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Negotiating reforms at home: Natural resources and the politics of energy access in urban Tanzania

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**Negotiating Reforms at Home: Natural Resources
and the Politics of Energy Access in Urban Tanzania**

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Abstract

Household access to resources in urban areas is increasingly contested as a political arena under the rubric of globalization. These debates focus on the coming together of urban population growth, increasing inequality, and economic restructuring - processes that cut through arenas of households, communities, national policies, and international regimes. Sector reforms including privatizations of urban resource services and infrastructures such as water, transportation, and energy all figure prominently in these debates and have important stakes for household and community access. This paper is part of a broader dissertation research project focused on unraveling the historical, resource, and discursive processes producing conditions of urban energy in Dar es Salaam. It presents a preliminary set of arguments suggesting that reforms may be contributing to dynamics that may increase and sustain urban charcoal use, and consequently increase pressure on forestry resources. The relationship between formal and informal resource economies, community-level resource strategies, and differentiated intra-household dynamics around labor, gender, and power all play central roles in this discussion. This paper arrives at its main argument through three parts. First, it introduces the specific policies connected with reforms and their historical origins in a paradigm shift from treating energy as a public service to a commodity good. Second, it lays out a framework for conceptualizing dynamics of household energy access, where reform policies may rework access conditions in important ways. Third, it elaborates the main hypothesis of this paper by showing how charcoal is now the cheapest cooking fuel as a result of changing fuel pricing policies and elaborates a set of dynamics around consumer goods that may serve to further differentiate types of energy priorities and direct resources away from spaces of kitchens. The paper concludes with a short discussion of the policy implications and next steps in the broader research project.

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1. Introduction

Household access to resources in urban areas is increasingly contested as a political arena under the rubric of globalization from a range of perspectives (Balbo 1993; Hall and Pfeiffer 2000; Graham and Marvin 2001; Evans 2002; World Bank 2003; Global Exchange 2004). These debates focus on the coming together of urban population growth, increasing inequality, and economic restructuring - processes that cut through arenas of households, communities, national policies, and international regimes. Sector reforms including privatizations of key urban resource services and infrastructure such as water, transportation, and energy are central to these debates and are part of a what Watts describes as “the privatization of everything” (1994).

On the international stage, international financial institutions have promoted sector reforms affecting household resources in developing countries through lending conditionalities and policy advice, while international activist networks have dramatized the plight of an urban citizenry in the face of inexorable forces of privatization. However, from the perspective of urban household resource access, neither the process of reforms nor the outcomes they play a part in shaping are quite so monolithic or absolute. As a result, there is a need for greater understanding of how broader processes of reforms, for which privatization is a part, are shaping conditions of household resource access for different groups and within specific urban contexts.

This paper is part of a broader dissertation research project focused on household energy resources and conditions of energy access in Tanzania. It considers how energy reforms in Tanzania are a part of a broader set of processes that are shaping patterns of energy use in ways that are important both to natural resources, urban livelihoods, and the environment. The stakes of changing resource conditions with reforms are particularly significant and challenging in an urban African context where informal resources often make a greater contribution to household resource access than formal services and rights are not static but configured by a complex set of claims and relations for which citizenship is only a part.

This paper presents a preliminary hypothesis resulting from early dissertation research suggesting that energy reforms are contributing to a set of household energy dynamics that are likely to increase and sustain urban charcoal use, and consequently increase pressure on forestry resources as a result of urban energy demand in Tanzania. Specifically, preliminary results from ongoing research suggest that policies associated with reforms are contributing to a set of conditions that may reinforce the use of charcoal as the primary urban cooking fuel even in higher income households. The relationship between formal and informal resource economies, community-level resource strategies, and differentiated intra-household dynamics around labor, gender, and power all figure into these dynamics.

This paper will arrive at this hypothesis through a pathway of three parts. First, it introduces the specific energy policies connected with reforms experienced by Tanzanian households and traces out their historical origins within a paradigm shift in energy and development policy from treating energy as a public service to a commodity good. Second, it highlights patterns of urban household energy use and lays out a framework for conceptualizing dynamics of household energy access, where reform policies may rework access conditions in important ways. The third section elaborates the main hypothesis of this paper in two parts by showing how charcoal is now

the cheapest cooking fuel as a result of reform policies and by elaborating a set of dynamics that may serve to further differentiate types of energy priorities within the household in ways that may direct resources away from spaces of kitchens and coking and toward other highly valued energy services. The paper concludes with a short discussion of the policy implications and next steps in the broader research project.

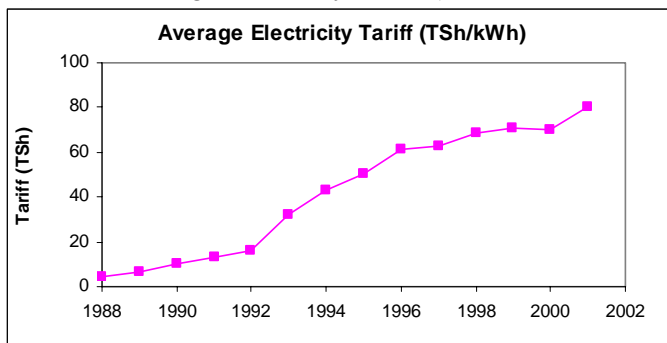
2. Urban Energy Conditions in Tanzania in a Historical Context

2.1 Policies of Energy Reform and Restructuring in a Local Perspective

This section lays out a critical set of energy policies connected to energy reforms that have important stakes for household energy conditions. The policies and perspectives presented here serve as the starting point for closer analysis of the historical context of these reform policies and their possible significance in shaping patterns of household energy use.

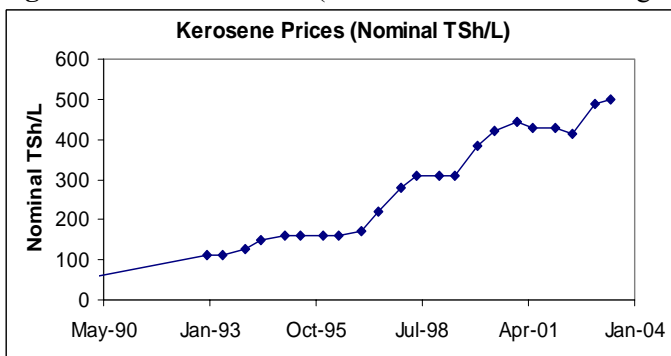
Household fuels used for cooking, lighting, and other uses are getting more expensive from the perspective of household incomes in Tanzania. The retail prices consumers are paying for household fuels are going up. In nominal terms the average electricity tariff has increased almost nine fold since 1990, and kerosene retail prices have increased by more than a factor of four since 1993. Figure 1 and Figure 2 show steady increases in nominal electricity and kerosene prices over the last decade.

Figure 1. Average Electricity Tariff (nominal Tanzanian Shillings / kWh)



Data Source: (Mwandosya and Luhanga 1993; Marandu 2002; Eberhard 2003)

Figure 2. Kerosene Prices (nominal Tanzanian Shillings / L)



Data Source: (TNBS 2003)

What is significant about these increases from the perspective of households is that these prices have been rising faster than incomes. Table 1 shows that the ratios of price increases for electricity and kerosene have increased in real terms at a rate faster than expenditures¹ between 1990 and 2001. This result suggests that the formal energy fuels of electricity and kerosene have become more expensive relative to incomes over the decade - an important set of conditions for what these results may suggest about decreasing affordability of formal energy fuels and reduced prospects for expanding consumption without substitution of resources from elsewhere in the household budget.

Table 1. Ratios of price increases over the last decade (real terms)

	Ratio 2000/1990 (ratio in real terms ¹)
Electricity Tariff ²	5.0
Kerosene Price	2.1
Expenditures	1.5

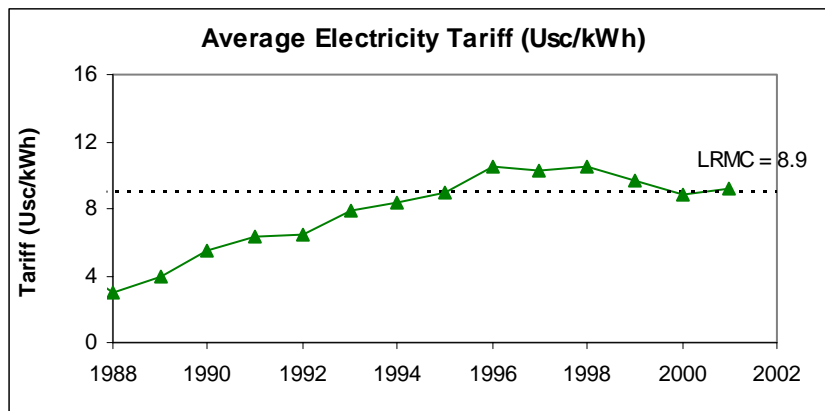
¹ Electricity tariffs and kerosene prices are adjusted to real terms using a national fuel price index as a deflator. Expenditures have been adjusted by a Fischer price index that takes into account substitution effects.

² Electricity tariff ratios are calculated from an average per kWh tariff based on a low level of overall monthly electricity consumption, comparing the energy charge for the first block tariff of ≤ 100 kWh/month over the decade

Data Sources: (TNBS 2002; TANESCO 2003; TNBS 2003; TNBS 2003)

These changes in prices are part of a set of energy sector reforms initiated in the 1990's aimed at making the energy system operate along more commercial lines. In Tanzania, reforms have corresponded to reductions in the level of subsistence and cross-subsidies, and increases in prices that consumers pay to commercial levels, such that consumers bear the commercial cost of production. Figure 3 shows the average electricity tariff in Tanzania has been raised to the level of estimated long-run marginal costs, the level of tariff that is expected to earn a commercial rate of return by international standards.

Figure 3. Average electricity tariffs and estimated long run marginal cost (US cents / kWh)



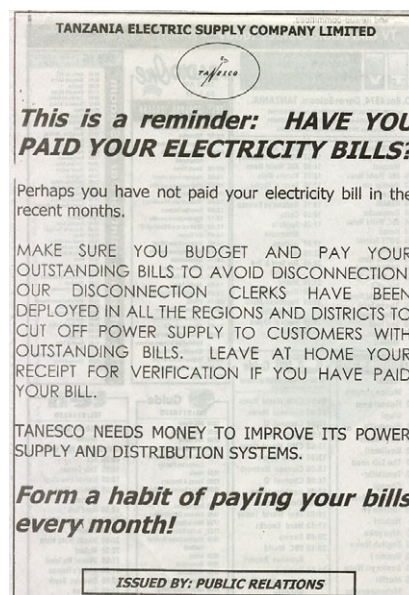
Data Sources: (London Economics 1993; Mwandosya and Luhanga 1993; Marandu 2002; Eberhard 2003; TNBS 2003)

¹ Expenditures are a typical proxy used for income in developing countries household surveys

Simultaneously with raising fuel prices, there has been a movement toward stricter enforcement of collections on electricity. The imposition of collections “discipline” has spanned from the individual consumer to large industrial and government consumers. In September 2004, Tanzanian newspapers reported long queues at utility payment offices as a crackdown on overdue collections was to be planned to begin (Bilal 2003). Also included in the enforcement of collections have been high profile disconnections of larger customers, such as the disconnection of the entire island of Zanzibar in August 2003. These enforcements of public collections are significant, particularly as one of the leading causes of the electric utilities financial insolvency and inability to finance infrastructure investment has been attributed to the outstanding energy debt of the public sector that reached more than 20% of revenues in 1991 (Mwandosya and Luhanga 1993).

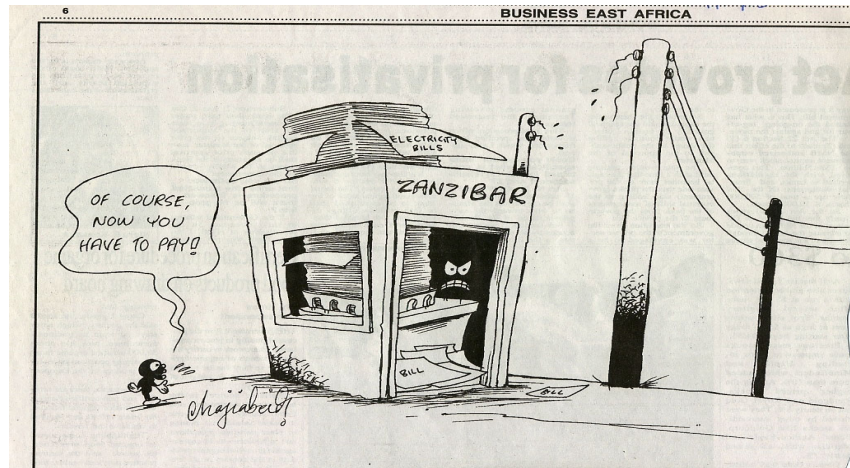
These reorientations in utility – customer culture and the tactics used to impose discipline in enforcement of collections have met with controversy and significant debate within the popular press. The newspaper clipping shown below in Figure 4 is an example of the English and Swahili newspaper announcements that appear near daily as a part of the electric utility, TANESCO’s, enforcement of collections campaign. Figure 5 shows a political cartoon from a local paper related to the uproar that occurred after the crackdown and cutting off of entire island of Zanzibar, and sparking debates not only on the techniques of enforcement, but also long standing debates over island sovereignty and succession. Notably, Zanzibar quickly came to an agreement for repayment with TANESCO and the island’s power was restored after only four hours.

Figure 4. Newspaper announcement for the enforcement of collections campaign by the electric utility, TANESCO



Source: (Guardian Newspaper, August 5, 2003)

Figure 5. Political cartoon depicting disconnection of island of Zanzibar's electricity as a result of outstanding bill nonpayment



Source: (Financial Times Newspaper, July 30, 2003)

Energy reforms are fundamentally about institutional changes that are reworking the role of the state in overseeing the operation of the economy. The electricity utility, TANESCO is on a pathway toward privatization and is currently operated under a fixed period private management contract with a South African company, Net Group Solutions. Under the management contract, which is a typical arrangement in the pathway of water and energy privatizations, the state formally owns the utility assets and infrastructure, while the private company oversees management of all day-to-day operations. The primary objective of the management contract is to reorganize operations in order to turn TANESCO from a loss making to a profit making enterprise. Incentives built into the management contract link the private operating company's rate of return to meeting benchmarks for increasing the level of commercial returns.

All of these reforms are part of a broader set of economy wide reforms across all sectors in Tanzania. Since the early 1990's Tanzania has privatized hundreds of state owned enterprises and includes steps toward greater private sector involvement in energy, water, railways, air transportation, and telecomm.

The larger question this paper engages is: *How are changes associated with reforms reshaping conditions of household energy use? And what is the significance of these transformations for household livelihoods and the environment?* This paper focuses on tracing out an argument for one possible outcome that may result from the ways that changing conditions interact with dynamics of household energy use. Specifically, it hypothesizes that reforms may reinforce and increase pressure on wood fuel resources through sustained charcoal use.

The next section traces out how Tanzania has come to undertake these energy reform policies that represent a departure from earlier energy and development policy. It presents the idea that energy reforms are part of a historical paradigm shift configured by a combination of national and international conditions that shift the foundation of energy policy from treating energy as a public service to treating energy as commodity good. The policies and their historical context

serve as a foundation for taking a closer look at dynamics of household energy use in the second half of the paper, which considers the ways that these changing conditions may penetrate and interact with household and community level arenas to shape patterns household energy use in ways that are significant to natural resources in Africa.

2.2 From Public Services to Commodity Goods: A New Paradigm for Energy

The context for energy policy and practice in Tanzania is being reconfigured by an ongoing paradigm shift. Underlying this transition is the emergence of a global model for energy provision based on energy as market commodity allocated according to a consumer's ability to pay. The paradigm eclipses earlier conceptions of energy as a public service aimed at providing for the basic needs of the majority and the energy requirements of the state-led development project of the post-independence era.

The public service paradigm most prominently influenced energy policy in Tanzania from the post- independence period through the onset of structural adjustment policies in the mid-1980's. The transition between paradigms has no abrupt dividing line, but structural adjustment loans and policies were central in catalyzing institutional reform and privatization activities that began to lay the groundwork for a reorganization of the economy and the energy sector (Kaiser 1996). By the end of the 1980's, a dramatic shift in the direction and objectives of energy and development was apparent. The state began to relinquish its historical control of the "commanding heights" of the economy and moving toward greater economic reform. Much of the responsibilities of provision of energy services were turned over to the private sector with the lifting of the state monopoly on electricity generation in 1992 and initiation of the pathway toward privatization with the transfer of day-to-day operations of the electric utility, TANESCO, to a private company under a management contract in 2002.

This section situates current energy reform policies within a longer history of energy and development. These engagements provide insight into the set of transitions initiated in the mid 1980's that energy reforms are a part of. History is also important to understanding current patterns of access to services through the accomplishments, limitations, and inequities of energy service provision of the post-independence planning model. Importantly, historical provision of energy services has primarily benefited urban areas, and as a result, urban households are likely to experience the most significant direct effects of changing energy reforms policies. These urban energy conditions and their political reworkings are the focus of this research.

The Public Service Paradigm under Tanzanian Socialism

The defining ideological foundation of Tanzania's public service paradigm was the model of African socialism premised on state control of economic and infrastructure planning. This model was founded on the idea that socialist state planning would be able to put the national interest ahead of strict profit maximization and make the most effective use of scarce national resources to promote development (Fagan, Deere et al. 1986). In contrast, the private sector market was viewed within these political debates as unreliable for furthering the best interest of Tanzanian society.

The energy sector under the public service paradigm was organized such that the state controlled energy pricing, infrastructure decisions, and a large part of daily operation and management of

energy companies. Electricity generation, transmission, and distribution were controlled by the state utility TANESCO. Private companies involved with distribution and sales of petroleum products operated as minority shareholders in private-state joint venture companies. Energy policy focused on providing low cost kerosene, low electricity tariffs, and electricity grid extension. Under the public service paradigm, these energy services were seen to merit public subsidy, investment of public resources, and efforts for equitable distribution, as a part of broader development objectives. In this case, economic cost recovery was subsumed to the greater interests of equity and social welfare. Extensive subsidies of household fuels of electricity and kerosene were justified on these terms

Table 2. Features of the public service and commodity goods paradigms

	Public Service Paradigm	Commodity Goods Paradigm
Time Period	1961 Independence to early 1980's	Mid-1980's to present
Macro-Economic Model	State-led national development	Market-driven economic growth
Basis of Allocation	Public service, industrial factor	Economic good, willingness-to-pay
Ideological Foundation	Equity, self-sufficiency	Efficient allocation, comparative advantage
Policy Focus	<ul style="list-style-type: none"> - Household fuel subsidy (electricity and kerosene) - Electricity grid extension 	<ul style="list-style-type: none"> - Commercial pricing based on marginal cost - Enforcement of collections - Privatization and private investment
Broader Debates	Modernization, dependency	Economic globalization & critiques

The inequities and urban bias of electricity provision in practice

However, in practice, the public service paradigm in many ways fell short of its ambitious goal of universal energy service and equitable distribution of energy resources. After more than 40 years since independence, the level of access to electricity is still very low. Electrification rates remain dramatically insufficient at only 10% overall and less than 2% in rural areas (TNBS 2002). Electrification is only extensive in urban areas being primarily confined to the capital, Dar es Salaam, and a small number of regional centers, where electrification is reported to be over 50% (TNBS 2002).

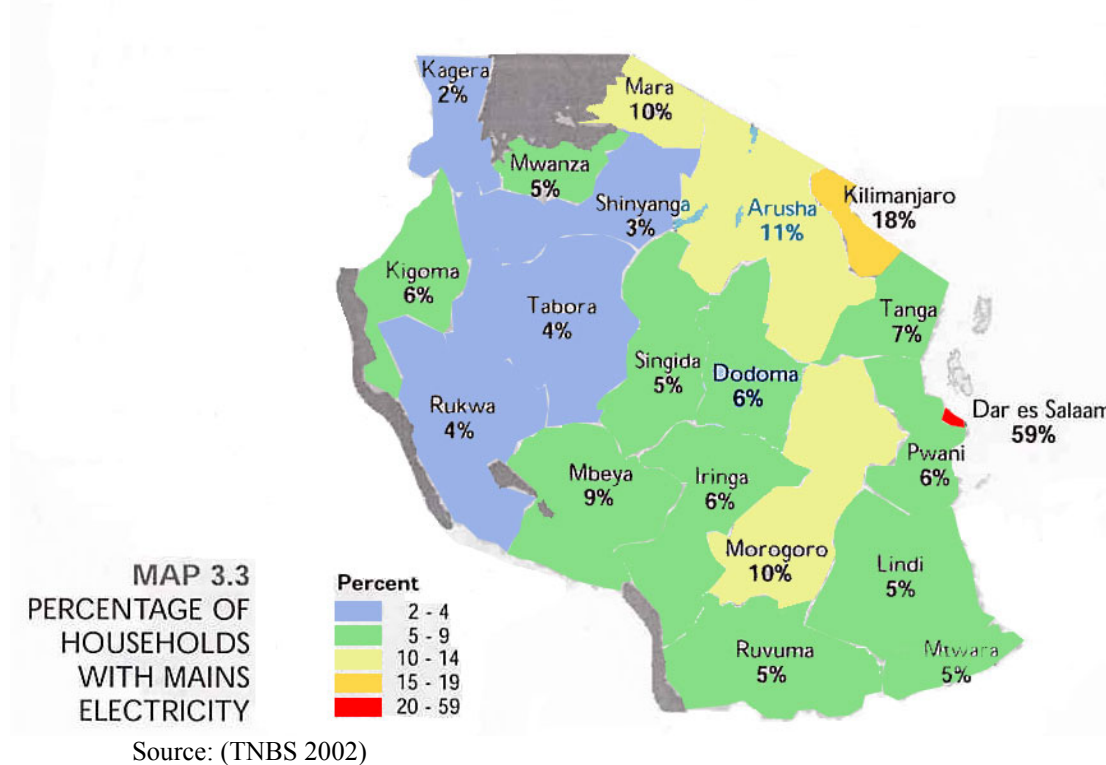
Table 3. Fraction of Households with Electricity

	1991/92	2000/01
Total	8.5%	10%
Urban (Dar es Salaam only)	51%	59%
Rural	2.6%	2.0%

Source: (TNBS 2002)

Figure 6 shows the distribution of electricity services across different regions of the country. Services are concentrated in the capital city and the productive and prosperous cash-crop regions of the Kilimanjaro-Usambara corridor. These same areas have been the primary beneficiaries of services since the colonial period.

Figure 6. Fraction of Households with Electricity



Urban bias in provision of services was a central feature of state-led development. According to Karekezi and Majoro, “there is some evidence that a larger proportion of Government financing, subsidies, and international development aid is aimed at modern energy infrastructure that largely serves the needs of the urban-based formal sector, commercial, and industrial sectors, and the medium- and high- income urban households (2002)”. Tanzanian households spend on average 20% of their median income on energy, and state subsidy of electricity represented a significant increase in entitlements for the urban households that were able to access electricity (Hosier and Kipondya 1993). This policy of electricity subsidy benefited electrified households that were primarily urban at the expense of unserved households that were primarily rural.

The urban bias in energy policy and resource allocation in the post-independence era can be understood in part by recognizing the sheer magnitude of the energy project the Tanzanian government inherited on independence, the limited resources it had to initiate and sustain the desired transformation, and the complexity and trade-offs the government faced in balancing the demand of economic growth and public services. In practice, the state often put growth before equity in terms of immediate priorities, and chose to allocate scarce energy sector resources in favor of “productive interests” of industry and urban consumers over extension of basic service into rural areas. This form of urban and industrial bias was consistent with the two dominant modes of intellectual thought on development of the time, modernization and dependency theory, both of which saw industrialization and urbanization as the key to development. This approach also served political interests by directing benefits and subsidies to urban households that firmed political relations between urban residents, industrialists, and politicians, and similar argument have been made to explain low food pricing policies under state-led development (Bates 1981).

Energy reforms and a shifting paradigm towards energy as a commodity good

In contrast to the public service paradigm, the objectives of emerging global paradigm of treating energy as a commodity good have been less expansive. They are principally concerned with operating the sector on more commercial lines and incentivizing greater private sector involvement in the energy sector. This paradigm has strongly influenced Tanzania's implementation of institutional reform, privatization, and an independent regulatory body in accordance with policy conditionalities and recommendations of the IMF and World Bank. Key mechanisms under this paradigm are: elimination of subsidies, implementation of commercial pricing for fuels and electricity, extension of supply chains into unserved areas, management efficiency improvements, and investment into profitable areas. Together, these transitions and policies are aimed at providing a supportive climate for entrance of new private sector companies to provide for existing, new, and expansion of supply. The primary concern is development of a more extensive and dynamic energy sector using the financial resources, profit incentive, technical capability, and management savvy of the private sector to provide services when and where there is ability-to-pay.

The transition between paradigms was catalyzed under conditions of world economic crisis in the 1980's as the viability of Tanzania's socialist project began to unravel. Deteriorating economic conditions and public services called into question the idea that "planning and public ownership leads to a more rational and socially just system" (Fagan, Deere et al. 1986:15). Against the backdrop of crisis, reforms were figured as the central feature of World Bank policy models. With few economic alternatives and mounting pressures, Tanzania's socialist state initiated structural adjustment policies in the 1980's under the terms of the IMF and World Bank and set in motion a dramatic reorientation of Tanzania's policy models toward a trajectory of political and economic reform. Continuing down this path, the combination of unmet energy expectations, financial insolvency of the state, and the pressure exerted by international finance institutions created the essential set of ingredients used to justify a dramatic reorganization of the energy sector toward a model based on commercial priorities.

It is important to recognize that the shift in paradigms played out both in the arenas of policy, practices, and discourse. Much of the shift in ideology underpinning energy policy models was justified discursively in reference to perceived state failure in its goal of universal service. This idea is reflected in the World Bank Energy and Development Report in 1999, which states, "The challenge of expanding access (to energy) deserve better than well-meaning, but misguided romanticism of past policies based on the notion that electricity service is a right which does not need economic justification." (Albouy 1999) Under the shifting model, the state was discursively presented, under the best of circumstances, as limited in capacity and inherently inefficient at management of the business of energy, and, in the worst of cases, as self-serving and unaligned with society's interests. The discourse of the commodity paradigm sought to disable the claims of the equity ideology of the former state-led development project by highlighting the inequities and limitations of its implementation in practice.

Under a backdrop of crisis, the commodity paradigm discourse presented itself as more efficient and equitable. Claiming that because the idea of equity is morally and not economically based,

the objective of equity was interpreted to be as normative and easily corrupted, particularly by ineffective developing country governments. In contrast, the commodity paradigm discourse presented itself as offering expanded services based on a reliable and trustworthy set of economic principles. Efficiency was presented as a grounded and rigorous (read incorruptible) alternative to equity that could be relied upon by society to more extensively expand energy supplies.

The shift in paradigms reworks the development-era notion of government alliance with society and substitutes the private sector as the ally of society. In doing so, the commodity paradigm reconstitutes the relationship between the state, the private sector, and the best interests of society. The shift in meanings of the terms equity and efficiency is provocative. Marandu interestingly points that “Whereas market failure justified intervention by government in the past, now it is government failure justifying the role of markets.” (Marandu, 2002)

This section has traced out a brief history of a shift in the ideological underpinnings of the models of energy and development policy in Tanzania. This history provides a foundation for understanding the backdrop of changing conditions. It also highlights urban areas as the primary recipients of earlier subsidies and services. As a result, these areas are likely to experience the most dramatic primary effects of energy reform policies. The next section presents some features of urban energy conditions and lays out a framework for conceptualizing the landscape of household energy access. Together both the history of energy provision and the landscape of access provide a foundation for considering in the last section how changing conditions maybe reworking the terms of these urban energy access dynamics in important ways for natural resources.

3. Household Energy Use and the Dynamics of Urban Energy Access

Households and communities are the sites of urban energy use and consumption. They are also the central arenas where a set of processes come together to configure access. This section traces out urban energy conditions and makes the claim that energy access is more than the presence of supply in a given locale. Instead, it presents access as configured by the ability of individuals and groups to command resources, making access an arena of rights and claims constituted by multiple processes.

This section begins by describing some of the patterns of urban energy use in the capital city of Dar es Salaam. It highlights the important role of informal, natural resource based fuels and informal, community based energy services in serving household needs. The second part then lays out a framework for conceptualizing access. Discussion in this section serves as a foundation for considering how policy changes may reconfigure these dynamics of access and patterns of energy use.

3.1 Patterns of Urban Household Energy Use

Households and communities in Africa generally rely on many fuels to meet their needs. Particularly in urban areas, diversification is highly valued, particularly in light of the long history of scarcity and price fluctuations (Hosier and Kipondya 1993). Biomass fuels including

wood and charcoal are the only fuel delivery systems in the country that has had consistent, uninterrupted supplies (Boberg 1993).

One of the most critical and distinctive features of urban hh energy use in Africa is the important role that informal fuels and energy services (those not provided by the state or formal markets) play in providing energy services to households. Informal markets made up of small scale vendors provide woodfuel and charcoal, and charcoal provides the largest contribution to urban energy services. Figure 7 shows the juxtaposition of formal and informal energy services in a Dar es Salaam neighborhood, where residents carryout their activities under power lines that connect to only some homes, while a charcoal vendor in the foreground sells to homes in the vicinity for cooking.

Figure 7. Street scene from residential Dar es Salaam neighborhood: powerlines overhead and an informal charcoal vendor in the foreground



The largest household use of energy is for cooking, which also represents the largest energy expenditure (Karekezi and Majoro 2002). The most common urban cooking fuel is charcoal, followed by kerosene and electricity (Katyega, Kahyoza et al. 2000). In Dar-es-Salaam, cooking activities, including the purchase of food, fuel, and cooking technologies, represent more than half of household expenditures (TNBS 2002).

Cooking mainly occurs in the private spaces of the home, often indoors or in an enclosed courtyard. In terms of space and labor, energy use for cooking is highly gendered. Figure 8 shows a typical charcoal cookstove with a ceramic liner that improves efficiency. It also shows a female vendor using charcoal to cook fried bread for sale in the community. Cooking is commonly the responsibility of the female head of the house, with the actual labor often commanded from junior females or domestic servants in the household.

Occurring in enclosed or inside spaces, cooking often involves significant exposure to smoke and particulates. Studies of the public health impacts of indoor cooking conditions with traditional

charcoal and woodstoves have found cookstove smoke to be a leading cause respiratory illness and mortality in women and children (for a review see Ezzati and Kammen 2002).

Figure 8. Cooking is the largest household use of energy. Its spaces, labor, and health impacts being highly gendered.



As the main cooking fuel, charcoal is the most widely used urban household fuel. Charcoal serving Dar es Salaam travels around 100 kilometers and usually involves three to four participants, including a harvester/charcoal maker, trader, small neighborhood vendor, and end user (Boberg 1993). Charcoal resources come from forest resources closer to the city compared with other primary African cities; for example charcoal travel more than 500 km to reach Dakar, Senegal and woodfuel travels 170 km by rail to reach Bamako, Mali (Boberg 1993).

Electricity is found in between 40-50% of households in Dar es Salaam, mainly in higher income homes. It is used primarily for lighting and often other end uses. Electricity is used to a small extent for cooking. Surveys suggest higher use of electric stoves for cooking in 1990 than presently (Hosier and Kipondya 1993; Katyega, Kahyoza et al. 2000; TNBS 2002). In middle and higher income homes it is common to see unused electric stoves from earlier in the decade when electricity was more highly subsidized. Kerosene is widely available, being sold in petrol stations and by informal vendors in smaller quantities through out the city. Kerosene is used as both a lighting and cooking fuel. Bottled gas (LPG) is not widely used, and is only found at larger petrol stations.

Even without electricity connections, individuals may access electricity services outside the home through many small, informal services found throughout urban neighborhoods. Figure 9 shows a small kiosk selling mobile phone services and a sign advertising the availability of multiple mobile carrier services by the minute. The figure also shows the inside of a small, informal community movie house, where primarily young men gather to watch sports and films. The sign on the bottom left lists the schedule for the day and indicates the presence of the movie house located down a small alleyway and not visible from the street.

Figure 9. Informal, community-based enterprises provide energy services that include mobile phone access by the minute and informal movie and television programs at nominal fees



These examples show some of the ways that informal markets, intra-household dynamics, and community resource strategies play a role in shaping conditions of access and energy use in urban Tanzania. The next section uses these ideas as a starting point for laying out a framework for conceptualizing access. The framework is useful for considering how policies may be reworking the terms of these dynamics and their outcomes for household resource use.

3.2 A Framework for Conceptualizing Urban Energy Access

Access is commonly treated in energy and development as the presence of supply, where policy prescriptions focus on increasing supply availability (of formal fuels such as electricity and bottled gas) in local areas in order to improve economic and energy conditions. However, household energy access in urban Africa is shaped only in part by the presence of formal energy supplies, and conditions of access are more broadly configured by a combination of a number of process that cut through the arenas of households and communities. In order to consider how

reform policies may shape household energy use, this section lays out a framework for conceptualizing access as configured by multiple processes and dynamics. This framework is useful for considering some of the ways that changing policies may rework these conditions and patterns of energy use.

This section begins with the idea of households and communities not as bounded units, but rather social formations produced and cut through by dynamics and processes that involve multiple arenas and spatial scales. Many of the contributions in this area have been developed by Africanist anthropologists, geographers, sociologists, and feminist scholars who have sought to expand and rework bounded economic models of the household (Guyer 1981; Guyer and Peters 1987; Berry 1993; Hart 1995). In conceptualizing households and communities, it is useful to draw on Massey to consider the “idea of particular places not as static geographical containers, but rather constructed by many sets of social relations involving multiple spatial scales.” (Massey 1994) This section traces out some of these dynamics and multiple arenas that shape conditions of access.

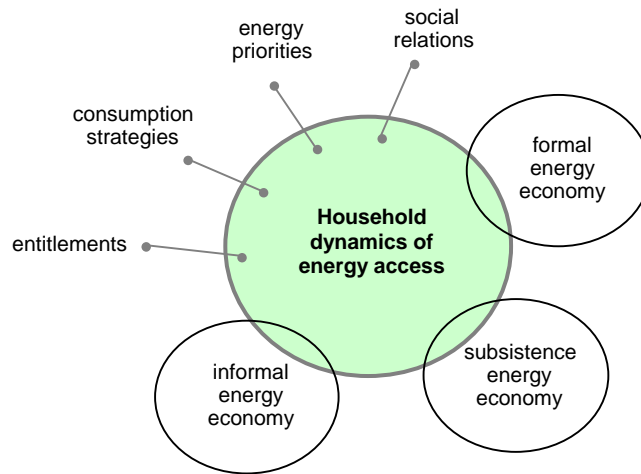
First, households negotiate a combination of formal, informal, subsistence economies in accessing energy. These multiple economies and the relations, policies, and processes that configure them are represented in Figure 10 as circles. The formal energy economy provides electricity, kerosene, and bottled gas as well as a range of technologies and consumer goods that consume formal fuels. The informal energy economy provides the largest fraction of household energy services. Small vendors sell fuels such as charcoal and locally made appliances such as charcoal stoves and kerosene lamps. Informal enterprises are also increasingly involved with providing access to end uses on a community level, such as the example of mobile phone services and informal movie theaters. The subsistence energy economy is made up of urban households that gather of wood or other fuels through negotiated rights to land or waste resources either in urban or peri-urban areas or through relations with rural areas.

Together these three economies interrelate with one another and are neither separable nor independent categories. Changing energy policies around electricity and kerosene are likely to have broader consequences for how household interact with formal and informal economies. Relations between these economies and the choices and trade-offs that households take on are central to understanding how increasing prices of formal fuels may shape patterns of energy use.

Access is also configured by the ability of individuals and groups to command resources. A relational understanding of how individuals and groups interact to access resources, not only through formal exchanges of cash income for formal market goods but also through a range of rights and claims over resources, is particularly important for understanding the dynamics of access in an urban African context, where neither rights nor claims over resources are necessarily formally conferred and are often configured by social processes. Understanding the ways that changing policies may shape patterns of energy use requires attention to the “bundles of relations” that constitute conditions of access².

² My use of the term “bundles of relations” draws on Ribot’s (1998) use of the term “bundles of rights”, however I find relations to be a more direct term that takes into account the social processes that configure rights

Figure 10. Key Arenas and Elements in Conceptualizing Household Energy Access



Recognizing access as the ability of individuals and groups to command resources, Sen’s concept of entitlements is useful for drawing attention to a broader set of assets that provide the means of making claims over resources than simply cash income (Sen 1981). Entitlements represent the combined means of the household for commanding resources through legal means in society. These means may be derived from endowments of existing resources like land or labor power or livelihoods that bring in effective income. According to Sen, “a person’s ability to command food –indeed, to command any commodity he wishes to acquire or retain –depends on the entitlement relations that govern possession and use in that society. It depends on what he owns, what exchange possibilities are offered to him, what is given to him free, and what is taken away from him.” (Sen 1981: 155)

However, Guyer takes the idea of entitlements a step further to highlight the socially constructed nature of endowments and assets that shape resource access (Guyer 1993). She brings in the idea that social relations can also be recognized as a form of rights and claims over resources. Concepts such as “wealth in people” (Guyer 1981), “investment in social relations” (Berry 1993), and *de facto* rights (Ribot and Peluso 2003) offer important insight into ways that claims over resources can involve both entitlements to legal rights as well as claims over people. This recognition that endowments and assets can take the form of particular social relations expands conceptions of access from a static to a relational model.

Ribot’s concept of *de jure* and *de facto* rights is illustrative of how access to resources may involve both entitlements and social claims (Ribot 1998). *De jure* rights are those that represent formal legal rights; *de facto* rights represent extra-legal configurations that are made informally among resource users. In the case of household energy access, Ribot’s *de jure* rights map closely onto Sen’s concept of entitlements. *De jure* rights or entitlements might include land ownership, cash income, and forms of property such as houses or livestock that confer particular forms of access, purchasing power, or collateral for obtaining resources. *De facto* rights, on the other

hand, primarily operate through intra- and inter- household dynamics such as social relations, status privileges, gender, and age and class relations. *De facto* rights confer a particular ability to command resources from others. The same resources of houses and livestock may also confer a particular status in the community where it is possible to draw on *de facto* rights. In this way, these categories should not be viewed as separable dimensions, but instead part of a complex set of ways that wealth, power, and claims over resources interact.

De facto rights are particularly important in the ways that they shape the dynamics of differentiated power relations of gender, age, and class relations. These dynamics in turn are critical to understanding what kinds of energy services make up demand and why resources are allocated in particular ways. For example, the gendered sphere of kitchens combined with low status labor around cooking create contrasting dynamics with energy consumption decisions in more public arenas of the home and outside the home. Allocation of greater resources to the more public spaces may offer the combined benefits of consumption, status, and investment in social relations.

Decisions, priorities, and choices around energy operate differently for different individuals and groups as well as for different end uses and spatial arenas depending on their social context. Policies associated with reforms together with other processes of change are likely to reshape both *de jure* and *de facto* forms of access and the power dynamics associated with them. The next section traces out one preliminary hypothesis of how reform policies may shape access dynamics in ways that increase charcoal use and consequently increase pressure on woodfuel resources. In this hypothesis, the relationship between formal and informal energy economies, differentiated energy priorities, and social relations of energy use play important roles in shaping possible outcomes.

4. The Hypothesis of Complex Urban Energy Transitions

Energy reform policies are likely to have important consequences for shaping conditions of urban energy access. This section claims that decreasing subsidies with reforms may be shaping urban energy use in ways that transfer greater pressure to charcoal and subsequently forestry resources used for biomass fuels. The greater significance of this hypothesis is that it suggests that the ‘economic discipline’ of reforms may in part be subsidized by natural resources and the environment, particularly if reforms are carried out without adequate attention to charcoal regulation and planning and sustainable forestry practices.

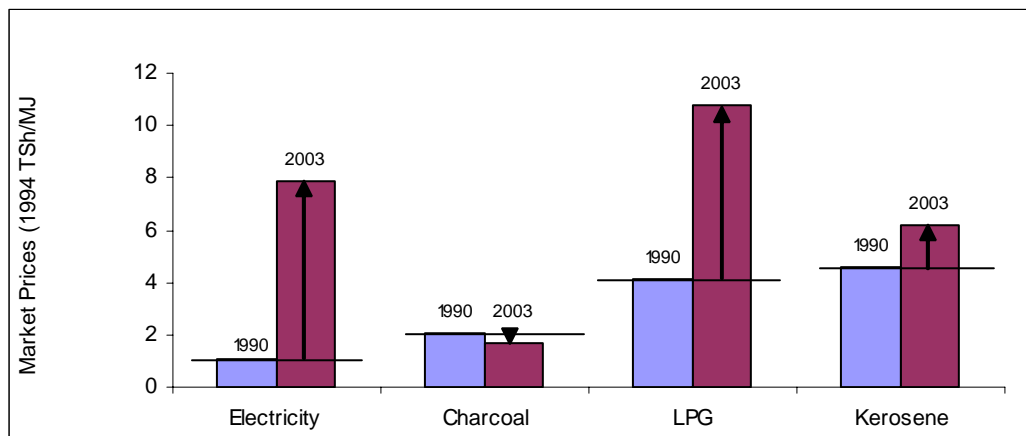
This section lays out this hypothesis in two parts. First, shows how with the elimination of extensive electricity subsidies over the last decade, charcoal has become the lowest cost cooking fuel. Fuel price changes have made charcoal the relatively least expensive fuel option for cooking and effectively widened the gap between charcoal and any other fuel substitutions or transitions. Second, this section then highlights an emerging set of dynamics around the increasing availability of consumer goods that may serve to further differentiate energy priorities within the home. Specifically, under conditions of limited income, these dynamics may create conditions of allocation of resources away from the spheres of kitchens in order to redirect resources to other highly valued services under income constraints.

These sets of discussions form the basis of the hypothesis that reforms may have the result of putting greater pressure on charcoal, hinder fuel switching, devalue kitchen investments and in so doing, put greater pressure on domestic forestry resources and woodfuels. Together the dynamics traced out have a number of important potential policy implications and are discussed in the last section.

4.1 Widening the Gap: Charcoal and its Increasingly Expensive Alternatives

Over the last decade with the elimination and phase-out of earlier subsidies, the prices of formal energy fuels have dramatically increased. Figure 11 shows the increasing market prices for formal household fuels in Dar es Salaam and the relatively stable price of charcoal between 1990 and 2003 in real terms. The greatest increases in prices have been for electricity and bottled gas (LPG). For a typical consumption level, the average price paid for electricity has increased more than 7 times, and the price of LPG has increased more than 2.5 times between 1990 and 2003 (in real terms). In relative terms, charcoal has become significantly less expensive, nearly 4 times cheaper than kerosene, 5 times cheaper than electricity, and 6 and a half times cheaper than LPG on gross energy terms in 2003.

Figure 11. Market Prices for Household Fuels in Dar es Salaam¹ : 1990 vs. 2003 (1994 TSh / MJ)



¹ Market prices correspond to prices consumers pay at point of retail sale

² Prices presented here are presented in real prices, deflated by national fuel price index

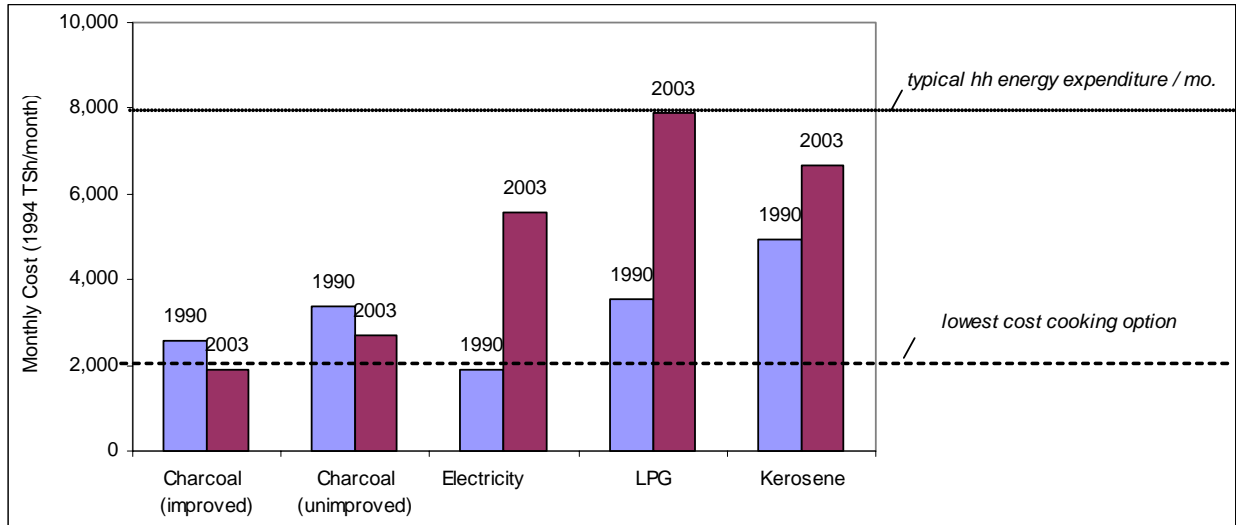
³ Price of electricity is based on 150 KWh consumption per month and includes the energy charge, service charge, and 5% levy in 1990 and 20% VAT in 2003, but does not including initial connection fees.

Data Sources: (Hosier and Kipondya 1993; TANESCO 2003; TNBS 2003) and retail survey (August, 2003)

However, in order to compare the costs of using these fuels from the perspective of the household it also necessary to take into account the efficiencies and costs of the end-use technologies as well as the equipment and connection costs of using different fuels. A calculation to compare the costs of cooking with these fuels incorporating these considerations shows that fuel price changes have significantly reconfigured the costs of cooking over the last decade. Figure 12 shows the estimated monthly costs of cooking with different fuels based on a fixed amount of energy delivered to the pot comparing 1990 and 2003 prices (that is, comparison of costs for cooking equivalent meals over the month) and taking into account different efficiencies of cooking technologies and a simple amortization of stoves and necessary

equipment and connection fees³ (see Appendix 2 for more details on the calculation). This calculation shows that the cost of cooking with electricity, bottled gas (LPG), and kerosene have gone up dramatically in real terms making charcoal now the lowest cost cooking option. It is significant that electricity has gone from being the most highly subsidized and lowest cost cooking fuel (for those who could afford the upfront costs of connections) to being more than twice as expensive as cooking with charcoal.

Figure 12. Comparison of Cooking Costs for a Monthly Scenario Using Various Fuels¹



¹ Monthly costs based on fuel costs, stove efficiencies, and simple amortization of appliances, and connection costs based on 320 MJ per month delivered to the pot, see Appendix 2 for detailed description of the calculation.

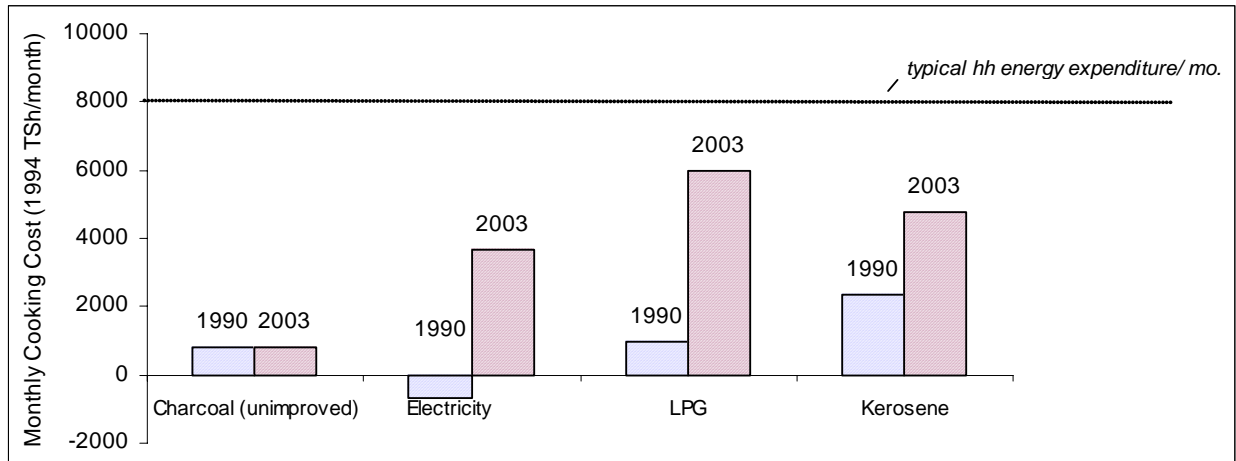
These results show that charcoal is now the lowest cost cooking option. Over the decade there has been a growing incentive for households using electricity to transition to charcoal. There is also an increasing price gap associated with substitution or transitions from charcoal to other fuels. Figure 13 shows the cost gap between cooking with charcoal on an improved stove and with other fuels. In our sample scenario, cooking on an improved charcoal stove is now nearly 3 times cheaper than cooking with electricity, 3.5 times cheaper than kerosene, and 4 times cheaper than LPG, where formerly the gap between cooking with charcoal and other fuels ranged between factors of 0.7-2. The gap between cooking with biomass and other fuels has increased as a result of reform pricing, suggesting conditions which hinder energy transitions and fuel switching from charcoal. This is especially true given that the cooking estimates presented in Figure 12 and Figure 13 only include simple amortization of upfront costs, when in actuality these costs represent a greater barrier than shown in these figures.

These results comparing fuel prices and the costs of cooking suggest that there are significant price incentives for a greater fraction of households to use charcoal as a primary cooking fuel than a decade ago. With an increasing urban population this is likely to create an even greater

³ The monthly costs in Figure 12 represent only a sample scenario for an assumed level of cooking (320 MJ/month), so households are likely to experience a wide range of monthly costs depending on how much energy they consume.

magnitude of urban charcoal consumption, suggesting increasing pressure on woodfuel resources as a result of urban charcoal use.

Figure 13. Monthly Cost Gap Between Cooking with Charcoal and Other Fuels



The increasing gap between the cost of cooking with charcoal and other fuels means that households would now have to explicitly value other benefits from fuel switching, such as convenience/labor time, health/smoke reduction, or other attributes in order to invest additional resources to make transitions and even more so than a decade ago. As well, for greater use of alternative cooking fuels to occur, those who value these benefits would also need to have access to the economic resources and bargaining power within household decision making.

The next section takes these ideas further and highlights an additional set of dynamics that may serve to further reinforce charcoal use even within higher income households. It introduces a differentiated set of energy priorities that appear to be becoming more pronounced with the greater availability of consumer goods and appliances that consume energy, where processes of intra-household gender and power relations may have important consequences for the types of decisions and priorities that are represented in patterns of energy use. Together these ideas are significant for considering the kinds of energy transitions might be expected with further urbanization in Tanzania.

4.2 The Consumption Paradox: Rising Aspirations, Increasing Prices, and Limited Income

In many ways, the types of energy transitions that may be expected in urban Africa hinge around the question: *what happens to patterns of household energy use when aspirations to consume are increasing, formal fuels are more expensive, and incomes are relatively static or decreasing?*

Tanzania is experiencing increasing availability of consumer goods, at least from the perspective of shop windows where mobile phones, televisions, radios, and household appliances are readily available for those with an ability to pay. The visibility of these goods replaces not so distant memories of earlier scarcity conditions under Tanzania's controlled socialist economy, which actively limited imports to conserve foreign currency and allocate public and private resources toward development of local industry and markets. Imported goods were not readily available

and shortages of even basic goods such as sugar and clothing was common during Tanzania's socialist era, as domestic industries struggled to provide adequate supply to meet domestic demand.

Together the greater availability of goods, changing public culture around consumption, and an emerging middle class are all shaping increasing aspirations to enjoy these services that are highly valued and relatively newly available. However, these dynamics also have the possibility to introduce greater tensions and trade-offs between different energy use priorities within the household, particularly under conditions of limited income. With the greater availability of energy services, growing aspirations, increasing prices of fuels, and limited incomes, households face a complex set of decisions and priorities around where to allocate their resources.

Under constrained income conditions and high consumer aspirations, household and community energy decisions are likely to reflect complex intra- and inter- power relations that play an important role in shaping the type of energy transitions that may emerge. With limited room to maneuver in *de jure* rights such as overall income, *de facto* rights and claims over people represent an important arena for the exercise of power and differentiation of resource use. This hypothesis suggests that differentiated claims and differentiated energy priorities are key to understanding what kinds of energy use patterns may result from these conditions.

Importantly, very different sets of dynamics appear to be operating around different kinds of energy services and energy uses. The idea of separate spheres and negotiated processes around intra-household resource allocation are useful for understanding the different kinds of decision-making dynamics occurring around energy uses, such as gendered spaces for cooking versus other high value services such as mobile phones, television, etc. (Carter and Katz 1993; Hart 1997).

In particular, growing energy aspirations may result in a disinvestment pressure to economize energy services in the spaces of the kitchens in order to reallocate resources for other high value services that do not have substitutes. Community based enterprises providing access to services at the level of communities rather than households, serve to further make these high value consumptive options possible even for lower income households.

This hypothesis suggests that gendered arenas of the home, such as the private spaces of kitchens where cooking takes place, represent areas that can potentially be "economized" and 'squeezed' to redirect resources to other valued services. These energy uses are 'economizable' under certain circumstances particularly when those who place high value on kitchen priorities have a low level of representation and direct decision-making power within the household, such as when the main cook is a junior female or domestic servant. As well, investments in private spaces such as kitchens do not provide the same level of status benefits as other potential energy uses.

In this case, differentiated priorities around energy uses are connected to the material and symbolic benefits that energy use provides and the relations of negotiation that take place between different members of the household. As a result, this hypothesis suggests that in many cases, spheres of kitchens and activities around cooking may represent arenas that can be

“squeezed” in order to redirect resources to other kinds of energy use that provide other kinds of benefits connected to status, identity, kinship, and other benefits. These dynamics are in founded in part on differential gender, labor, and power relations within the household.

What is significant in the context of this discussion is that these dynamics may serve to create greater pressure on charcoal and further hinder investments in kitchens needed for fuel switching or energy transitions to realize labor or health benefits. These ideas also suggest that higher income households may also be less likely to make energy transitions in cooking away from charcoal as they also strive to access other relatively newly available services and appliances.

This preliminary hypothesis about the kinds of dynamics that are shaping energy transitions emerging in Dar es Salaam goes against the conceptual model of the energy ladder that is used widely within energy and development discussions. According to Hosier and Kipondya, “The energy ladder is based loosely on the economic theory of household behavior ... that as household income increases through time, households will switch from relying on relatively inefficient, dirty traditional fuels to utilizing efficient, clean modern fuels.” (1993)

Instead, the picture that emerges is a complex and differentiated transition with charcoal likely to remain the primary cooking fuel even in higher income homes and with greater use of electricity even in lower income households to the extent that it is possible to maneuver and access these high value services. Households do not march up the energy ladder with income, but instead occupy multiple rungs, with the driver variable being much more complexly constituted than simply income. These ideas support Murphy’s critique of such imagery, “While these types of metaphors may be tenable at a grand scale – where abstractions dominate the discourse the notion is troubling and unrealistic when it is applied to real people at the household level.” (Murphy 2001, 730)

Returning then to our original question of how reforms are likely to shape conditions of household energy use, the picture that emerges is distinctively more complex and differentiated than either reform discussions or energy and development discourses commonly present. An exploration of the ideas presented here suggest that the processes that reforms are a part of reinforce the importance of the informal energy economy and charcoal use as much as they make any sort of transformation in the formal sector. “Traditional’ cookstoves and cell phones are likely to continue to exist side by side. If anything, reforms may emphasize the importance of charcoal as a cooking fuel as households maneuver to access the range of energy services available in their landscape using the rights and claims available to them, including formal income and entitlements, community resource strategies, as well as differential power relations within and between households. In African cities both charcoal and electricity are distinctively part of the “modern” experience.

5. Policy Implications and Next Steps

The policy implications of this discussion reinforces the importance of informal markets and biomass resources in providing urban energy in Africa. From the perspective of resource policy and planning, sustainable management of woodfuel resources growing urban populations and increasing prices of alternative fuels remains an area in need of greater attention. This is

particularly the case as informal markets and biomass have been deemphasized over the last decade as international attention has focused nearly solely on sector reforms aimed at attracting international investors to formal energy services.

In this context, this discussion intimates that the conceptual and policy distinction between formal and informal energy economies are themselves problematic, particularly when this categorical binary serves to reinforce a lack of attention, and devaluation in policy circles of areas are that centrally important from the perspective of household energy. The regulation, management, and planning of charcoal resources are critical if energy reforms and their drive to increase commercial viability from the perspective of investors is not to decrease overall welfare and increase burdens on the environment.

This paper represents an early and preliminary set of results from a wider dissertation project focused on unraveling the historical, resource, and discursive processes producing conditions of urban energy in Dar es Salaam and the spaces of resource politics created by the combination of urban resource access and economic restructuring. The ideas presented here are preliminary set of claims that will be engaged with more closely in the context of a wider household and community level study in Dar es Salaam that I will be undertaking as a part of my dissertation research over the next year.

Through an ethnographic study combining history and energy analysis of household energy conditions in Dar es Salaam, my research aims to shed light on the ways that resource access is itself a political category and provide insight into the significance of these dynamics in the context of urban Africa. Reform may be the privatization of everything; but the negotiation of its terms by households will configure its significance for urban resources and those who rely on them for their livelihoods and well-being.

Appendix 1. Tanzanian Household Energy Statistics

A1. Household Ownership of Selected Consumer Goods (%)

	Dar-es-Salaam		Mainland Tanzania	
	1991/92	2000/01	1991/92	2000/01
Radio	79.5	79.6	37.4	51.9
Sofas	34.5	65.2	9.3	18.7
TV	0.8	20.1	0.1	2.6
Video	3.6	15.0	0.9	2.7
Dish antenna	na	10.6	na	3.0
Telephone	1.9	9.8	0.5	1.2
Stove (charcoal, kerosene, wood)	81.1	89.7	22.8	29.3
Iron (electric/charcoal)	50.4	52.6	22.1	25.3
Refrigerator/freezer	7.1	20.2	1.0	2.5
Stove (Electric/gas)	16.6	13.4	2.7	3.2

Source: Tanzania National Bureau of Statistics, Household Budget Survey, 2000/01

A2. Basic Household Energy Statistics (% of household)

	Dar-es-Salaam		Mainland Tanzania	
	1991/92	2000/01	1991/92	2000/01
Electrified	51	60	9	12
Primary cooking fuel				
charcoal	52	46	11	14
kerosene	34	43	5	5
electricity	10	4	2	1
firewood	1	5	82	79

Source: Tanzania National Bureau of Statistics, Household Budget Survey, 2000/01

A3. Breakdown of Household Consumption Expenditures (% of expenditures)

	Dar-es-Salaam		Mainland Tanzania	
	1991/92	2000/01	1991/92	2000/01
food (purchased and non)	65	49	69	61
non-durables	23	33	20	26
durables	10	12	9	9
education	1	4	1	2
medical	1	3	1	2

Source: Tanzania National Bureau of Statistics, Household Budget Survey, 2000/01

Appendix 2 . Cooking Cost Analysis for Monthly Consumption Scenario Using Different Fuels

	A		B		C		D		E		F		G		H		I		J	
	Market Price		Energy Content		Primary Energy Price		Stove Efficiency		Final Energy Price		Equipment Cost		Appliance Lifespan		Appliance Cost/month		Monthly Cooking Cost		Monthly Cooking Cost	
	TSh/unit		MJ/unit		TSh/MJ		%		TSh/ MJ(eff)		TSh		months		TSh/month		TSh/mo		1994 TSh/mo	
1990																				
Firewood	6.1	kg	15.5		0.39		10%		3.94		0		0		0		1,259		3,650	
Charcoal (unimproved)	20.8	kg	29.0		0.72		20%		3.59		400		18		22		1,170		3,391	
Charcoal (improved)	20.8	kg	29.0		0.72		30%		2.39		1,500		12		125		890		2,580	
Kerosene	55.0	l	35.0		1.57		30%		5.24		2,000		60		33		1,710		4,955	
LPG	65.0	kg	45.5		1.43		45%		3.17		25,000		120		208		1,224		3,548	
Electricity	1.5	kWh	3.6		0.41		65%		0.62		55,000		120		458		658		1,907	
2003																				
Charcoal (unimproved)	110.0	kg	29.0		3.79		20%		18.97		3,000		18		167		6,236		2,705	
Charcoal (improved)	110.0	kg	29.0		3.79		30%		12.64		3,500		12		292		4,338		1,882	
Kerosene	500.0	l	35.0		14.29		30%		47.62		5,500		60		92		15,330		6,651	
LPG	1133.3	kg	45.5		24.91		45%		55.35		90,000		120		750		18,463		8,010	
Electricity	84.9	kWh	3.6		23.58		65%		36.27		142,910		120		1191		12,799		5,553	

Data Sources:

1990 market prices and equipment costs: : (Hosier and Kipondya, 1993);

2003 market prices and equipment costs: (TNBS, 2003), (TANESCO, 2003), (Katyega, 2003) and a 2003 Retail Survey

Energy Content, Stove Efficiency, Appliance Lifetimes: (Hosier and Kipondya, 1993)

Description of Terms:

A - Market prices are prices paid at the point of retail sale. Electricity price includes tariff, service fees, and 20% VAT and is based on consumption of 250 kWh/month

B - Energy content is a constant based on fuel type

C - Primary energy price reflects market price on a per MJ basis (for cross comparison), calculated as (A/B)

D - Average values for typical stove efficiencies

E - Final Energy Price, takes into account stove efficiency, price of energy delivered to the pot, calculated as (C/D)

F - Equipment/Appliance cost. LPG estimate includes 2 burner stove, bottle deposit and regulator. Electricity estimate includes 2 burner stove and initial connection fee.

G - Appliance lifespan, typical stove value

H - Appliance cost per month, reflects simple amortization of appliance cost, calculated as (F/G)

I - Monthly cooking cost, based on 320 MJ (effective) delivered to the pot per month including simple amortization of appliances, calculated as (E*320+H)

J - Monthly cooking costs in real terms (1994 TSh), for comparison across years, calculated as (I/Fuel Price Index)

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