



County energy planning in Kenya: Local participation and local solutions in Migori County

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Cover photo: A small solar-powered business in Kuria East sub-county where customers can get their hair cut or charge their phones and torches. Solar panels do more than meet individual households' needs – they can also provide a basis for income-generating activities. © SEI / Oliver Johnson

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ABSTRACT

In 2010, Kenya established a devolved government system that, among other things, allocates responsibility for energy planning to the county level. Devolution offers an opportunity for the government to better understand and respond to the needs of the people – but only through effective participation of community members. This study examined household energy consumption patterns in Migori County, in southwestern Kenya, and explored avenues for citizen participation in energy planning processes. Through a literature review, it identified six key activities that can help overcome barriers to and enable participation: stakeholder engagement and awareness creation; needs assessment; resource mapping; visioning and action planning; capacity-building, and implementation, monitoring and evaluation. A survey of 500 households (85% rural and 15% urban) showed that four energy sources predominate: charcoal, firewood, dry cell batteries and kerosene. However, there were stark differences between rural and urban households, with greater diversity of energy sources in urban households, also including electricity (65%), candles (56%) and LPG (39%), none of which are available to most rural households. Focus group discussions highlighted challenges faced by communities, such as expensive and unreliable electricity; hazards involved in collecting firewood; health impacts for biomass users, and lack of participation in energy planning and decision-making processes. The survey found that 79% of households would like to be involved in such processes, through direct contact such as surveys, or through their ward administrators or existing community groups. The study ends with several recommendations for the government to improve citizen participation in energy planning.

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EXECUTIVE SUMMARY

In 2010, Kenya established a devolved government system that provides for citizens' participation in matters that affect them. In the energy sector, responsibility for planning has been devolved to the county level, offering an opportunity for the government to better understand and respond to the needs of the people. However, this can only occur through meaningful participation by community members. This study examined avenues for citizen participation in county-level energy planning processes in Migori County, in southwestern Kenya, which is home to more than 900,000 people. It reviewed the available literature on participatory planning to see how different planning tools have helped meet user needs and to determine the barriers to and enablers of citizen participation in energy planning. It also examined household energy consumption patterns in Migori County, through a survey of 500 households, interviews, and eight focus group discussions.

The literature on participatory energy planning suggests that participation is a necessary, but insufficient, condition to meeting end-users' energy needs. Though the potential benefits are significant, just setting up participatory processes may do little to change entrenched power dynamics that dictate how participation happens, or ensure that it truly informs and influences the resulting policies and plans. Hence, in order to build effective bottom-up participatory processes that meet users' energy needs better than top-down planning approaches, the system has to include mechanisms for reflection and learning, so that planning processes can be continuously improved.

We reviewed existing participatory energy planning tools and identified six key activity types that can enable effective participation and help overcome barriers to it: stakeholder engagement and awareness creation; needs assessment; resource mapping; visioning and action planning; capacity-building, and implementation, monitoring and evaluation. While some of these activities represent specific steps in the planning process, others may occur throughout the process, such as stakeholder engagement and awareness creation.

The household survey showed that four energy sources predominate in Migori County: charcoal, firewood, dry cell batteries and kerosene. The disaggregation of the data for rural (85%) and urban households (15%) showed a more nuanced picture: rural households relied primarily on kerosene (97%), firewood (96%), dry cells (72%) and charcoal (67%), while urban household used a greater variety of energy sources. Electricity (65%), candles (56%) and LPG (39%) were the important energy sources for urban households, but practically non-existent in rural households (only 12% had electricity, for example). Electricity access was limited by the lack of a power grid nearby or, when physically available, by the high cost of initial connection.

The survey data showed that households spent the most on charcoal, an average of KES 1334 per month per household, followed by LPG (KES 869). Households with electricity paid roughly KES 600 for it; the monthly cost of kerosene and firewood were KES 351 and 531, respectively. However, comparing these costs does not tell the full story, because different energy sources provide different energy services (i.e. lighting, cooking, powering appliances), and they tend to be bought and/or paid for over different time-scales.

For cooking in particular, the survey showed that 77.4% of the sampled households used an open three-stone fire. Many households owned improved cookstoves, such as the Kenya Ceramic Jiko, but only 17.4% used it as their main stove, while 77.3% said it was their second option. This pattern suggests that in order to increase the use of these technologies, there is a need to better understand complexities in household energy consumption, such as individual behavioural patterns, household power dynamics, and socio-cultural norms and relationships.

The focus group discussions, which involved women's groups, community leaders, local government administrators and youth, highlighted the main challenges that communities face with their current energy sources and in trying to adopt alternative energy sources. Participants noted that electricity connections are costly, yet the supply is unreliable and the suppliers are non-responsive when called upon. Collecting firewood involves a risk of snake bites, rape, and harassment from forest wardens; biomass users suffer health impacts. Participants also noted a lack of community involvement in energy planning, policy-making and implementation. They also discussed how existing national policies hinder full exploration of available energy resources and what they regarded as the unfair distribution of electricity, for which they faulted political leaders. County energy administrators cited a lack of information, lack of cooperation among stakeholders, and understaffing as key challenges, especially for the administrative unit responsible for supporting the devolution activities.

Both the surveys and focus groups explored avenues for citizen participation in energy planning – something 79% of the households surveyed indicated that they would like to be involved in (58% of urban and 84% of rural households). When asked how they would like to be involved, a majority preferred individual direct communication such as surveys – which are time-consuming, expensive and difficult to administer. Households' second choice was for the government to engage with influential community members, such as the ward administrators, who have strong convening power and are able to bring together community representatives to engage in dialogue. There are also several groups to which community members belong – youth groups, women's groups, etc. – that have developed strong support and information-sharing networks. Empowering these groups to engage in energy issues opens up a number of opportunities for improving energy planning and implementation.

Overall, there are several areas in which county governments and the national government – in particular the entities responsible for energy – could act to improve participation in energy planning at the county level. We recommend the following for consideration:

- **Take advantage of increasing interest within communities to engage on energy issues.** The capacity of ward administrators to convene discussions on energy issues should be utilized through regular structured engagements.
- **Utilize existing mechanisms for communities to have their voice heard**, so as not to duplicate processes. Women's groups, youth groups and others already have established channels of communication and support networks, which can and should be further empowered.
- **Seek to further develop their capacity to deal with energy issues.** This includes hiring new staff, training new and existing staff, and training key community members.
- **Directors of Energy in all counties should set up a forum to discuss and share experiences.** Since they are all working in a relatively new system, this knowledge exchange can help them to learn and support each other.
- **Improve coordination between county governments and the national government's Energy Centres.** Awareness-raising activities would be a suitable starting point for building a strong partnership, since Energy Centres have the capacity to demonstrate different energy technologies and county governments have strong links with community groups who can benefit from such demonstrations and act as knowledge bridges to the wider community.
- **National government must allocate adequate resources for a participatory planning process**, so that communities can legitimize these counties' master plans that are feeding into the national energy plan.

1. INTRODUCTION

1.1 Background

In 2010, Kenya established a devolved government system that provides for people's participation in matters that affect them. Article 1(1) and (4) of Kenya's Constitution (2010) provide for the rights of people to participate either directly, or through their elected representatives. This power is further strengthened in Article 10(2a) and (2b) of the Constitution, which lay out national values and principles of governance, including participation of the people, inclusiveness, and protection of marginalized groups.

In the energy sector, devolution (also referred to as decentralization¹) offers an opportunity to redress past imbalances created by the centralized approach to planning. For example, centralized energy planning has tended to prioritize large-scale centralized energy systems, often with little emphasis on the household sector, even though it accounts for most of the country's energy demand. Furthermore, limited access to modern energy services means that most household energy needs are met through traditional biomass fuels, which are associated with serious indoor air pollution, environmental degradation and negative social impacts. (Lambe et al. 2015; Practical Action 2014).

However, devolution is not guaranteed to lead to more locally appropriate energy planning. In theory, bringing government closer to the governed – in both the spatial and institutional senses – allows government to better understand and respond to the needs of the people (Crook and Sverrisson 1999). Yet if, in practice, planning remains tightly controlled by the devolved government, with little participation of citizens, understanding of local needs may remain limited, and responses may continue to favour the elite (see, for example, Crook and Sverrisson 1999; Haque 2008). Indeed, evidence shows that citizen participation in most developing countries is limited, despite many publicly stated policy commitments (Speer 2012). In the energy sector, more than half of the world's population continues to lack access to basic energy, despite constitutional provisions for people's participation or decentralization. This situation is not just found in sub-Saharan Africa, but also in Asian countries such as India, which have experienced years of decentralized energy planning. Rather than involve communities to ascertain their needs, programmes remain technology-driven (Neudoerffer et al. 2001, p.373).

Kenya has only recently embarked on a process of devolving responsibility for energy planning to the county level. This means there is a timely opportunity to support county governments in developing a framework for ensuring citizen participation in their energy planning processes.

1.2 Aims of the study

Although the Kenyan Constitution creates the policy space for citizen participation in energy planning, there is no clear path for county energy planners to follow to actually undertake participatory energy planning. Thus, the means of achieving effective engagement need to be properly conceptualized and framed. This study sought to better understand household energy

¹ Devolution is a form of decentralization (for an overview, see Rodríguez-Pose and Gill 2003; Smoke 2003; Yuliani 2004).

consumption patterns, focusing on a single county, and explored avenues for participation in energy planning processes at the county level that could be pursued throughout Kenya.

The findings of this project contribute to knowledge on participatory energy planning in low-income settings, and will be useful for planners as well as for organizations working on energy and in other sectors. The research could serve as a starting point for ensuring that energy planning takes into account the energy needs of the most marginalized, informing Kenya's current Sustainable Energy for All (SE4ALL) action agenda and investment prospectus.

The choice of planning as the stage in which to increase citizen participation is key, as planning is a clearly established county function in the energy sector and determines all that will come afterward. Furthermore, the county structures are still new, so implementation of energy projects and programmes is currently limited. The new Energy Bill currently under consideration by the Kenyan Parliament seeks to mandate counties to take over energy planning, but counties currently lack the knowledge, tools and human resources to undertake this critical function. This is therefore a critical opportunity to inject scientific and practical experience into the process.

1.3 Study outline

The remainder of this paper is structured as follows: Section 2 explores the literature on participatory energy planning, including opportunities in Kenya. Section 3 describes the design of the study, including the details of how we conducted the household survey and focus group discussions. Section 4 presents our findings on household energy consumption patterns. Section 5 presents our findings on avenues for participation in energy planning. Section 6 presents conclusions and recommendations on the way forward.

2. PARTICIPATORY PLANNING IN THE ENERGY SECTOR

This section explores the experiences of participatory energy planning in the literature, with a view to determining whether participatory approaches are more successful than top-down approaches in meeting users' energy needs. We provide a brief overview of the concept of participation, followed by a review of a range of participatory planning methodologies used in the energy sectors. We then discuss the current energy governance structure in Kenya and how county-level energy planning will fit into that structure.

2.1 Conceptualizing participation

Developing countries are increasingly adopting various types of participatory governance mechanisms – institutional arrangements that aim to “facilitate the participation of ordinary citizens in the public policy process” (Andersson and van Laerhoven 2007, p.1090). They involve citizens in planning, decision-making about the allocation of public funds and the design of public policies, as well as in monitoring and evaluation (Speer 2012). The World Bank's (1993) Water Resources Management Policy broadly defines participation as “a process in which stakeholders influence policy formulation, alternative designs, investment choices and management decisions affecting their communities, and establish the necessary sense of ownership” (p.4).

The adoption of participatory governance mechanisms is in part a response to concerns that over time technological progress appeared to have diminished ordinary citizens' control over collective decisions that affected their lives and increased the power of scientific and technical elites. For example, “experts” were often brought in to resolve technical disputes

because it was felt that the public was not sufficiently knowledgeable to adequately understand the rationale for certain decisions and their potential impact. This framing perceived the experts' views on problems, risks, priorities, etc. as more rational and less subjective than those of lay persons (Fiorino 1990, p.229). However, there is now a growing recognition that experts are not necessarily disinterested or well placed to make social decisions, and stakeholder engagement is crucial to addressing complex problems such as climate change. Slowly, but surely, citizens are reclaiming a central place in decision-making processes.

How does citizen participation improve planning and decision-making processes? Fiorino (1990) identifies three main rationales for increasing participation. The first is *substantive*: the public's judgements about risk are equally sound, and sometimes better, than those of experts; hence, increasing participation can improve the outcomes of planning. The second rationale is *normative*: the best judge of citizens' interests are citizens themselves, hence, increasing participation is the right thing to do. The third rationale is *instrumental*: decisions that involve citizens are seen as more legitimate; hence, increasing participation ensures better buy-in, which leads to better results. As Stirling (2007) puts it, participation should be encouraged because, "under normative democratic perspectives, a well-conducted ... participatory process is a self-evidently good thing" (p.268).

Participation itself, however, can take many forms. It can be indirect – in a representative democracy, elected officials and government bureaucracies are expected to act in the interest of the citizens. Or participation can be direct, reflecting the view that citizens own the government and should be involved in decision-making (Yang and Callahan 2005). Our study emphasizes the latter. Direct participation can be achieved through a number of approaches or mechanisms, such as public hearings, public ballots, public surveys, negotiated rule-making, and citizens' review panels (Fiorino 1990). The extent and the nature of citizens' participation will vary: ballot initiatives, for example, involve everyone casting a single vote, while citizens' review panels involve only a few people who delve in-depth into an issue. Fiorino (1990) identifies several factors that determine the extent to which a participatory process can be viewed as democratic:

- **Method of participation:** A fully participatory mechanism should allow for the direct participation of laypeople in decisions, not just experts (as citizens, rather than in their professional capacities).
- **Depth of participation:** A fully participatory mechanism should enable citizens to actually influence collective decision-making, engaging in a way that is "more than therapeutic, oppositional, or pleading, but in which citizens share in governing".
- **Type of participation:** A fully participatory mechanism should provide a structure for face-to-face discussion over some period of time.
- **Equality of participation:** A fully participatory mechanism should offer citizens the opportunity to participate on an equal basis with administrative officials and technical experts – having an equal role in defining issues, questioning technical experts, disputing evidence, and shaping the agenda.

These factors evoke the notion of a ladder of citizen participation (Arnstein 1969), from non-participation (manipulation) to token participation (consultation & informing) to full citizen power (partnership & control). Not all mechanisms that are considered "participatory" actually provide opportunities for full citizen engagement in decision-making. Many only provide opportunities for *representation* of citizens, or for speaking out, but without a chance to make a real impact.

This raises important questions for the design of planning processes: What determines the method, depth, type and equality of participation in any process? Or rather, *who* determines it? It is easy to assume that effective participation can be achieved simply by following a set of objective “good practices” and criteria, perhaps led by an external facilitator (perhaps from a non-governmental organization). It is also often assumed that participation, in and of itself, is enough to achieve effective desired outcomes. For example, Forester (1999, p.1) imagines the city planner as a facilitator, studying complex problems, listening carefully to controversial political arguments, and learning about values attributed to certain “facts” in order to propose effective strategies.

First of all, such assumptions involve falling into the old trap of viewing “experts” (or supposedly disinterested facilitators) as best placed to lead the planning process – precisely what the recent push for increased citizen participation popularity is trying move away from.

Second, even if a truly disinterested facilitator could be found, the different interests and framings of actors seeking to influence the process would shape and constrain the outcomes. Invoking Lukes’ (2004) vision of power as not only overt pressure and coercion, but also influence over another, we can envisage framing as a process by which ideas and assumptions are affected by those who have positions of power and influence (and the money to perpetuate their views). This may result in participatory processes being framed so that the range of options considered reflects the preferences of incumbent interests. Participation may thus be used as a “technology of legitimation” (Harrison and Mort 1998 in Stirling 2007, p.264).

In short, we take as given that the constellation of actors and their power and influence will determine the method, depth, type and equality of participation. In that sense, as Stirling (2007) argues, participatory processes do not inherently solve the problem associated with expert-led planning: the sensitivity to framing by powerful interests. In order to make a difference, participatory processes need to open up the decision space beyond the options preferred by those with the most power and influence. They need to better inform and determine the technical analyses, and uncover alternatives that might not otherwise be considered.

2.2 Review of participatory planning processes

There is a wealth of social science research on participatory approaches to decision-making. However, it has had limited translation into policy, due either to its confinement to academic literature, or to a lack of clear guidelines for translating the research findings into action. Furthermore, much of the work has focused on management of common pool resources such as forests, fish stocks and water; there is very limited work on management of common energy resources, such as biomass fuels. On the occasions that participation in energy decision-making has been addressed, it has been mostly ad-hoc, tending to focus on the village/community level only, without being widely applied in the context of Africa. Below we explore some notable exceptions and experiences in other sectors.² In our review, we find six key types of activities that contribute to participatory energy planning (see Table 1).

² Our original plan was to undertake a small systematic review, including key search terms, inclusion and exclusion criteria for studies and scope for review. However, time and resource constraints did not allow us to take this approach. But we believe our experience and knowledge of the literature around participatory planning in energy and other sectors were sufficient to identify key ingredients for success.

Table 1. Key activities in a participatory energy planning process

Activity type	Participatory planning approaches				
	Participatory urban planning toolkit	Participatory rural appraisal	Multi-criteria decision support systems	Participatory village energy planning toolkit	Pro-poor energy delivery model
Stakeholder engagement & awareness-raising	Identify & mobilize stakeholders, raise awareness in community of planning meetings			Community mobilization: visioning exercises & expectations	Define target group for the intervention & its geographical & socio-cultural context Use stakeholder engagement & participatory approaches
Needs assessment	Community/ neighbourhood profiling/needs assessment	Assessing the rural communities' needs	Include technical & non-technical aspects of energy & livelihoods		Map the stakeholders, their roles, their drivers & interests Develop an understanding on the end users' need & wants
Resource mapping		Looking at available appropriate technologies	Assesses strengths & weaknesses of community by indicating overall status of capitals or assets	Identify renewable energy opportunities through resource mapping	Carry out feasibility test to look at combination of people & resources & processes that can provide energy services for end users in a sustainable way
Visioning & action planning	Community visioning & action planning	Determining feasible institutions & organizational models for service delivery	Draws up energy plans which would affect assets differently	Village energy committee formation, village energy plan development	Consider characteristics of enabling environment & socio-cultural context of end users Develop shared understanding among stakeholders of local & market context of intervention; stakeholders revisit their different energy service delivery options & evaluate risks & opportunities Agree upon a viable delivery model
Capacity development	Stakeholders' capacity-building				
Implementation, monitoring & evaluation & learning	Resources mobilization Implementation of priority projects Participatory monitoring & evaluation		Refer to the time dimension of "before" & "after" an energy intervention is put in place	Implementation processes: social & technological Participatory monitoring & evaluation	Develop an implementation & monitoring plan

The first activity is **stakeholder engagement and awareness-raising**. This is the bedrock of participatory planning, as stakeholders need to be engaged from the beginning to ensure ownership of the process. In this context, stakeholders include people with and without access to modern energy services, as well as those who provide modern services or have the institutional mandate to address the issue (Okello et al. 2008). In many cases, awareness of energy issues – both at the household, community and county levels – is limited. Hence, awareness-raising activities are particularly important at the outset. The Participatory Village Energy Planning toolkit by Development Alternatives (2013), for example, calls for raising awareness of the benefits and potential of alternative energy sources early on, to open up options in later planning stages. Yet stakeholder engagement and awareness-raising are also ongoing processes, and should continue throughout the participatory planning process.

Another key activity is **needs assessment** – understanding current energy consumption patterns and desirable and potential future consumption patterns. There are a number of ways to do this. For instance, household surveys offer a way for citizens to be directly involved in developing data on their energy consumption and needs. Of course, surveys cannot cover all citizens, but they can gather input from a larger number of people than if the same information were only sought from community representatives or leaders. Another way of undertaking a needs assessment is through a community appraisal process, such as participatory rural appraisal or similar approaches. Participatory rural appraisal aims to enable local people, regardless of their positions, tribal affiliation or social position, to express and analyse the realities of their life conditions (Malhotra et al. 2004). This people-centred approach often relies on focus group discussions as a method for generating insights.

A third key activity is **resource mapping with the community**. This is often done in tandem with the needs assessment. Focus group discussions can provide a valuable space in which to also map out resources with community members. There may be need to undertake more technical resource mapping, such as remote sensing, solar irradiation mapping, wind speed mapping, water flows and exploratory well drilling. Even if those tasks can only be performed by experts, once the results are known, it is important to consult with the prospective users of the energy system. For example, it is important to analyse how the implementation of specific energy solutions might affect livelihoods and social disparities (Cherni et al. 2007). Participatory geographic information systems (GIS) mapping with communities and experts can offer a useful way to do this, by spatially mapping existing and potential resources, including areas of conflict over resource use.

The fourth key activity is **visioning and action planning**, which is central to participatory rural appraisal (Chambers and Blackburn 1996), Cherni et al.'s (2007) multi-criteria decisions support for energy planning, and Bellanca and Garside's (2013) pro-poor energy delivery model. Whether at the village, community or county level, it is important to develop a viable vision for the future and develop plans of action to achieve it. Participatory scenario planning – ranging from basic to more technical, as is possible with SEI's Long-range Energy Alternatives Planning (LEAP) modelling tool – offers a way to consider visions of the future that are compatible with the situation of communities on the ground. It also offers a structured way for different stakeholders to discuss potential trade-offs before reaching a consensus. Within this process, concrete actions can be identified that can serve as milestones on the way to achieving the agreed-upon vision (or scenario).

A fifth activity that is often needed is **capacity development**. It can be a stand-alone activity, or be an integral part of other activities, such as visioning and action planning. Different capacities may be needed at different stages – and how much capacity development is needed will depend on stakeholders' existing skills and capacities. Skills for which further training

may be needed include leadership and conflict resolution, resource mobilization, accounting and budgeting, doing surveys, negotiation and communication, and working with technical, financial and legal concepts (see Okello et al. 2008). Stakeholder engagement and awareness-raising activities are a good starting point for assessing existing capacities and initiating capacity development activities.

The sixth key activity is a combination of three: **implementation, monitoring and evaluation, and learning**. These might be considered separate from the planning process, but they are closely connected. Plans are useless if they are not implemented – and often their flaws are only revealed during implementation. Participatory monitoring and evaluation activities can give citizens an opportunity to ensure that plans are successfully realized, and hold the authorities accountable. Even more important, they foster social learning, whereby stakeholders – citizens, community leaders, government officials, service delivery companies, etc. – reflect on what worked and what did not, and learn how to do better the next time. As noted before, participation itself may do little to affect entrenched power relations. Social learning, on the other hand, may offer a way to do this (Collins and Ison 2006).

2.3 Citizen participation in county energy governance in Kenya

In order to ascertain where and how county governments will play a role in Kenya's energy system, it is imperative to understand the governance structure of the energy sector. Even if the legal mandate is in place for counties to take the lead in some areas, it is not a foregone conclusion that this will happen in practice. There may be many political economy aspects that hinder, minimize or negate the decentralization process in the energy sector.

Devolution in Kenya offers the opportunity for greater citizen participation in matters that affect them. Article 14 of the Constitution (Government of Kenya 2010, p.177) gives the newly formed counties responsibility for “ensuring and coordinating the participation of communities and locations in governance at the local level and assisting communities and locations to develop the administrative capacity for the effective exercise of the functions and powers and participation in governance at the local level”.

Kenya has tried before to institutionalize decentralized planning and participatory development, with little success (see Wakwabubi et al. 2003). In 1983, the Government of Kenya's District Focus for Rural Development Strategy became operational, although it largely focused on increasing the involvement of central government field workers in planning and implementation of rural programmes (Chitere and Ileri 2004). The enactment of Physical Planning Act in 1996 indicated some progress on participatory development, as it provided for citizen participation in preparing and implementing physical and development plans. A further breakthrough came with the establishment of the Local Authority Service Delivery Action Plan in 2001 and Constituencies Development Fund in 2003, which have been the main vehicles of citizen participation at the local level to date.

The new Energy Bill under consideration by the Parliament further specifies what local-level governance would mean within the new counties when it comes to energy issues (see Government of Kenya 2015). First, Article 5(3) states that each county government is expected to develop a county energy master plan that will be used by the Cabinet Secretary of the Ministry of Energy and Petroleum to formulate an integrated national energy master plan for purposes of national energy planning. Second, Articles 254 and 255 of the proposed Energy Bill give county governments the power to enforce certain provisions for efficient use of energy and its conservation, undertake inspections, and issue directions, all in relation to national energy laws and provisions. Third, Article 253 states that county governments must

establish a fund to promote efficient use of energy and energy conservation within the county. This fund would hold all grants and loans made by the county government, national government or any other organization or individual. Our study focuses on how the constitutional requirement for the citizen participation can be incorporated into the first element of county-level governance: development of a county energy plan. Table 2 highlights key actors in the energy sector and their roles.

Devolution typically entails a transfer of responsibility for planning, management, fund-raising and budget allocation from the central government entities to lower levels of government (Work 2002). It typically implies a desire to improve participation and allow people to have more of a say in issues that directly affect them. As Robert Ebel (1998; cited in Work 2002) observes in his overview of decentralization: “Developing countries are pursuing decentralization reforms [such as devolution] to counter economic inefficiencies, macroeconomic instability, and ineffective governance”. However, as discussed above, participation can vary and is often framed in ways that limit its democratic and deliberative power. Hence, devolution does not always improve the lives of the most marginalized.

According to Cook and Sverrisson (1999), key factors that determine the extent to which decentralization (or devolution) actually result in change include:

- (a) The character of relations between the local and central governments;
- (b) The extent to which enhanced participation is effective in establishing accountability;
- (c) The system for allocating resources, both administrative and financial; and
- (d) The length of time a system has been in operation.

In Kenya, there appears to still be a debate over how the governance of the energy sector at county and central governments will be managed in practice. In some cases, it appears that central entities, such as the Ministry of Energy and Petroleum’s county-based Energy Centres, have a good working relationship with county governments. But in many cases, relations between Energy Centre managers and county government energy directors are strained. Accountability mechanisms at the county level related to how budgets are set up and managed are still being set up. Citizens vote for ward representatives, but the process seems unclear. The system for allocating resources is only just being defined, with central and county governments still in discussion over budget allocations and fund-raising responsibilities. The devolved system in Kenya is extremely new, despite earlier moves towards more decentralization. Hence, there is still a lot of learning and adaptation that needs to take place for the devolved system to establish effective means of ensuring citizen participation.

Table 2. Energy system actors and proposed responsibilities under new Energy Bill

Actors	Responsibilities
Ministry of Energy	Formulation and articulation of energy policies, through which it provides an enabling environment for all stakeholders National energy planning Training of manpower Mobilization of financial resources
County Ministries of Energy	Enforcing certain provisions for efficient use of energy and its conservation Developing appropriate policies Establishing a fund for energy activities Inspecting various facilities and issuing directions
Energy Regulatory Commission (ERC)	Economic and technical regulation of electric power, renewable energy and downstream petroleum sub-sector Functions include: Tariff-setting, review, licensing, enforcement, dispute settlement, approval of power purchase and network service contracts
Energy Tribunal	Quasi-judicial body Hearing appeals against the decisions of ERC Hearing and determining all matters relating to the energy sector
Kenya Power (formerly Kenya Power and Lighting Company)	Purchasing electricity in bulk from KenGen and other power producers Transmission, distribution, supply and retail sales of electricity
Kenya Electricity Generating Company Ltd. (KenGen)	Electric power generation; produces the bulk of electricity consumed in the country Hydro, geothermal, thermal and wind
Rural Electricity Authority (REA)	Extending electricity supply to rural areas Managing rural electrification fund Mobilizing resources for rural electrification Promoting the development and use of renewable energy
Geothermal Development Co Ltd. (GDC)	Development of geothermal resources in Kenya
Kenya Electricity Transmission Communication Ltd (KETRACO)	Development of national transmission grid network Facilitation of regional power trade through its transmission network

Actors	Responsibilities
Independent power producers (IPPs)	Private companies that generate power and sell electricity in bulk to KPC Iberafrica power (EA) co Ltd (thermal), Tsavo power (Thermal), Mumias Sugar (Co-generation), Orpower 4 Inc (geothermal), Rabia power company (Thermal), Imenti tea factory (Mini-hydro)
Kenya Petroleum Refineries Ltd (KPRL)	Processing crude oils
Kenya Pipeline Company Ltd (KPC)	Storage, transportation and handling of refined petroleum products in Kenya
National Oil Corporation of Kenya Ltd (NOCK)	Stabilizing the petroleum supply market by participating in all aspects of the petroleum industry i.e. upstream, mid-stream and downstream activities
Centre for Energy Efficiency and Conservation (CEEC)	GoK and Kenya Association of Manufacturers Championing energy efficiency and conservation efforts in Kenya
Oil Marketing Companies (OMC)	Local and international company Importation, storage, wholesale, export and retail of petroleum products
Petroleum Institute of East Africa (PIEA)	Voluntary membership institution for major oil companies Capacity-building and awareness creation in the petroleum sub-sector
Oil Exploration and Production Companies (OIEPS)	Local and international companies Licensed to undertake exploration and production of petroleum products
National Environmental Management Authority (NEMA)	Environmental aspects of the energy sector
Kenya Association of Manufacturers (KAM)	Energy efficiency and conservation programs designed to help companies identify energy wastage, determine saving potential and give recommendation on implementation measures Providing professional technical services for developing, designing and implementing energy efficiency projects to suit the needs of commercial, institutional and industrial consumers Reducing cost and enhance competitiveness and profitability while promoting a clean and healthy environment
East Africa Power Pool (EAPP)	Studies and capacity-building activities that will enhance a regional power development system and also create an environment of efficient power trade in the region
Climate Innovation Centre (CIC)	Accelerating development, deployment and distribution of relevant clean energy technologies
Renewable Energy and Energy Efficient Competence Centre for East Africa	Training, policy discussions, quality certification and awareness creation in the field of renewable energy and energy conservation in East Africa (solar PV systems)

3. RESEARCH DESIGN

Our research followed a mixed-methods case study approach. One county was chosen as the selected case study, and quantitative and qualitative research methods were used to collect and analyse data related to household energy consumption patterns and avenues for participation in energy planning. In this section, we explain the case study selection, household survey methodology, and interview and focus group discussion processes.

3.1 Case study selection

Participatory approaches are commonly used in village- or community-level decision-making, but integrating such approaches into county-level planning processes requires dismantling traditional, closed planning processes. New guidelines have to be developed and institutionalized to support the change, and buy-in and learning are needed within the county government. Hence, the first criterion for our case study selection was local commitment to pursuing a participatory energy planning process.

Already, the project focused on county governments in the Lake Victoria Basin region of Kenya, where SEI and Practical Action have extensive experience, and informal discussions had indicated that there was demand for developing a framework for participatory energy planning. Officials in Migori County were the most enthusiastic and keen to partner with us.

One of Kenya's 47 counties, Migori County is made up of eight sub-counties, subdivided into 40 electoral wards. Previously part of the former Nyanza province, the county is situated in south-western Kenya, bordering Homa Bay County to the north, Kisii and Narok Counties to the east, the Republic of Tanzania to the south, and Lake Victoria to the west. The total population of Migori County according to the 2009 Census was 917,170 – 48.6% male and 51.4% female (Migori County Government 2013). The climate is favourable for agriculture, supporting the cultivation of cotton, tobacco, sugar cane and a variety of food crops.

As noted earlier, the original aim of this study was to jointly develop and pilot test a framework for citizen participation in energy planning with a selected county government. However, early discussions with Migori County officials revealed that energy planning in the county was being done with very limited data and engagement with citizens. Officials expressed the need for a proper baseline survey and community engagement and awareness-raising. Hence, we focused on conducting the baseline survey and focus group discussions, as an entry point for developing a framework for participation at the county level.

3.2 Household survey

For the survey, SEI developed a detailed, comprehensive questionnaire with input from Practical Action. The survey was then discussed, pre-tested and reviewed before adoption. The questionnaire consisted mostly of multiple-choice or short-answer questions, but also included some open-ended questions in order not to close down options for responses on avenues for participation (see Appendix A for a sample of survey questions). Time and financial constraints meant we were only able to sample 500 households in our survey.

3.2.1 Survey design

The survey aimed to elicit responses about household energy consumption behaviour, including energy sources used, expenditure on energy, and energy technologies used. It also included questions about preferred avenues for discussing energy issues within the household, the wider community, and the county. The survey design was informed in part by a rural

household energy survey undertaken in Peru in 2007 by the Ministry of Energy and Mines and the World Bank's Energy Sector Management Assistance Program (Meier et al. 2010).

The survey was split into eight sections:

- Characteristics of house and household: eight questions;
- Characteristics of household members: 13 questions;
- Sources of energy: up to 127 questions, depending on types of energy used;
- Cooking and health: 15 questions;
- Mobile phone use: four questions;
- Attitudes towards energy: 19 questions
- Participation in energy discussions: 20 questions;
- Getting in contact: two questions.

The bulk of the survey centred on sources of energy and cooking. We asked households about their use of 13 sources of energy: electricity from interconnected grid or isolated system, kerosene, candle, dry cell batteries, car batteries, liquid petroleum gas (LPG), solar PV home system, firewood, animal dung, crop residues, electric generator set, charcoal, and coal. This was followed as appropriate by a series of more detailed questions – for example, how much of that particular source they consumed, how much they spent on securing that source, and what they used the source for (lighting, cooking, appliances, etc.). For the questions on cooking, we aimed to explore what types of cookstoves households used, their cooking behaviour and environment, and which, if any, household members experienced eye irritations and coughs.

Questions on participation in energy discussions, both within the home and within the community, were a mix of closed and open-ended questions. The aim was to generate household-level data to complement the community-level focus group discussion data on how Migori County could engage with citizens as part of the energy planning process.

3.2.2 Sampling procedure

As recorded by the 2009 Census (Kenya National Bureau of Statistics 2010), Migori County has 180,211 households.³ Although there are more recent estimates of the current population, we deemed the Census figure to be more robust for purposes of sampling. **The first step in sampling was to divide our sample of 500 households into urban and rural samples.** The 2009 Census did not specify how urban and rural populations were defined, and how peri-urban populations fit within those categories, so data in the County Integrated Development Plan for Migori were used (Migori County Government 2013). The plan identified five major urban centres in the county, defined as having a population of more than 10,000 per the 2009 Census; the five combined accounted for 14.9% of the county's total households. In our sample, 15% of the households, or 75 in total, came from those major urban centres.

Since Migori County has a largely rural and agriculture-dependent population (Migori County Government 2013), the experts involved in this project agreed that it was legitimate to categorize the rest of the county outside the major urban centres – 85.1% of all households – as rural. In our sample, 425 households, or 85%, were rural. There were a few small areas that

³ Given the total population of 917,170, this means the average household size was 5.09 people. Since we wanted to sample households, we determined our sample size based upon household numbers, rather than population data.

could have been classed as peri-urban, but since it was impossible for us to clearly identify them, we chose to divide our sample into major urban and rural only.⁴

The second step was to select specific places from which to draw our sample. For the urban sample, we chose households from all five major urban centres: Migori, Kehancha, Rongo, Awendo and Isibania. For the rural surveys, the process was multi-stage. First we stratified the rural areas into 164 small “administrative units” – ranging in area from 1 to 38 km² – identified in the 2009 Census.⁵ Seven high-density administrative units with more than 1,000 people per km² were omitted to avoid resampling major urban areas. Out of the remaining 157 mid- to low-density administrative units (fewer than 1,000 people per km²), we then randomly selected 20 from which to sample rural households. We chose 20 to ensure we captured as wide a range as possible within the time, financial and logistical constraints.

The third step was to decide how many households to survey within each of the urban and rural locations. We used a probabilistic sampling technique to ensure that the number of households sampled in each place was representative of the relative size of the population. Thus, for example, instead of surveying an equal number of households in each urban centre, we included 29 households from Migori, reflecting the fact that the town is home to 38.7% of the county’s urban households. See Table 3 for the sample size for each urban centre. Similarly, the number of households sampled in each of the rural locations, was proportional to the number of households in that administrative unit relative to the total for the 20 selected mid- to low-density units. For example, Komenya Masogo had 2.8% of the households, so we included 12 households from there in our rural sample of 425.⁶ See Table 4 for the sample size for each rural centre.

The fourth step was to choose specific households in each location. This was done randomly at the discretion of the enumerators, who had extensive knowledge of the area. In most rural areas, they enlisted the help of local guides (and interpreters where necessary) who also helped direct them to households.

⁴ Migori County government is undertaking a study to determine the urban, peri-urban and rural population of the county. However, since the study was not yet complete at the time of our research, we used figures from the County Integrated Development Plan, which were based on the 2009 Census.

⁵ Although the county system was not in place during the 2009 Census, it was possible with local knowledge and government maps marking administrative boundaries to identify all administrative units and the respective wards and sub-counties under which they fell.

⁶ We rounded up or down where necessary, as only whole numbers of households could be sampled.

Table 3. Sampling major urban centres

Major urban centre	Total households	% of total sampled urban households	Household sample size*
Migori	10,432	38.7%	29
Kehancha	5,915	22.0%	16
Rongo	2,427	9.0%	7
Awendo	3,535	13.1%	10
Isebania	4,628	17.2%	13
Total	26,938	100.0%	75

* We round up to the nearest whole number.

Table 4. Sampling rural administrative units

Administrative unit	Sub-county	Total households	% of total sampled rural households	Household sample size
Komenya Masogo	Uriri	586	2.8%	12
Makararangwe	Kuria East	1147	5.4%	23
Nyandago	Nyatike	737	3.5%	15
Sakuri	Kuria East	584	2.8%	12
Sagegi	Suna East	748	3.5%	15
Nyankore	Kuria West	1215	5.7%	24
S. Kogelo	Awendo	528	2.5%	11
Otati	Nyatike	554	2.6%	11
Bala	Nyatike	738	3.5%	15
West Kawere Rateng	Uriri	369	1.7%	7
Marindi	Suna east	2898	13.7%	58
Kopanga	Suna West	1004	4.7%	20
Kanyimamba	Rongo	1447	6.8%	29
Nyamaranya	Kuria West	692	3.3%	14
Nyabikongori	Kuria East	1181	5.6%	24
Kodera Bara	Rongo	2142	10.1%	43
Kanyimamba	Rongo	1447	6.8%	29
Kakelo Kakoth	Nyatike	927	4.4%	18*
Kadera Kwuoyo	Awendo	1351	6.4%	27
Wangirabose	Kuria East	902	4.3%	18
Total		21,197	100%	425

* In calculations, this number should be 19, rounding up from 18.59, but, this would have made the sample size 426.

3.2.2 Data collection and analysis

Three experienced local research assistants were hired and trained as enumerators over the course of three days. On the first day, enumerators were introduced to the project and the draft questionnaire.⁷ In the process, a discussion on household energy was held to ensure they were aware of the issues dealt with in the questionnaire. The research team from SEI and Practical Action then went through each question to clarify and make changes to wording and formatting as necessary. On the second day, researchers and enumerators went to the field to test the questionnaire. They worked in pairs, with each pair visiting at least two households and filling out the questionnaires as trained. In the afternoon, a feedback session was held

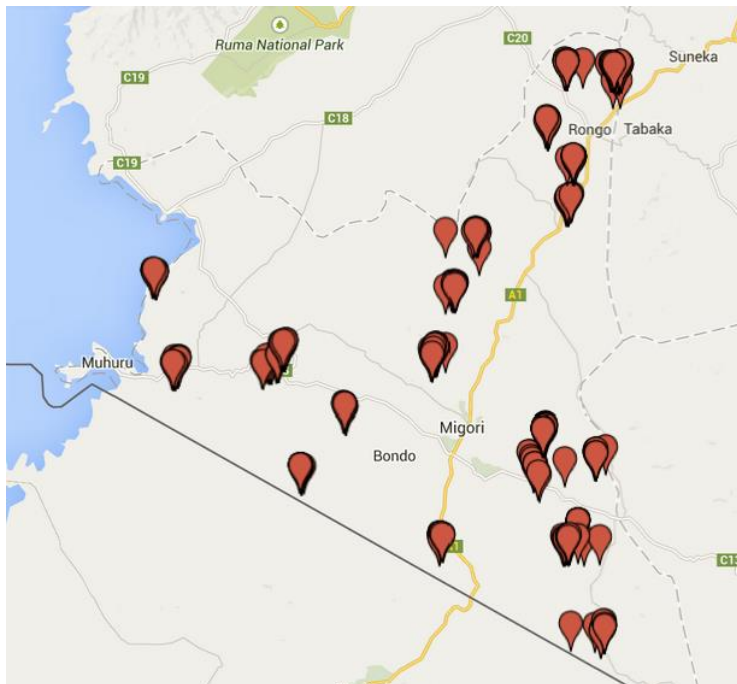
⁷ See Appendix A, available online at <http://www.sei-international.org/publications?pid=2903>.

in which a number of further adjustments were made to the questionnaire to enhance its clarity and keep the effective administration time at around 40–60 minutes per household. Final copies were printed for the rest of the exercise.

Questionnaires were administered from September 2014 to January 2015, with each research assistant surveying about 5–10 households per day. Figure 1 shows the general location of each household respondent, based upon GPS coordinates taken by each research assistant while administering each questionnaire. Since the study involved human subjects, SEI, Practical Action and the research assistants were governed by ethical standards of public research, which demand treatment of the subjects with dignity and upholding of the principle of informed consent before, during and after the study. All data was analysed anonymously, without reference to the name of the respondent, names of household members, or precise household location.

Upon receiving completed questionnaires from research assistants, the data were simultaneously coded and entered into a Microsoft Excel database by SEI staff. Codes had already been created for most answers (e.g. yes = 1, no = 0). If necessary, enumerators were contacted to help clarify any issues. Once data entry was complete, the data were sifted to ensure consistency and correct any typographical errors. They were then analysed using Microsoft Excel and in SPSS statistical software.

Figure 1. Location of households surveyed



3.3 Interviews and focus group discussions

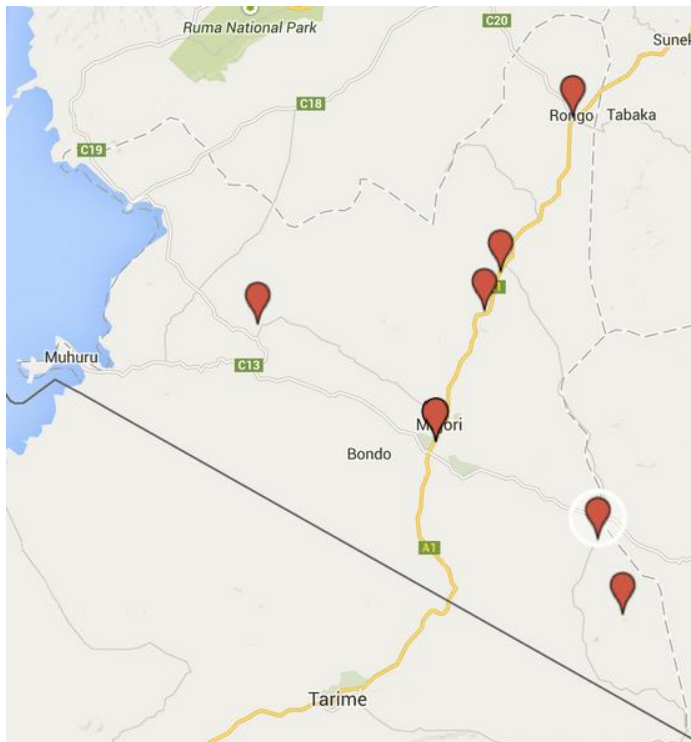
With meetings pre-arranged by ward administrators with support from the Research Assistants, SEI and Practical Action teams were able to interview strategic stakeholders. The teams identified and interviewed officials from the central Ministry of Energy and Petroleum, Migori County Energy Centre and Migori County Ministry of Water and Energy. The goal of the interviews was to establish their perspectives on the level of participation in the development of energy plans at the county level. Their input was also sought on how to develop a successful participatory framework for energy planning.

The completed questionnaires were evaluated for accuracy and completeness. The data collected were coded, cleaned and analysed using SPSS software. Descriptive statistics, cross tabulations, frequencies and financial analyses were all used to describe energy usage patterns in the selected divisions. The consideration of both quantitative and qualitative analysis was key in informing and interpreting the gender implications. Data from questionnaires, key informant interviews and focus group discussions were collated, corroborated and interpreted to fulfil the study objectives. Data analysis was presented using standards formats (i.e. tables and graphics).

3.3.1 Focus group discussions

Focus group discussions were carried out in eight sub-counties (see Figure 2): Suna East, Suna West, Kuria East, Kuria West, Nyatike, Uriri, Awendo and Rongo. The SEI and Practical Action teams grouped the persons to participate in the focus group discussions from each of the divisions into four categories: women's groups, youth groups, administrators and community leaders. Each of the groups was asked to map out actors in the energy sector, and discuss the roles, responsibilities and the challenges faced by each of the identified actors. The groups were also asked to discuss ways in which they could help the county to deliver on its mandate, with specific examples, drawing on their past experiences, even those which did not relate to an energy project.

Figure 2. Location of focus group discussions



3.3.2 Data analysis

Analysis of focus group discussion data involved collating data from similar groups – i.e. women, youth, community leaders and ward administrators – and drawing out common themes and threads. The results of this iterative process were validated during a final project workshop in Migori, in which participants were asked to reflect on the analysis and identify key areas that should be prioritized.



The 2MW Gogo Falls hydropower dam in Uriri sub-county still uses the generators installed in 1957. It was built to supply power to the local gold mine, but now feeds into the national grid. Photo by Oliver Johnson.

4. HOUSEHOLD ENERGY CONSUMPTION PATTERNS IN MIGORI COUNTY

The data collection on energy consumption in Migori County produced extremely rich quantitative and qualitative data. Here we highlight some of the most interesting and robust insights, focusing on energy sources, fuel consumption costs, energy use/technologies, and energy challenges.

4.1 Energy sources

Based on our sample of 500 households, four main energy sources predominate in Migori County: charcoal, firewood, dry cell batteries and kerosene (see Figure 3). This finding confirms much anecdotal evidence on household energy consumed in the county. It also echoes the 2009 Census finding that 77.4% of households in the county (then a district) used firewood as their main source of energy for cooking, followed by charcoal at 18.8%, while 94.4% of households used kerosene as the main source of energy for lighting (Migori County Government 2013).

The picture is more nuanced if we disaggregate rural and urban households. Figure 4 shows two separate energy consumption patterns: In rural households, the four main energy sources are charcoal (67%), firewood (96%), dry cell batteries (72%) and kerosene (97%), similar to the overall figures for Migori County. Only 2% of rural households have access to electricity.

The figure for charcoal consumption in rural areas is very high compared with the roughly 30% that is typical for charcoal consumption in rural African households (see, for example, Adkins et al. 2012; Ministry of Environment, Water and Natural Resources 2013). However, as noted by FAO (1994) in a study of charcoal consumption in Sudan, figures can vary significantly within a country for a number of reasons, such as question bias and location bias. For example, our survey simply asked whether charcoal had been used in the past month, but did not explore the frequency of use was, or whether charcoal was the main or supplementary fuel. Thus, it is possible that the responses reflected occasional, perhaps seasonal use. The data on stove usage presented in Section 4.3 below supports this assumption, as we find that most rural households cook primarily over an open fire, fuelled

with wood. However, many have a charcoal-burning improved cookstove as well, although it is not clear how often they use it. Focus group discussions revealed that in Migori County – and in particular some sub-counties – charcoal production is very common, often using wood from the neighbouring Mara region. This could help explain the high rate of charcoal use in rural households.

Urban household energy consumption patterns are different. Electricity (65%), candles (56%) and liquefied petroleum gas, or LPG (39%), all rare in rural households, are common energy sources for urban households. Charcoal use is much higher, at 84%, whereas firewood use is only 14%. As in rural areas, use of dry cell batteries and kerosene is common, at 58% and 71%, respectively.

When we examined why electricity connection rates are so low, particularly in rural areas, we found two major reasons: the lack of an electricity grid in the area, and the high cost of the initial connection (see Figure 5). Other potential barriers, such as the cost of monthly bills, cost of wiring, cost of appliances, lack of interest, did not seem to be issues here.

The data raise questions that require further investigation. For instance, why is the use of candles so prevalent in urban areas? Is it because they are more easily accessible and/or cheaper in urban areas? Is it because electricity supply – which is largely confined to urban areas – is unreliable, so candles are often needed during power cuts? In our interviews and focus group discussions, we heard common complaints about poor electricity service, so the latter reason is quite plausible.

Another important point to make – and one that will benefit from further analysis of covariance in our data – is that simply focusing on increasing access to electricity for the 88% of households without grid connections will not reduce charcoal and firewood use. These fuels are typically used for cooking even in households with grid connections, whereas electricity is not.

Figure 3. Overall energy consumption

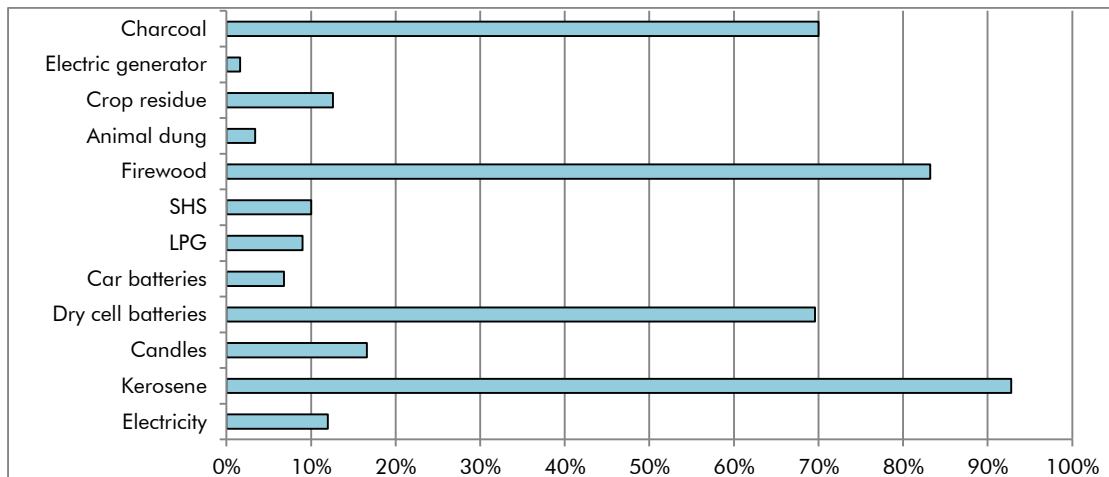


Figure 4. Energy consumption in urban and rural households

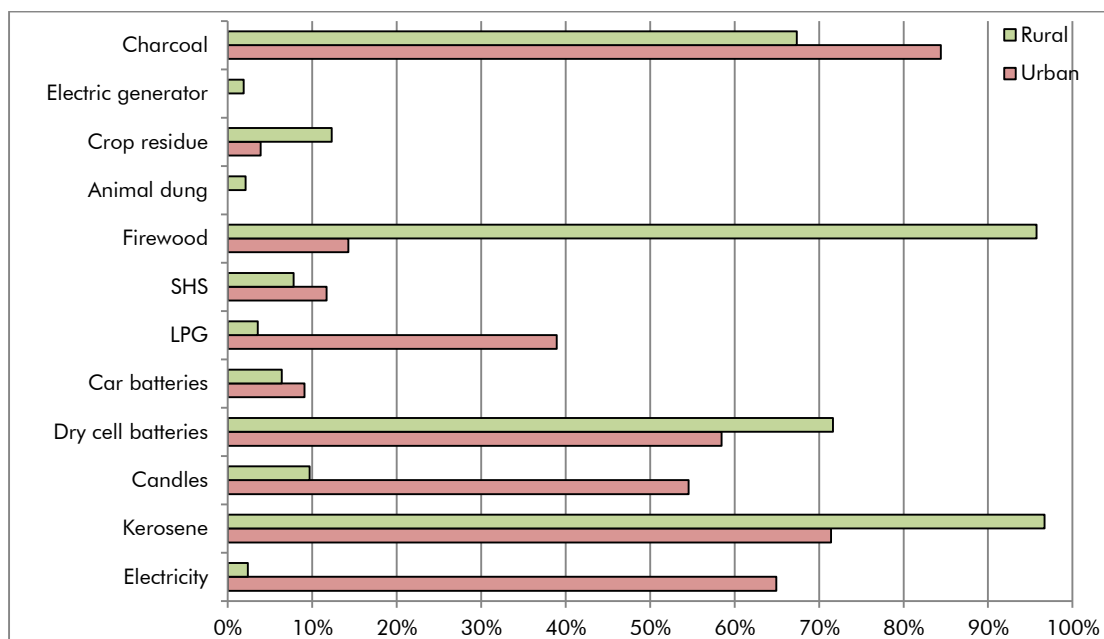
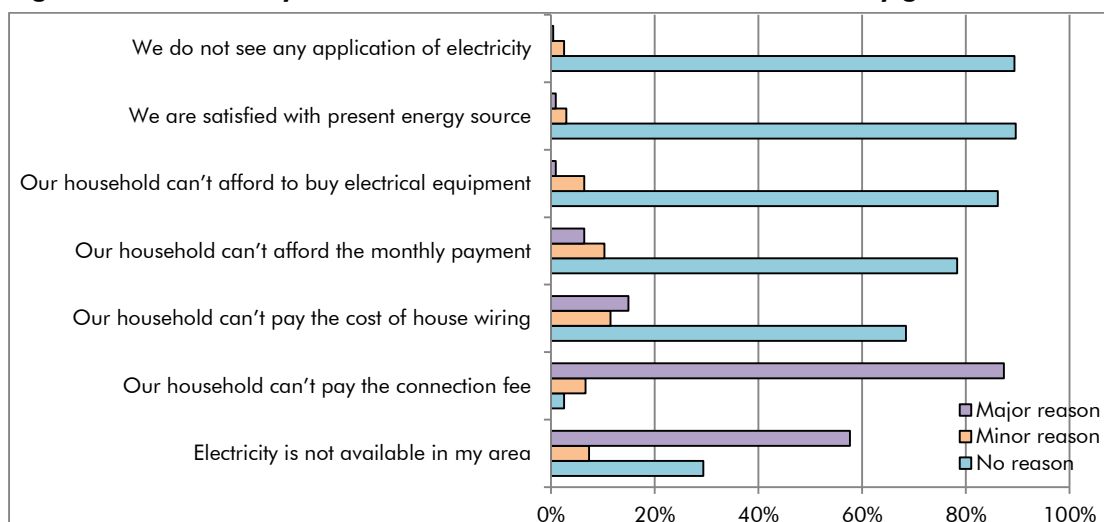


Figure 5. Reasons why households are not connected to the electricity grid



4.2 Energy expenditures

Some households are paying significant amounts for traditional and often inefficient energy sources. Table 5 shows the average monthly energy expenditure of all the surveyed households in Migori on electricity, kerosene, charcoal and firewood (where firewood is bought, not collected for free). On average, charcoal is more expensive than LPG, which would be a viable alternative in urban areas (in rural areas, the supply of LPG is not well established, so it is unreliable). The typical expenditure on electricity was higher than the monthly costs accrued from the daily use of kerosene. However, given that most electricity consumers were in urban areas, it is likely that rural households would pay less if they were connected, as electricity consumption in rural areas tends to be lower than in urban areas (Kamfor Company Limited 2002, p.18). Both kerosene and electricity costs amounted to less than what was generally spent LPG and on charcoal.

However, comparing the costs of different energy sources is not always useful. First of all, different energy sources provide different energy services. For instance, electricity and kerosene are both used primarily for lighting – though they could also be used for cooking, and electricity also for appliances. Secondly, firewood is often collected for free, whereas other fuels, such as charcoal, kerosene, batteries and LPG, are purchased. Different energy sources also tend to be bought and/or paid for over different time-scales: electricity bills are usually monthly, while kerosene is often bought daily, in small quantities. Similarly, LPG cylinders have fairly high upfront costs but often last for several months before they need to be refilled. As a result, households do not generally make decisions about which energy sources to use by comparing the potential monthly or weekly costs of each. This is an important issue to be aware of when designing schemes to incentivize households to use alternative energy sources.

Table 5. Average monthly expenditure on different fuels

Fuel	Typical purchase volume*	Typical purchase amount*	Typical purchase frequency*	Average monthly expenditure
Electricity	–	600 KES	Monthly	597 KES
Kerosene	10 ml	10 KES	Daily	351 KES
LPG	6 kg cylinder	1,500 KES	Less than monthly	869 KES
Charcoal	2 kg container	50 KES	Daily	1,334 KES
Firewood	1 bundle	20/90 KES	Daily/weekly	531 KES

* Purchase amounts are given in Kenyan shillings (KES). These numbers are indicative only, and come from focus groups, interviews, and survey data.

4.3 Types of energy technologies used

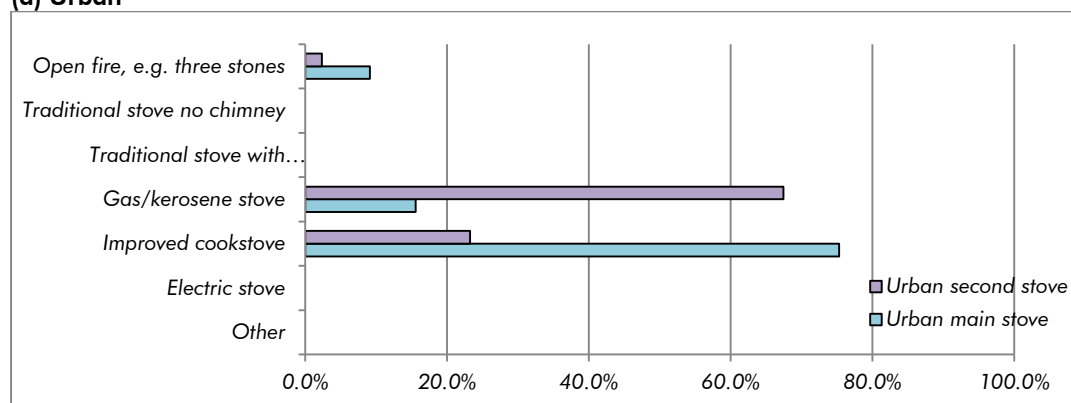
Cooking is a major activity in all households.⁸ Kenya has a long history of promoting improved cookstoves, particularly the Kenya Ceramic Jiko and Upesi/Maendeleo stove. From survey data, it appears that ownership of these improved cookstoves in Migori County is high, but usage is limited. Figure 6 shows that the most common way of cooking in rural households is over an open three-stone fire (89.6% of households). Improved cookstoves are used as a second option by 84.8% of households, with only 6.9% using it as their main stove. In urban areas, the situation was very different: 75.3% of households used an improved cookstove as their main stove, with 23.3% using it as a second stove. The other main type of stove used was a gas or kerosene stove, with 15.6% of households using it as their main stove and 67.4% using it as a second stove.

This situation reflects the challenge of achieving widespread uptake (i.e. use) of new cooking technologies. These technologies seek to disrupt long-established practices of cooking underpinned by individual behavioural patterns, intra-household relations, and complex socio-cultural norms and relationships (Lambe and Atteridge 2012). Any interventions to promote improved cookstoves must seek to understand these complexities and incorporate them into the design of the stove and the intervention. Otherwise, households may come to own improved cookstoves, but still not use them enough to reap the health, environmental, economic and social benefits.

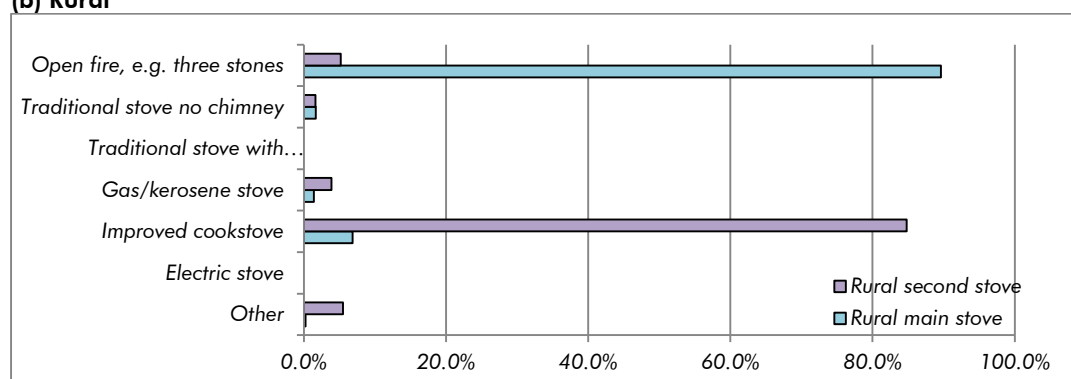
⁸ Of 500 households surveyed, 499 gave a response about their main stove and 352 households gave a response about use of a second stove.

Figure 6. Main and second stove used by (a) urban and (b) rural households

(a) Urban



(b) Rural



The use of batteries in urban and rural households was very common; 63.6% and 70.2%, respectively. The technologies these batteries were used for tell us a lot about household energy needs and desires in Migori County (see Table 6). In urban households, flashlights were the most common battery-powered devices, used by nearly three-fifths of households. Radios were used by two-fifths of urban respondents, and remote controls by just over a third. In rural areas, radios were the most commonly used battery-powered device, with almost 90% of households using them. About three-quarters of rural households used flashlights.

It is noteworthy that rural households depend so greatly on radios. Although it is not clear for what, one might assume that news and entertainment are most important, and the low access to electricity in rural areas means television is not an option. However, as we discuss later, other community-based information-sharing activities are prevalent. Similarly, it makes sense that flashlights are important in areas where there is little electricity access. The common use of flashlights in urban areas, meanwhile – combined with the popularity of candles in urban households – reinforces the sense that the electricity supply may not be very reliable. The implications for policy and practice are that grid expansion must be complemented by investments in improving the reliability of electricity supply. In addition, solar lanterns and solar home systems may be viable options for powering radios and rechargeable batteries.

Table 6. Different uses of batteries

Category	Households using batteries	Use (%)					
		Radio	Clock	Flashlight	Lamp	Remote control	Other
Urban	63.6%	40.8%	10.2%	57.1%	6.1%	36.7%	0.0%
Rural	70.2%	88.2%	2.7%	74.7%	1.3%	1.7%	1.3%

Even more commonly used than batteries was kerosene, used by 72.7% of urban and 96.7% of rural households (see Table 7). Rural households tended to use kerosene only for lighting. However, urban households used kerosene for many purposes, the most common being lamp lighting – 87.5% used kerosene for this purpose, despite the prevalence of electricity access. Focus group discussion participants highlighted the problem of frequent and lengthy blackouts, which may explain the continued reliance on kerosene for lighting in urban grid-connected households. Cooking with kerosene was also fairly common in urban areas, with more than half of respondents using it for this activity. Around one-fifth of respondents used kerosene for starting firewood stoves, and the same share used it for starting charcoal stoves. The use of kerosene as a major cooking fuel in urban households is an important finding, as it shows it is a common alternative to charcoal and LPG in urban centres, although we have not analysed whether households are using any one fuel exclusively, or several in combination.

Households' annual expenditure on kerosene was extremely high, more than 4,200 KES. At that price, households could afford a solar lantern to replace kerosene. However, as noted before, most households pay for kerosene on a daily basis, and could not afford that kind of payment upfront. However, there are number of loan schemes (such as the M-KOPA Solar, an initiative by Safaricom⁹) to allow households to pay for technologies, such as solar lanterns, over a longer-term basis in order to offset this payment frequency issue. Upscaling the use of alternatives to kerosene for lighting (i.e. solar) and for cooking (i.e. LPG or clean cookstoves) is a high priority for Kenya. On the basis that household use of kerosene is associated with high levels of health-damaging pollutants and the risk of causing fires (WHO 2014), Kenya's new Energy Bill sets a target of eliminating kerosene use in households by 2022 (Government of Kenya 2015).

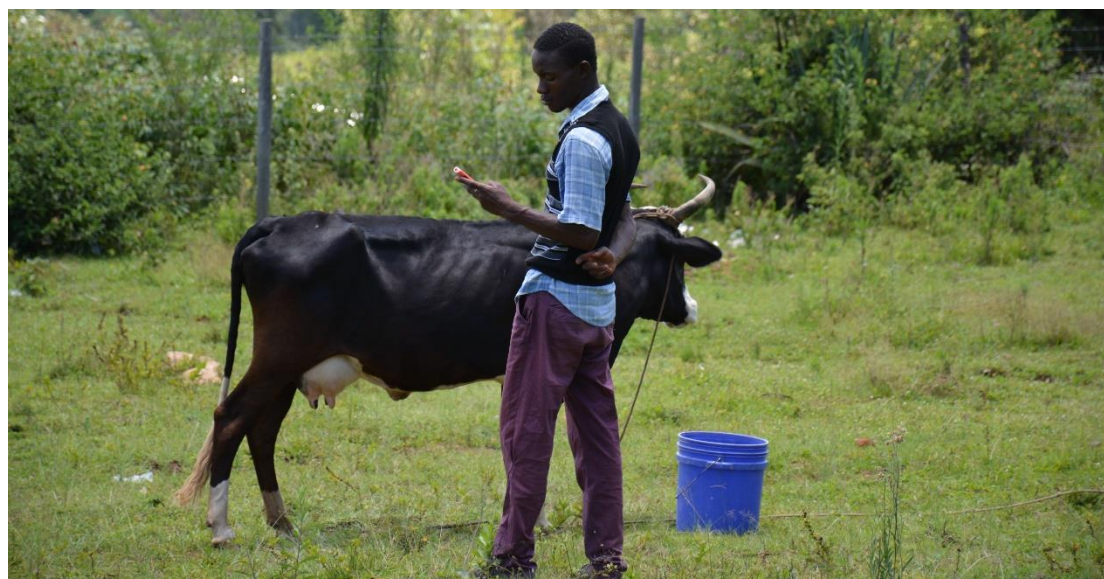
Household and focus group discussion participants appeared very interested in accessing cleaner forms of energy. They also expressed a willingness to pay, as long as the initial capital costs were manageable and flexible, although no specific figure was given. For instance, for electricity provision it was the initial connection cost that was problematic, but monthly bills were not deemed to be unaffordable. There was also a perception that a clean cookstove or solar lantern/solar home system would be expensive to buy upfront, but could be afforded if paid for over a longer term. Already, some women's groups had set up "merry-go-round" schemes to support such upfront payments. These schemes involve members contributing a small sum of money on a regular basis; each time contributions are collected, the total amount is paid out to one of the members, and members take turns to receive the payout.

Table 7. Different uses of kerosene

Household location	Households using kerosene	Use (%)			
		Start wood stove	Start charcoal stove	Lamp lighting	Cooking
Urban	72.7%	21.4%	19.6%	87.5%	53.6%
Rural	96.7%	4.9%	2.4%	95.8%	8.1%

Mobile phones are becoming ubiquitous across Africa, and the same is true in both urban and rural Migori County, as shown in Table 8. All urban households surveyed had at least one mobile phone. More than a third had one phone; nearly half had two, and a significant number had three, four or more phones. One can only speculate whether this was because of large

⁹ See <http://www.m-kopa.com/>



A man in Kuria East sub-county checks his mobile phone while tending to his cow. Photo by Oliver Johnson.

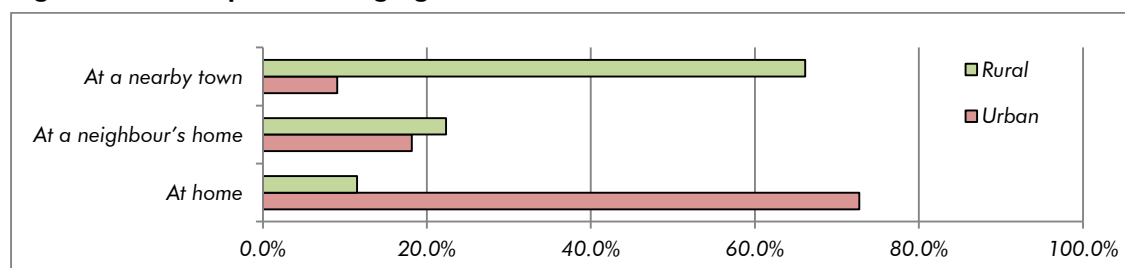
family size or was related to business activities. In rural areas, nearly 90% of households surveyed had at least one phone. Roughly one-third each had one or two phones; a small number had three or more.

Asked where they charged their phones, urban and rural households gave practically opposite responses, probably reflecting their relative electrification status. As Figure 7 shows, almost three-quarters of urban households charged their phone at home, but only 10% of rural households did. About two-thirds of rural households travelled an average of about 1km to charge their phones in nearby towns or marketplaces. About one-fifth of both urban and rural respondents charged their phones in neighbours’ homes. This suggests a number of business opportunities related to providing energy services in rural areas, particularly for charging mobile phones, which appear to be considered a necessity for all. At the same time, without access to such an energy service, many people are burdened by the need to travel and pay potentially higher costs in order to charge their devices.

Table 8. Mobile phone prevalence among households

Number of phones	Urban		Rural	
	Number	%	Number	%
0	0	0.0%	50	11.8%
1	27	35.1%	128	30.3%
2	34	44.2%	141	33.3%
3	10	13.0%	32	7.6%
4 or more	4	5.2%	25	5.9%

Figure 7. Mobile phone charging locations



4.4 Different perspectives on energy challenges

During the focus group discussions, we sought to gain a better understanding of the energy patterns in Migori County by asking groups to highlight the main energy challenges they faced under the status quo and in trying to adopt alternative energy sources.

Women's groups cited the high cost of electricity; the unreliable supply of firewood, especially in the rainy season; and the unresponsiveness of product suppliers when called upon. Women also noted being at risk of rape, snake bites, fatigue, and harassment by forest wardens during firewood collection, as well as health risks when cooking with firewood. They typically felt left out of energy planning processes except within their own households.

The youth groups were concerned about the health and pollution impacts of the fuels such as kerosene and firewood. They also reported high deforestation rates caused by the tobacco farmers during the tobacco curing process, which correlates with studies suggesting that the industry is causing the removal of half a million trees per year (Kibwage 2012). In addition, they expressed concern about the lack of involvement of the communities in policy-making and implementation, and about the current policies that hinder the full exploration of available energy resources, such as mini-hydro, solar, wind, etc.

In discussions with community leaders, we heard about prohibitive electricity connection costs, even when households are situated close to the grid, about low accountability of officials, and about lack of political goodwill in the energy sector. Participants also felt that energy development in the county had been very limited over a number of decades, thus stifling economic development and business opportunities. In addition, they said there was a lack of expertise and ownership of energy projects by the community, inadequate monitoring and evaluation of existing energy projects, and embezzlement of funds.

Key concerns raised by administrators included a lack of information, lack of cooperation among different stakeholders, and inadequate staffing to deal with energy issues in the county. They also were concerned about the high cost of electricity generation, which they said is due to the electrical utility's monopoly and subsequent lack of incentive to reduce the high installation and connection fees. In addition, they expressed concern about environmental degradation and resulting erosion, desertification and destruction of water catchment areas in the county.

A more detailed description of the challenges cited during the focus group discussions is presented in Table 9. These challenges pose real threats to implementation of the County Integrated Development Plan, as they may severely hinder achievement of ambitious development targets around energy access, environmental sustainability and poverty reduction. Efforts by the national government to subsidize grid connection costs (reducing the cost from 35,000 to 15,000 KES) and by the World Bank (from 35,000 to 1,060 KES) may boost access and lead to new business opportunities, but they will not address cooking demand, which is typically met by firewood, charcoal and kerosene.

One issue on which the focus group discussions did not provide clarity was the extent to which biogas technology is being adopted. Participants said biogas is being promoted by the Ministry of Energy, and noted that most households had one or two cattle, which could be enough for a small biogas digester. The Migori Energy Centre has the expertise to design and build digesters for families that are interested, but uptake has so far been limited. Therefore, further research may be required to ascertain the level of adoption of this technology and its viability in this county.

Table 9. Energy challenges cited in focus group discussions

Group type	Challenges
Women's groups	Electricity is expensive, often unavailable in the area; personnel do not respond on time; there are frequent blackouts and risks of accidents due to poor wiring.
	Collecting firewood is dangerous and time-consuming: risk of snake bites, rape, being chased by wardens.
	Use of firewood is hazardous: respiratory problems, eye irritations, burns and fire.
	Highly variable prices and limited availability of kerosene and charcoal.
	Many people within the community oppose alternative sources of energy and there is a lack of information on how to pursue potential options, such as biogas.
	Women are often left out of planning processes.
	Many alternative technologies are expensive, especially during initial installation. Loan schemes such as M-KOPA require credit, and poor harvests can hinder repayment. For solar panels, there is a risk of theft, since panels have to be exposed to the sun.
Youth groups	Use of fuels such as wood and kerosene causes health problems and pollution; tobacco farmers causing immense deforestation; lack of enough tree seedlings for planting.
	Difficult in transportation especially for the charcoal transporters due to poor infrastructure, energy infrastructure destroyed due to bad weather and consumer fatigue to rapid energy technology change.
	Constant blackouts, high monthly bills, children risk of electrocution by exposed wires.
	No community involvement in policy-making and implementation, insufficient budget for implementation and regulation; existing policies hinder exploitation/use of some sources of energy; exploitation of the common man through changing electricity billing rates.
	Risk of snake bites and injuries cutting trees; producing and transporting charcoal is very tiring. Being harassed and having to bribe the police and forest wardens.
	Children have no time to do their homework since they have to go collect firewood.
Community leaders	Burden for women and children (collecting, cooking, exposure to smoke) and always accused by men of misusing fuel.
	Lack of planning at the household level, and women prohibited from participating in tree planting by culture – hence gender inequality.
	Lack of information about forests and firewood and ignorance of the law.
	Diminishing supply of firewood and charcoal, lack of money and failure to delegate.
	Cooking is a challenge during the rainy season.
	Unfair distribution of energy sources such as electricity; impunity of officials; discrimination and disparities in the energy sector; lack of political goodwill.
	Lack of expertise and ownership of energy projects by the community; inadequate monitoring and evaluation of these projects; embezzlement of funds. Cultural resistance to proposed technologies. Environmental degradation due to deforestation, and thus erosion, environmental pollution and changes in water supply.
Administrators	Environmental degradation and hence erosion, desertification and destruction of water catchment areas.
	Lack of information, cooperation, enforcement and staff in the energy sector.
	Scarcity of trees, physically straining and risk of prosecution during collection and transportation, and exposure to danger (snake bites, rape, burns) and smoke.
	Resistance to new technologies if they go against local people's teachings, such as using human faeces for biogas generation.
	High generation costs due to monopoly in the electricity business.
	Application and connection fee is high, and monthly payments are inconsistent and expensive.



Focus group discussions with youth representatives in Awendo sub-county. Photo by Oliver Johnson.

5. AVENUES FOR PARTICIPATION IN ENERGY PLANNING IN MIGORI COUNTY

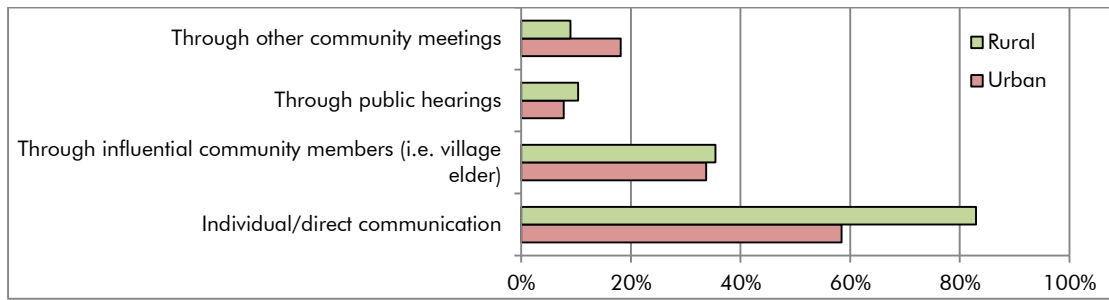
Through the focus group discussions, valuable qualitative data were gathered on potential avenues for citizen participation in energy planning in Migori County – both in general terms and for specific projects. This was supplemented by some basic survey data on whether and how people would like to be involved in energy planning. Input from such a wide range of stakeholders helped to establish a broader understanding of the energy challenges within the county and the diverse opportunities for addressing them. It is important to note that the focus group discussions themselves acted as a major participatory planning activity that forms a key component of a participatory energy planning process.

5.1 Household participation

From the survey, only 23% of the households had previously been involved in forums to discuss energy issues; 7% reported participating all the time. The participation in such forums by other households varied, with 51% participating regularly, 12% a few times and 29% only once. The households were also asked whether they would like to be involved in forums to discuss energy issues in future. Overall, 79% responded positively, suggesting an appetite for having their voice heard. Interest was notably higher in rural households: 84% compared with 58% of urban households. We might conclude that rural households – which are typically more remote and disconnected, both in political and electricity access terms – feel even more strongly about the opportunity to participate in discussions about energy.

Asked how they would like to be involved –through what channels or forums – the majority of both urban and rural households showed a preference for individual direct communication, such as through a survey (see Figure 8). The process of being asked directly for their opinion was considered to be valuable. However, surveys are costly, time-consuming and difficult to administer, so such individual direct communication is a limited option for financially constrained counties. We would still encourage annual or biannual energy surveys to uncover trends of how things are changing within the county, and to get data from individual households. Furthermore, the use of mobile phones might be one way to get smaller pieces of data on a more regular basis. Another option – the second preference among both urban and rural respondents – is to consult with influential community members.

Figure 8. Favoured channels through which to discuss energy issues



5.2 Community-level participation

The groups identified different roles they could play in county energy planning. Among the key roles identified by the women were educating women and children, raising awareness, mobilizing resources to promote energy technologies, and engaging in conservation activities. This identification is based on experiences emanating from past activities such as successfully supporting one another in school to buy solar lamps. K-Rep Bank and the Kenya Women Finance Trust have used women in the county before to raise awareness of their products.

Youths said they could work on the implementation of various projects (by providing manpower), do research and write proposals for development projects, and participate in afforestation and reforestation initiatives. The youths said they had stopped the construction of Mumbo Bridge in Suna Central in protest for being left out of the design and implementation of the project. They have also actively participated in Magina forest tree planting activities.

Community leaders said they could work on identifying community needs; education and mobilization of the community (for planning, implementation and information-sharing); monitoring energy activities to ensure implementation, or participating in the implementation; influencing decisions through the involvement of various groups such as youths, churches, women, and opinion leaders, and advocacy or activism, to catalyse action or incite communities to end projects if needed. Previously, they staged complaints in Kuria East to get electricity and it was brought to the community; they demonstrated for upgrading of poor hospitals, and as a result, a mortuary and X-ray machines were supplied; and the Bukoba Dam project was proposed by the community, built using the Constituency Development Fund; it is now benefiting the community.

The administrators identified their key roles to include providing civic education on alternatives sources of energy; being agents of regulation; enforcement and advocacy; data generation on energy sources, uses and demand; mobilization (to provide information for planning and implementation); monitoring the implementation, and participating in the implementation activities. They cited several examples of successfully playing these roles, such as the North Kadem Ward Development Fund Committee’s bursary fund for secondary schools and colleges and the Kaler Ward Self-Help Group on food security.

The successful experiences cited by the groups demonstrate the diverse knowledge and skills that already exist among stakeholders in Migori County and can be tapped when all are involved in the planning processes. However, in the group discussions, communities and their leaders indicated that they are not currently involved in the management of energy resources in the county. Their opinions were not sought during planning; they were not aware of policies and regulations governing the sector, or of budget allocations or their purpose, and they were not very sure of the presence and role of the Energy Ministry in the county.

All of the concerns described above are directly linked to a lack of citizen participation – there is a causal relationship. Too often, citizens are involved merely as the targeted beneficiaries. It is important to note that designing programmes to reflect local needs requires flexibility in both the approach and the roles of the various stakeholders. Certain barriers result from inequities that exist in the social fabric. Most of these inequities emerge due to traditional roles and norms, particularly in rural communities. The most prominent among these are the gender-based inequities that define the role and position of women in the rural community/household and places restrictions on their mobility, expression of views/opinions, and decision-making.

The participants suggested that they should be involved in the management of energy resources through the existing County structures. They indicated that they could be involved in the following manner:

1. Mobilize themselves through community leaders and implement civic education on what constitutes good energy resources in the villages; how they can be harnessed; the laws governing the sector; business value chains; and how to participate in planning, budgeting, implementation, and monitoring and evaluation.
2. Ensure devolution structures are working at the ward level and that community members are participating.

It is worth noting that, in order for interventions to be effective, they must not only facilitate meaningful participation by the citizens and community leaders, but also be based on local perceptions and past experiences, so they live up to the spirit of participatory decentralized planning, which means planning by the people.

The positions of Sub-County Administrator and Ward Administrator in the county government structure were recognized as critical to realizing development at the community level. This is attributed to the fact that they are in contact with community members all the time; they are accepted as the government's representation within communities; and they can easily mobilize people to participate in development projects. The administrators have effectively used the county structures in the wards for many purposes: for road-building, security, agriculture, classroom construction, food security, combatting female genital mutilation, HIV/AIDS and early pregnancies, water projects, promoting good fishing methods, and utilization of bursary funds. Officials appeared to understand the convening power of using existing county structures and expressed a desire to use them in future planning processes.

To achieve widespread success, county energy planning needs to be a flexible process, able to adapt to the conditions and desires of local people. County governments need to recognize that planning should be truly participatory, so as to understand the local rural energy context and capture the needs, desires and aspirations of citizens within the local community.¹⁰

¹⁰ For more specific ways in which the different groups would like to be involved and how they showed this, see Appendix B, available online at <http://www.sei-international.org/publications?pid=2903>.

6. CONCLUSIONS AND RECOMMENDATIONS

The study sought to understand household energy consumption patterns and explore avenues for participation in energy planning processes in Migori County. In doing so, it has illuminated the need for a framework for local participation at the county level as envisioned in the Constitution of Kenya (2010). Currently, planning remains ad hoc, done without citizen participation and based on very limited data. Our study provides some of the first elements of a participatory planning process by gathering baseline data on energy consumption and engaging with communities through focus group discussions to raise awareness and identify existing avenues for increasing citizen participation.

6.1 Overall conclusions

Section 2 presented our review of the literature on participatory planning and what it says about how different approaches meet users' energy needs; about barriers and enablers to citizen participation in energy planning; and about the conditions under which participatory planning works. Our research then aimed to inform the development of a broad framework for supporting energy planning in counties in Kenya.

The literature on participatory energy planning suggests that participation is a necessary, but insufficient, condition to meeting end users' energy needs. While greater involvement of beneficiaries in the planning process is important for substantive, normative and instrumental reasons, it may do little to change entrenched power dynamics that dictate how participation happens and the extent to which it affects the planning process. Hence, for bottom-up participatory processes to be more successful in meeting users' energy needs than top-down planning approaches, there needs to be an effective system for reflexivity and social learning among actors, so that iterative planning processes can be improved.

A number of participatory energy planning tools exist that point to key enablers of citizen participation. In our review of these tools, we drew out six key participatory activities that can help overcome barriers to and enable participation: stakeholder engagement and awareness creation; needs assessment; resource mapping; visioning and action planning; capacity-building; and implementation, monitoring and evaluation. These activities are not necessarily sequential, and some may occur throughout the planning process, such as stakeholder engagement and awareness creation.

Several of these activities formed the basis for the empirical work in this study. By seeking to understand household energy consumption patterns and explore avenues for participation in energy planning processes in Migori County, we undertook action research. While generating important data on how energy planning could include communities, we also engaged with stakeholders; raised awareness of energy issues and options; generated data on energy needs; mapped current resource use; and engaged community members in developing a vision around energy futures. We also built the capacity of research assistants, who we hope might find a place in the energy department of the county government.

Since the insights from all of these activities will inform the next energy planning process, it can be argued that the partners in this project did actually engage in participatory energy planning. However, we also believe that a more structured approach – i.e. further embedding it into county government activities – is necessary for this participatory energy planning framework to be properly used. The Migori County government's cooperation and participation in the entire project shows a willingness to address some of the barriers that hinder local citizen participation in the development of the energy plans. But there is a need

to further engage with the county to ensure that a framework is further refined and operationalized.

The data generated on energy consumption and avenues for participation in energy planning processes suggest some interesting patterns that require further investigation. For instance, why is the use of candles so prevalent in urban areas? Is it because they are more easily accessible and/or cheaper than in rural areas? Or is it because the electricity supply – which is largely confined to urban areas – so candles are often needed during blackouts? In our interviews and focus group discussions, we heard common complaints about poor electricity service, so the latter reason is quite plausible. Another important point to make – and one that will benefit from further analysis of covariance in our data – is that simply focusing on increasing access to electricity for the 88% of households without grid connections will not address the issue of charcoal and firewood use. These biomass fuels are typically used for cooking, whereas electricity is not. The county has a mandate to deal with these fuels – although in tandem with neighbouring counties where resources come from.

There appear to be a number of existing channels through which communities are able to have their voices heard. We believe these can and should be used for the purposes of involving communities in energy planning within counties. It is clear that ward administrators have a strong convening power and are able to bring together community representatives to engage in dialogue. There are a number of groups to which community members belong – youth groups, women’s groups, etc. – that have developed strong support and information-sharing networks. Empowering these groups to engage in energy issues opens up a number of opportunities for improving energy planning and implementation of energy projects.

6.2 Recommendations

There is a need for further engagement with the Migori County government to ensure that a framework for local participation is developed and tested within the county. We will also be disseminating the results of this study in other counties, and seeking funding to engage more substantially on energy planning issues.

There are number of areas in which county governments and the national government – in particular the entities responsible for energy – could act to improve participation in energy planning at the county level:

- County governments should **take advantage of increasing interest within communities to engage on energy issues**. The capacity of ward administrators to convene discussions on energy issues should be utilized through regular structured engagements.
- County government should **use existing mechanisms for communities to have their voices heard**, so as not to duplicate processes. Women’s groups, youth groups and others already have established channels of communication and support networks, which can and should be further empowered.
- County governments should seek to **further develop their capacity to deal with energy issues**. This includes hiring new staff and training new and existing staff. Communities themselves could provide human resources for the purposes of participatory energy planning.
- **Directors of Energy in all counties should set up a forum to discuss and share experiences**. Since they are all working in a relatively new system, this knowledge exchange can help them to learn and support one another.

- **Improve coordination between county governments and the national government's Energy Centres.** Awareness-raising activities would be a suitable starting point for building a strong partnership, since Energy Centres have the capacity to demonstrate different energy technologies, and county governments have strong links with community groups that can benefit from such demonstrations and act as knowledge bridges to the wider community.
- If the national government is keen on ensuring that governance and planning is participatory, it must **allocate adequate resources for a participatory planning process**, so that communities can legitimize these counties' master plans that are feeding into the national energy plan.

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