then that presents grounds for rejecting that particular energy source as embodying elements of unfreedom. Addressing energy poverty should thus not be on the broad basis of replacing traditional energy sources with modern energy sources; it should be focused on providing those energy sources whose provision encourage civic participation, transparency and accountability, promote economic facilities and environmental sustainability. Some of the so-called modern energy sources fail to meet this criterion.

Redefining Energy Poverty

Energy poverty can thus be redefined as *the lack of access to sufficient amounts of energy sources whose acquisition and use ensure the provision of economic benefits for the satisfaction of salient basic needs, foster civic participation, transparency, accountability and secure environmental sustainability.*

Towards a New Intellectual and Policy Agenda

Like Kuhnian scientists, development experts and academics, guided by the new perspective of development as freedom will begin to see new and different things when they look into places that they have looked before. They will begin to ask a different set of questions, apply a different set of methodologies and propose different strategies for the problems they are confronted with.

By emphasizing the interconnectedness of the various freedoms as well as the structural dimensions of these, a development approach informed by this new conceptual viewpoint will be integrated and will focus on drawing on the synergies between the different components of freedom in promoting development, all the while being mindful of the structural factors that affect or could potentially affect those freedoms. For academics, this will require an increasingly interdisciplinary approach in addressing problems of energy-development relations. To fully maximize the contributions of all the various freedoms, academics studying energy-development relations must be willing and ready to draw on a broad base in engineering, social science, political science, history, anthropology and indigenous knowledge to be able to engage in effective discourse in a new intellectual environment.

In the policy arena, there will be the need for a more integrated approach to development. Energy development must always go hand-in-hand with the

development of other basic needs and the other components of freedom which permit individuals to utilize these basic needs in ways which they find particularly useful given their prevailing circumstances. This calls for a multi-sectoral approach to energy and development.

The freedoms perspective also emphasizes the significance of context. What may be meaningful and valuable to a society living in a particular context at a particular time may not be necessarily meaningful and valuable to another living in different context. Development can thus not take on a cookie-cutter approach, but must be particularly designed and suited to the particular context to which it is applied. Likewise, addressing energy poverty cannot be approached as a one-size fits all approach. Before attempting to roll out energy-development interventions in any community, there must be an initial attempt to understand from the perspectives of the individuals and communities involved the factors that inhibit their capabilities to live the lives that they have reason to value. The role of energy should then be situated within this context, all the while keeping an eye on the interlinkages between energy and the other elements of freedom. This might not appear like the most efficient approach, but we ought to decide if the pre-occupation with efficiency trumps our desire to actually make a difference in the lives we set out to influence.

Possibilities also exist for engaging a new research agenda. The conventional approach to energy poverty has as it were “blamed” so-called traditional energy for its backwardness. But in this study it has been proven that modern energy has also failed in bringing about the so-called progress. It is perhaps time to consider another argument. Another question which could be asked and which could create a path for a new research agenda would be the question as to whether the seeming persistence of

these traditional energy sources actually tells a story about the nature of these energy sources and the knowledge structures which have been built around them. For in the peri-urban experience studied in this dissertation, one comes across a group of individuals with very few means, little or no infrastructure and who have been largely abandoned or ignored, who have nonetheless found unique and impressive ways of adapting energy options to satisfy their energy needs- it is nothing short of an incredible story of resilience, both of the energy systems that these peri-urban communities have depended on for years, the underlying knowledge systems that inform these energy systems and of the survival capabilities of these communities as well. Thus, rather than focusing exclusively on the modernization of the energy sector, there is undoubtedly the need for greater research which examines how lessons from this real success can inform the development of effective energy policies in development practice.

In sum, a new horizon can lie before us; a paradigm that focuses on the substantive freedoms of individuals and society, on the relevance of context and on the all important role of history and political economy in making sense of our human experience. The question that remains is whether or not we are ready to embrace the challenge of creating this new paradigm.

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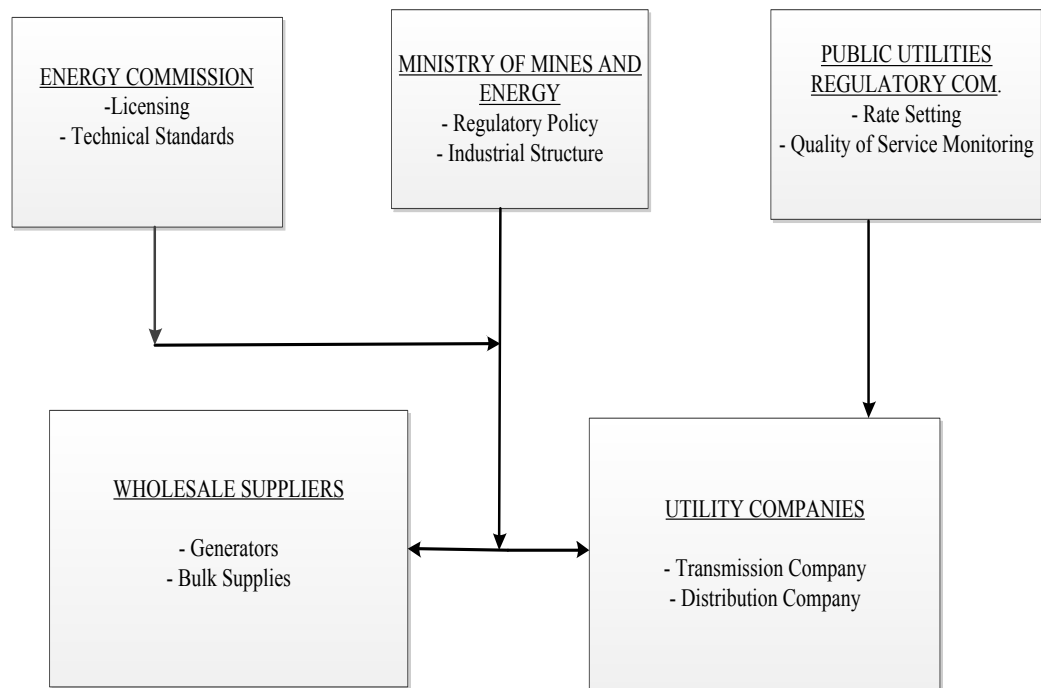
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Appendix A

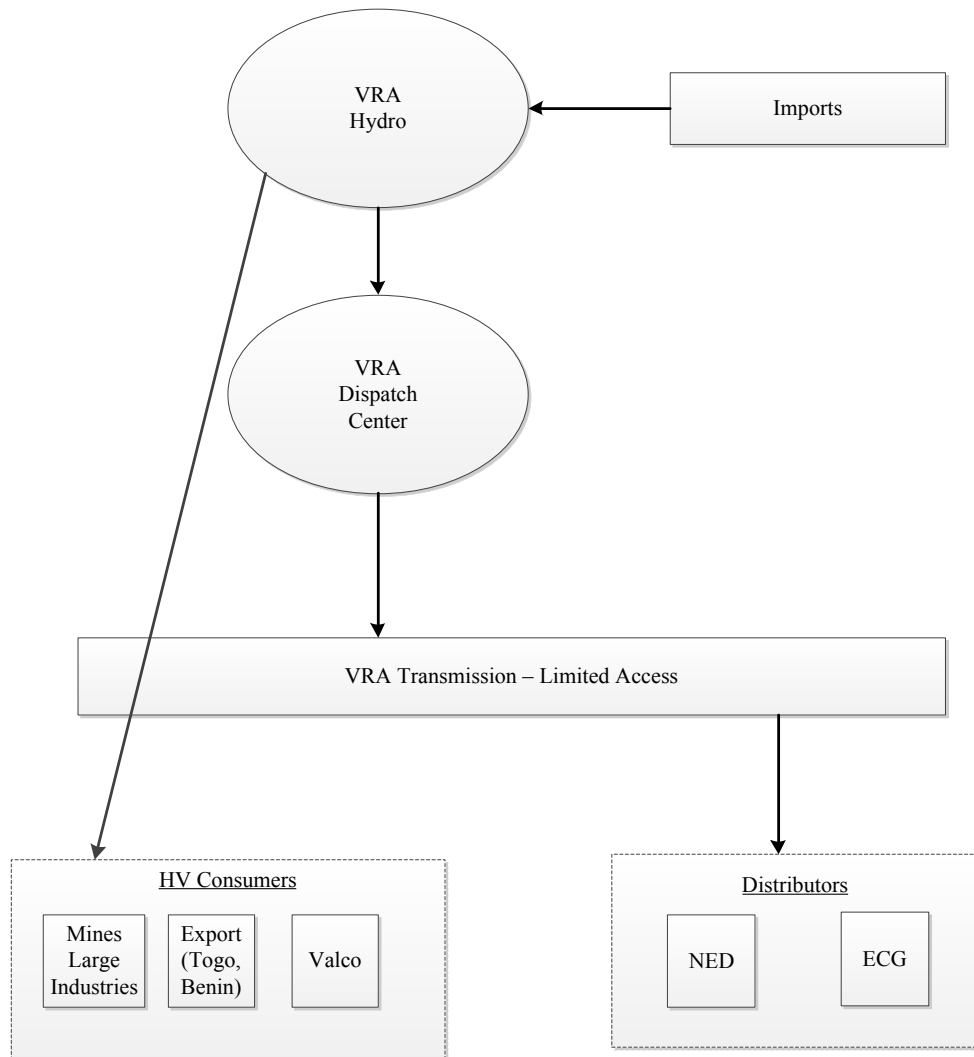
NEW REGULATORY STRUCTURE



Source: Opam (1996)

Appendix B

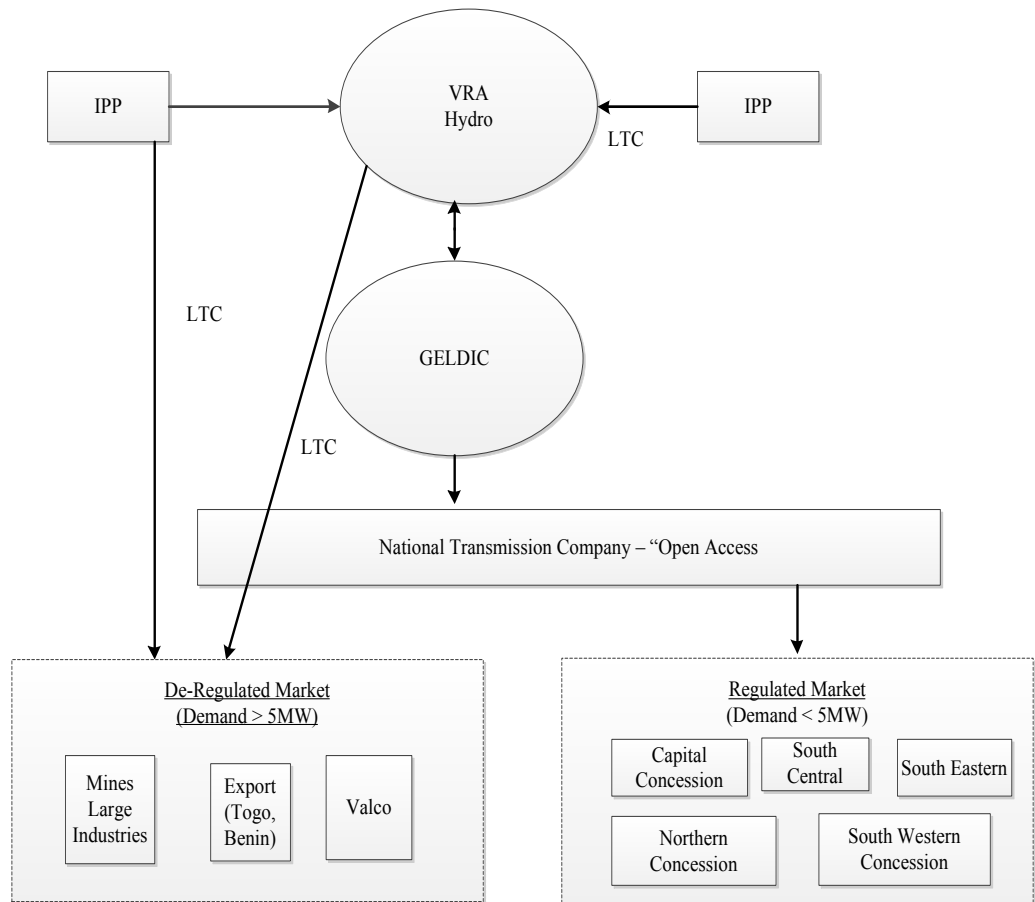
PRE-REFORM STRUCTURE OF POWER SECTOR IN GHANA



Source: Opam and Turkson (2000)

Appendix C

PROPOSED ELECTRICITY MARKET STRUCTURE



Appendix D

ACRONYMS

ADB.....	Asian Development Bank
ESMAP.....	Energy Sector Management Program
EPRAP.....	Energy for Poverty Reduction Action Plan
GDP.....	Gross Domestic Product
GNP.....	Gross National Product
HIPC.....	Highly Indebted Poor Country
IEA.....	International Energy Agency
MDGs.....	Millennium Development Goals
NED.....	Northern Electric Department
NEP.....	National Electrification Program
NES.....	National Electrification Scheme
NSE.....	New Structural Economics
OFID.....	OPEC Fund for International Development
PURC.....	Public Utilities Regulatory Commission
SEU.....	Sustainable Energy Utility
UNDESA.....	United Nations Department for Economic and Social Affairs
UNDP.....	United Nations Development Program
VRA.....	Volta River Authority
VRDA.....	Volta River Development Act
VRP.....	Volta River Project

Wafal.....West Africa Aluminium Limited

WEC.....World Energy Council

Appendix E

INTERVIEW GUIDE

Demographics

No. of people in household/business.....

Position of respondent e.g. household head.....

Gender of respondent.....

Average income*.....

What brought the respondent to this peri-urban zone? How long has he/she lived in this zone? Future plans to permanently dwell in this peri-urban zone?.....

.....
.....

Technology

a) What energy sources are available for your use?

1. Firewood
2. Charcoal
3. Wood chips
4. Animal Dung
5. LPG
6. Electricity
7. Other

b) Which of these energy sources is/are your preferred choice(s)?

c) Do you have access to your choice energy sources when you most need them?
What about the other sources?

d) What do you consider your most significant use of energy? What benefit do you derive from this use?

1. Cooking
2. Heating
3. Drying
4. Mechanical power
5. Economic activities
6. Entertainment
7. Other

- e) How has the availability of energy choices impacted these uses/benefits?

Environment

- f) Are you aware of any environmental impacts associated with your energy use?
- g) If yes, how has this awareness informed your choice of energy sources and use?
- h) If no, would the knowledge of the existence of any such impacts affect your energy choices and use?

Values

- i) Have there been any significant changes in energy use and management patterns in the area in the last 10yrs, 5yrs, 2yrs (depending on how long respondent has been resident in the area)?
- j) Does the present pattern of energy utilization have any impact on social norms and/or values in the area?

Institutions

- k) Which institutions are the most important in the provision and management of your energy sources?
- l) Who constitute these institutions?
- m) How effective are they in meeting your energy needs?
- n) Are you aware of the existence of any structures within these institutions to which you can relate specific concerns related to your use of energy?

Economy

- o) What is the average cost of your energy source(s) of choice?
- p) How much of your average income do you spend on energy provision?
- q) Would you identify the cost of energy sources as a significant factor which affects your choice of energy source(s)?
- r) Have you ever had to adjust your energy choices and use in response to economic changes?

Knowledge

- s) How much knowledge do you have about your energy source of choice?
1) No knowledge 2) Minimal knowledge 3) Satisfactory knowledge 4) Very good knowledge 5) Excellent knowledge
- t) How much control does that knowledge give you over energy access and the efficiency of use?

- u) Do you consider your knowledge of your energy sources sufficient to improve upon the present availability and patterns of management of your energy source of choice?

Resilience

- v) What occurrences, natural or natural, intended or unintended have the greatest capacity to affect your ability to meet your energy needs?
- w) Have you been faced with any of these situations in the past?
- x) If yes, how did you deal with these shocks/disturbances?
- y) Are some energy sources in your opinion more susceptible to such external shocks and why?
- z) What elements/factors in your opinion are most important in helping you withstand some of these shocks?

Perspectives on Development

- a) What do development and the attainment of progress mean to you in your everyday life



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DATE: June 24, 2013

TO: Lily Odarno, PhD
FROM: University of Delaware IRB

STUDY TITLE: [472718-1] Confronting the Peri-Urban Energy Poverty Challenge: Lessons from Kumasi, Ghana

SUBMISSION TYPE: New Project

ACTION: APPROVED
APPROVAL DATE: June 24, 2013
EXPIRATION DATE: June 23, 2014
REVIEW TYPE: Expedited Review

Thank you for your submission of New Project materials for this research study. The University of Delaware IRB has APPROVED your submission. This approval is based on an appropriate risk/benefit ratio and a study design wherein the risks have been minimized. All research must be conducted in accordance with this approved submission.

This submission has received Expedited Review based on the applicable federal regulation.

Please remember that informed consent is a process beginning with a description of the study and insurance of participant understanding followed by a signed consent form. Informed consent must continue throughout the study via a dialogue between the researcher and research participant. Federal regulations require each participant receive a copy of the signed consent document.

Please note that any revision to previously approved materials must be approved by this office prior to initiation. Please use the appropriate revision forms for this procedure.

All SERIOUS and UNEXPECTED adverse events must be reported to this office. Please use the appropriate adverse event forms for this procedure. All sponsor reporting requirements should also be followed.

Please report all NON-COMPLIANCE issues or COMPLAINTS regarding this study to this office.

Please note that all research records must be retained for a minimum of three years.

Based on the risks, this project requires Continuing Review by this office on an annual basis. Please use the appropriate renewal forms for this procedure.

If you have any questions, please contact Jody-Lynn Berg at (302) 831-1119 or jlberg@udel.edu. Please include your study title and reference number in all correspondence with this office.