International Journal of Sustainable Energy and Environmental Research
2018 Vol. 7, No. 1, pp. 35-43
ISSN(e): 2306-6253
ISSN(p): 2312-5764
DOI: 10.18488/journal.13.2018.71.35.43

POLITICAL ECONOMY AND STAKEHOLDER PERSPECTIVES ON INCLUSIVE LOW-CARBON ENERGY TRANSITION: CASE OF KENYAN RANGELANDS

Angela Mungai[1+]
Richard Mulwa[2]
Stephen Anyango[3]

[1,2,3]*Center for Advanced Studies in Environmental Law and Policy University of Nairobi, Nairobi Kenya*
[1]*Email: mungai22@gmail.com Tel: 254 726673468*
[2]*Email: richard.mulwa@gmail.com Tel: 254 710561626*
[3]*Email: s.obieroanyango@gmail.com Tel: 254 722849936*

(+ Corresponding author)

Article History
Received: 19 June 2018
Revised: 24 July 2018
Accepted: 27 July 2018
Published: 1 August 2018

Keywords
Off-grid
Low-carbon
Energy
Actors
Household
Political economy
Policy
Kenya.

ABSTRACT

Kenya, among other developing countries, is challenged by low access to clean power, particularly among households located in remote rangelands of the country. This study sought to evaluate the role and perspectives of energy sector actors in the transition of low-carbon off-grid technologies to households in Kenya as an alternative to the national grid for powering isolated low-income communities. To this end a key informant survey was conducted, involving State and non-state energy sector actors to assess the level of capacity, policy inclusiveness, constraints and delivery of clean off-grid energy technologies to rural households. Key findings revealed that County Government and non-state actors are largely excluded from clean energy planning for off-grid communities. In addition, women, within the framework of women's groups are strong players in this sector and have a high potential to expand clean energy access to off-grid areas. It was also found that despite the Kenyan Government commitment towards a green economy, a change in policy direction would be necessary to ensure a multi-stakeholder planning approach for increased private investment and inclusive access to clean energy.

Contribution/Originality: This study is one of the very few studies investigating stakeholder perspectives and policy gaps constraining clean energy transitions into remote Kenyan rangelands, indicating that key constraints are economic, cultural and under-inclusion of local government and indigenous communities, particularly women, in national off-grid clean energy planning and implementation.

1. INTRODUCTION

Clean energy has a significant contribution to sustainable development yet just over a half of Kenya's population has electricity access with less than 40% rural access to clean energy (World Bank, 2017) constraining development and exposing rural households to health risks from indoor pollution, largely affecting women and children (World Health Organization, 2016). Despite the scale-up of grid-based rural electrification through existing legal reforms and national programs, there will be a large portion of unreached rural households, particularly in rangeland settings, due to high poverty levels and the nature of remote scattered settlements (International Finance Corporation, 2012) calling for decentralized or off-grid alternatives in supplying clean power to unreached households. To this end, the role and perceptions of key energy sector actors is critical towards the effective delivery and implementation of decentralized clean energy programs to off-grid communities in achieving a low-carbon economy.

Kenya's energy policy and law is currently under review in line with its Vision 2030 and the 2010 Constitution which has changed the governance structure by adopting National and County governments. Key institutions governing the electricity sub-sector are the Ministry of Energy and Petroleum. The electricity sub-sector comprises of the Kenya Generating Company (KenGen) which principally deals with power generation and Kenya Electricity Transmission Company (KETRACO), responsible for developing the national transmission infrastructure. Legislation also provides for the Geothermal Development Company (GDC), whose principle responsibility is to accelerate the development of geothermal resources, and a number of independent power producers (IPPS) (Energy Regulatory Commission, 2018). The Rural Electrification Authority (REA) is responsible for rural electrification, under the Energy Act No 12 of 2006, and it works closely with the Kenya Power and Lighting Company (KPLC), a state-controlled firm which owns and operates most of Kenya's electricity distribution infrastructure and retails electricity directly to consumers. Other government agencies involved with rural electrification are the Energy Regulatory Commission (ERC), established under the Energy Act of 2006 to regulate the energy sector, and County Governments, whose role is specified under the new constitution.

Institutional agencies responsible for licensing and giving permits are the Energy Regulatory Commission and County Governments. The National Environment and Management Authority (NEMA) established under the Environmental Management and Co-ordination Act (EMCA) of 1999 (revised, 2015), oversees the environmental compliance of projects. The Law also requires that clean energy installations must obtain approval of the Environmental Impact Assessment (EIA) by the National Environment and Management Authority. However, the licensing process is perceived to be unsuitable for the household renewable off-grid sector due to the high licensing fees and lengthy approval processes, causing a large number of private firms to operate without permits (Economic Consulting Associates, 2014). The Kenya Bureau of Standards (KEBS) provides minimum quality standards and installation guidelines for off-grid installations; however the market supply of renewable household energy products is largely unregulated and fails to meet acceptable quality standards (IFC, 2012).

The 2010 Constitutional provision for the National Government's role in this sector is energy policy while the County Government is responsible for planning and development within their jurisdictions, as well as electricity regulation and distribution. Despite the fact that the Constitution provides for the roles of two levels of government, there are "operational uncertainties as to the specific areas of responsibility between the two levels of government" (ECA, 2014). In addition, the interests of local communities in the planning and policy making stage are not clearly specified, when it comes to the provision of clean, decentralized power for remote households (Mutua, 2014).

Various studies have addressed the key issues governing the expansion of low-carbon energy technologies through planning, delivery and regulation. According to Bhattacharyya and Timilsina (2009) the top-down delivery model is driven by State agencies while the decentralized off-grid model, or bottom-up approach, is usually run by private developers, non-governmental organizations, cooperatives and community groups. "Ideally a two-track approach is needed to support the expansion of rural electrification, but there is a lack of clarity on who will be responsible for regulation of renewable off-grid power for unreached households". Options include Central Government agencies, Local or County Government and civil society groups.

Blum *et al.* (2015) analyses the diffusion rate of electric mini-grids. Findings point to "mismatched institutional goals and constrained flows of resources between agencies" as key causes for low off-grid power diffusion, thus calling for a harmonized national and socially viable electrification strategy. Elder *et al.* (2015) assesses the factors influencing the adoption of renewable energy from individual household perspective. Study results indicate a relative advantage of renewable decentralized technology given a viable financial system for adopters and the need for collaboration between state and non-state agencies with local communities, as "lack of understanding of local communities can lead to failures in diffusion attempts" Yadoo (2012) analyses the impact of renewable off-grid power delivery models on the welfare of rural communities. Findings reveal that planning which involves a "critical

evaluation of social and economic risks and benefits, in consultation with stakeholders", can build resilience to internal and external shocks.

The objective of this study, therefore, was to assess the role and perspectives of key energy sector actors in the transition of low-carbon energy to the household off-grid sector and identify policy gaps that need to be addressed. To achieve this, the study assessed the level of stakeholder awareness of renewable energy policy in line with off-grid clean energy, evidence of clean energy delivery to remote off-grid areas, funding sources, level of participation in national energy policy and noticeable regulatory gaps.

2. METHODOLOGY

Selection of respondents for key informant interviews was carried out after carefully mapping the key actors that would be involved in the study. This was achieved with the use of a Power-Interest Grid where potential energy sector stakeholders were mapped according to power, impact, support and attitude, in order to identify high-impact stakeholders (Eden and Ackermann, 1998). Interactive informant interviews were carried out with the use of an interview checklist. Participants included an official from the Rural Electrification Authority (REA), representing a State rural energy supply agency. This institution was selected because it is the principle State player in Kenya's Rural Electrification Master Plan as proscribed in the Energy Act No. 12 of 2006. Also interviewed was an Administrator from the Laikipia County Government that has jurisdiction over the targeted study area. This institution was selected as prominent in the provision of clean energy to rural households because the role of County Governments in the planning and regulation of clean energy supply in their area of jurisdiction is clearly enshrined in the Constitution. A Project Officer from a Non-governmental organization (NGO) World Vision International, was selected as prominent civil society actor because the institution has a significant presence in remote parts of Kenya by providing solar-powered clean water and off-grid energy products to households. In addition an Electrical Engineer representing a private developer in the energy sector was selected due to the key role of private investors as active players in the off-grid market, as recognized by the Government of Kenya in its Private Sector Partnership Delivery under the 2012 Feed-in Tariff Policy. The role of local communities was considered important as they are the principal beneficiaries and players in the shaping of clean energy delivery and policy as enshrined in the Kenya Constitution 2010. The study therefore, selected a community elder from the Koige village in Laikipia North, the targeted study area.

The principal line of enquiry included the general level of awareness of energy policy in line with off-grid clean energy development, participation in clean energy delivery, factors constraining rural household access to clean energy, funding sources for clean energy development, the level of participation and perceptions regarding policy gaps in National clean energy policy formulation and programs, as discussed in detail.

3. RESULTS AND DISCUSSION

3.1. Awareness of National Energy Policy in Line With off-Grid Energy

The extent of knowledge about national clean energy policy and programs provided a framework for examining the involvement and capacity of actors in the delivery of clean energy. Findings revealed that the State rural energy supply agency, Rural Electrification Authority (REA) is fully aware of National Energy Policy in line with clean energy provision, as outlined in the Kenyan Constitution which recognizes a clean and healthy environment as a basic right for all Kenyans, and the Vision 2030 Strategy which aims to transform Kenya in to a newly industrializing middle-income country, providing a high quality life to all citizens through infrastructure transformation and expansion of access to clean energy. The State agency also acknowledged the Sessional Paper No.4 which provides a framework for its role in rural electrification, and the Kenya's Energy Act of 2006, which makes a provision for the mitigation of climate change through energy efficiency and promotion of renewable energy. The State agency also cited awareness of the proposed Energy Bill of 2015 which aims to ensure the

provision of adequate, quality, sustainable cost-effective and affordable supply of clean energy, and the National Digital Learning Program which aims at accelerating the provision of universal clean energy to primary schools in all counties through grid and off-grid power supply.

The County Government informant acknowledged the 2010 Kenya Constitution which spells out its role in planning and regulation of clean energy development within its jurisdiction, supported by the proposed Energy Bill of 2015, which aims to further clarify the roles of the National and County Governments in relation to clean energy delivery, However, the representative did not have adequate knowledge about national programs and strategies to expand clean energy to rural households through grid and off-grid projects, implying that County Governments are not strong participants and thus lack the required technical capacity in clean energy delivery to their area of jurisdiction,. The non-governmental official was familiar with provisions of the Constitution and Vision 2030 which aims to provide universal clean energy and the Last Mile Connectivity Project which is geared towards expanding electricity access to Kenyans across the country, targeted to reach over 1.5 million Kenyans through grid and off-grid supply programs. The private developer claimed active participation in the Independent Power Project (IPP) Procurement Program, where the Kenya Power and Lighting Company (KPLC) purchases power from independent power producers (IPPs). He also acknowledged the Last Mile Connectivity Project and the Feed in Tariff Policy (FiT) revised in 2012 which provides independent power producers with standard tariffs and guidelines for connecting small scale renewable energy to the grid. The community leader was unaware of any national energy policy and programs in line with off-grid clean energy development, implying a strong need for awareness programs at community level.

3.2. On-Going Rural off-Grid Energy Delivery Programs

To assess the extent of clean energy delivery, as summarized in Table 1.0, enquiries were made regarding the role of agencies, in line with legal provisions, in delivering clean energy to off-grid institutions, households and community groups.

Table-1. On-going rural off-grid clean energy delivery programs

Institution	Legal provision	Reported clean energy programs
Rural electrification authority	Rural electrification under Energy Act No. 12 of 2006	Installation of grid, mini-grid and stand-alone installations for institutions and households
County Government	Planning and development, licensing, permits, regulation and reticulation within their jurisdiction	No active clean energy programs reported. Performs licensing approvals for program sponsors.
Non-governmental organizations	Public policy participation Article 35 of Constitution	Training and delivery of solar powered boreholes and clean cook stoves
Private investors	Private Sector Partnerships and Delivery under FiT Policy (2012)	Delivery to off-grid institutions, households and community groups
Community leader	Public policy participation Article 35 of Constitution	Self-help household installations

Source: Survey data

The Rural Electrification Agency under the Master Plan for Rural Electrification, stated the key informant, has "powered over 12,000 institutions nationwide, through grid and off-grid electricity and over 200,000 off-grid rural households are currently benefitting from clean energy supplied through solar panels and small hydro projects". Through the Primary Schools Electrification program, REA reported that they have "powered 95% of primary schools through grid and off-grid power installations". This project has also increased clean energy access to businesses and households that are located near the schools.

The Non-governmental informant reported that they have installed solar-powered clean water boreholes in Northern Kenya, "which has benefitted over 3000 residents and a local school, while providing informal training for local artisans to maintain the equipment". In addition the NGO provides subsidized clean energy cook stoves, coupled with training on clean energy use, to residents through the Clean and Energy-Efficient Cooking Stoves (CEECS) as an initiative to improve child and maternal health, targeting areas where deforestation is severe, such as Northern Kenya and Solai, Rift Valley. The private developer stated they are active in selling solar photovoltaic (PV) and rechargeable instruments to off-grid institutions, households and community groups country-wide, but claimed that access to remote households is limited due to infrastructure constraints. The County Government informant stated that no county-sponsored clean energy delivery program for off-grid households or institutions were in process, however, they admitted that licensing approvals have been given to private and non-governmental project sponsors. The community leader noted that a few households in the local community have installed solar panels through self-help initiatives.

3.3. Sources of Funding for Clean Energy Delivery

The Rural Electrification Authority, reported by the informant, is a principal recipient of State funding for rural clean energy delivery, through budgetary allocations. In addition REA receives funding from international development partners. Disclosures from the County Government informant revealed that they did not receive direct financing from any source for clean energy delivery. However the official stated that they provide indirect support through partnership funding to REA and non-governmental organizations in order to facilitate clean energy delivery and training programs within their jurisdictions. Non-governmental organizations, according to the key informant, rely primarily on direct funding from donors and development partners, carbon financing and remittances from community groups for clean energy products. The principle source of funding for private developers in the delivery of clean energy to rural areas is banks, remittances from clients and investment capital. The private developer also stated that they receive a significant amount of remittances from women's groups for clean energy products, implying the strong potential of women to influence the rural upgrade to clean energy. The principle source of funding for households, according to the community leader, is self-help groups and personal household savings.

3.4. Factors Constraining Clean Energy Delivery to Remote Households

Informants were questioned about their perceptions concerning key barriers to clean energy access by remote households. Funding constraints was highlighted as a significant factor constraining clean energy delivery to households due to the high capital requirement for clean energy products, especially biogas co-generators, wind turbines, cook stoves and solar PV accessories, including backup storage units and power regulators. This claim was supported by the County Government informant who stated that they do not receive devolved funding for clean energy development. The private developer noted that the cost of finance is high due to prevailing interest rates, constraining their delivery to rural households at a price which was affordable to them. The community leader noted that clean energy products are unaffordable for most households, leading to reliance on high-carbon fuels.

Limited business capacity was also cited as a constraint by key informants. The REA informant noted that the "business motive to invest in clean energy among remote, rural communities is unworkable." Non-governmental organizations were challenged in supplying clean energy products to remote rural communities due to the low business capacity in these areas, leading to high logistical costs in the delivery of components from urban areas. The private developer supported this claim, stating that low investment capacity and poor infrastructure increases the cost of doing business in remote rural areas.

There was consensus among the respondents regarding the low intermittent income of deprived households as a constraint to clean energy access. The Rural Electrification Agency informant stated that consumers do not have the financial capacity to pay for clean energy access, creating a delivery constraint, especially in remote parts of the country. The private developer noted the low household income among remote communities, which is below a dollar a day, as a barrier to investment in clean energy. The NGO informant observed that "households tended to default on low-interest loans for the supply of clean energy cook stoves due to income constraints, especially during the dry season". The nomadic culture of pastoralist communities is also a constraint to clean energy access as households are difficult to identify and reach for clean energy programs. The REA informant agreed that programs designed for remote households in arid and semi-arid areas such as Laikipia North and large parts of Northern Kenya are difficult to implement because households are inaccessible, especially during the dry season. This constraint was supported by the NGO informant who noted that the extended drought was constraining access to a large number of households who had moved away from the area.

Lack of rural household awareness about clean energy and "cultural mindset regarding traditional fuel" use was observed as a significant constraint by the County Government representative, thus households do not perceive clean energy access as a priority in improving their standards of living. The NGO informant concurred that the cultural mindset of rural households is a barrier, claiming that users, when supplied with clean energy cooking implements at little or no cost, prefer to continue using high-carbon fuels for daily use, "while reserving clean energy products for guests or special occasions". An additional constraint to clean energy access is poor market access by remote rural households due to geographical barriers, poor roads and communication infrastructure. This was supported by the community leader who noted that "residents and local business operators have to travel long distances to the nearest town in order to send documents or parcels". Political apathy at County Government level was mentioned as a barrier by the NGO informant, as it was perceived that expansion of clean energy access is not highlighted as a development priority at County level.

3.5. Inclusiveness of Actors in Clean Energy Policy and Planning

In order to assess the level of inclusiveness in clean energy policy and planning, informants were questioned about their participation in the national policymaking process. The Rural Electrification Authority reported that all stakeholders are involved in clean energy policy and planning. However this perception was not shared by the County Government official, who claimed that they were not involved in clean energy policy and planning. The private sector and community actors also concurred that they are left out of clean energy policy and planning. Non-governmental organizations, however, claimed partial involvement in national policy-making through lobbying actions for increased subsidies and emission taxes to expand inclusive access to clean energy. This disconnect between the State agency and local actors in policy inclusiveness implied that only a token number of stakeholders are engaged in clean energy policymaking and planning, and a significant proportion of actors are left out due to lack of interactive public engagement and stakeholder awareness.

3.6. Barriers to Stakeholder Participation in National Clean Energy Policy and Planning

Energy sector actors, apart from the State Authority, claimed that they do not participate effectively in clean energy policy and planning. Varied perceptions were given regarding possible barriers to stakeholder participation. The State agency pointed towards a lack of capacity and knowledge gap among stakeholders, constraining them from effective participation at National level. The County informant claimed that National Government excluded County representatives during national energy planning and policy-making. Perceptions by the non-governmental informant revealed a general State unresponsiveness to lobby groups, while the private investor representative cited a failure by Central Government to reach remote communities at grass-root levels. As a further observation, apathy by media agencies towards rural clean energy policy and planning was observed as a noticeable barrier to

communication between State and stakeholder groups, while the community leader cited communication and language barriers as a key constraint to community participation at national energy planning and policymaking.

3.7. Gaps in National Clean off-Grid Energy Policy and Programs

Opinions were sought from informants about noticeable gaps in national clean energy policy and programs. Lack of subsidies for rural household access to clean energy was considered as a significant policy gap by non-governmental, private and community sectors. Respondents from the County Government and non-governmental sector were concerned about the lack of adequate stakeholder participation in clean energy policymaking and planning. Lack of clean energy awareness among rural households, especially those located in remote areas was noted as a concern by State energy and County representatives. Concerns were also noted by informants from the non-governmental and private sector that low private sector investments in rural clean energy as well as lack of robust public-private partnerships are policy gaps that needed to be addressed.

With regard to institutional gaps, concerns were raised by the private developer and non-governmental official about poorly coordinated institutions in the energy sector and lack of devolved funding targeted specifically towards clean energy expansion to respective County Governments. This is compounded by the "low-priority status given to clean energy development at County level", a concern noted by the NGO informant. In addition, it was noted that devolved funding in general is un-coordinated and underutilized, "while mismanagement in the allocation of funds" was cited as a policy gap that needed to be addressed. The concept of carbon financing, cited the non-governmental informant, is not fully exploited at national and county level, yet the funds could be made available to expand rural access to clean energy.

3.8. Suggested Reforms for off-Grid Clean Energy Expansion

As policy gaps were identified by respondents, they were requested to suggest adequate policy measures to reduce the gap and accelerate access to clean energy to remote rural areas. Suggestions from key informants on how policy gaps could be reduced were varied. The REA informant noted that capacity building for stakeholders, especially local communities, is important, in order to increase awareness of the benefits of clean energy and the channels available in order to participate more fully in policy-making. The private developer noted that more viable private investment models are needed for expansion of clean energy in remote parts of the country in order to alleviate supply-side constraints and reduce costs in the delivery of products and stand-alone installations. Targeted devolved funding towards clean energy development, as agreed by County and private sector informants, would also contribute towards accelerated access by unreached households. The NGO informant noted that subsidies targeted towards rural households or community groups, whose incomes are low and intermittent, is a key driver towards clean energy expansion.

Carbon financing, cited by the non-governmental informant, needs to be exploited by public and private sector actors in order to "reduce funding constraints for clean energy expansion, and allow funds to trickle-down to low-income households" through policy mechanisms. Due to the health hazards posed to households by the use of high-carbon fuels, compulsory programs, which include carbon taxes, should be implemented for rural household installations of clean cooking and lighting products

For effective policy actions, community leaders and households should be engaged by National and County leaders to assess their energy access needs and challenges, while more awareness programs and clean energy training should be conducted to correct cultural and traditional mindsets and enhance household willingness to adopt modern technologies for cooking and lighting. Finally, the role of media in the national dissemination of information about clean energy and carbon financing, as agreed by informants from the non-governmental and private sector, is vital towards accelerated access to clean energy by off-grid rural households.

4. CONCLUSION

The rural off-grid low-carbon energy sector at household level is largely dominated by private and non-governmental organizations that bear the economic risks of clean energy delivery to remote locations, with women, within the framework of women's groups, being active players. However, non-state actors including community leaders are largely excluded from national clean energy planning and policy. Funding for clean energy diffusion is not devolved to County level and does not trickle down to remote energy deprived households. In addition local government officials are also excluded from clean energy policy and thus lack the technical capacity to execute the required regulatory functions and deliver clean energy to off-grid households. Thus, in support of studies by Bhattacharyya and Timilsina (2009) and Blum *et al.* (2015) there is a need for a multi-stakeholder, consultative, low-carbon off-grid energy planning approach involving National, County level regulatory authorities and energy sector actors, including women and community leaders, to accelerate the diffusion of clean off-grid energy to remote, deprived households. The role of County Governments in the delivery and regulation of the household off-grid energy sector, provided for in the 2010 Constitution, needs to be implemented and expanded to enhance the diffusion of technologies to low-income households. This includes the provision of clean energy grants, enforcing the quality control of home energy products and sponsorship of clean energy awareness programs for rural communities.

To attract private investment and development financing in rural off-grid development, the political space for civil society and pressure groups, including the media, should be expanded to enhance the accountability and transparency of public energy sector institutions. In addition, a framework for light regulation in the area of licensing and approvals should be extended to business operators within the clean off-grid household sector. This includes a one-stop business registration procedure to fulfill licensing and regulatory requirements. To enhance clean energy awareness and technical capacity, training and awareness programs should be provided, through public-partnership initiatives with the media and vocational institutions, to fill the knowledge gap and fulfill the country's targets towards a low-carbon economy.

Funding: This study received no specific financial support.
Competing Interests: The authors declare that they have no competing interests.
Contributors/Acknowledgement: All authors contributed equally to the conception and design of the study.

REFERENCES

Bhattacharyya, A. and G. Timilsina, 2009. Energy demand models for policy formulation: A comparative analysis of energy demand models. Policy Research Working Paper 4866. Washington DC: World Bank Development Research Group.

Blum, N., C. Bening and T. Schmidt, 2015. Analysis of remote electric mini-grids in Laos using the technological innovation system approach. Zurich: ETH.

Economic Consulting Associates, 2014. Project design study on renewable energy development for off-grid power supply in rural regions of Kenya. UK: ECA.

Eden, C. and F. Ackermann, 1998. Making strategy: The journey of strategic management. UK: Sage Publication.

Elder, J., F. Mutsaerts and P. Sriwannawit, 2015. Mini-grids and renewable energy in rural Africa: How diffusion theory explains adoption of electricity in Africa. Energy Research and Social Science, 5: 45-54. *View at Google Scholar | View at Publisher*

Energy Regulatory Commission, 2018. Renewable energy portal. Retrieved from https://www.renewableenergy.go.ke/index.php/.

International Finance Corporation, 2012. Lighting Africa: Policy report note, Kenya. Washington DC: IFC.

Mutua, E., 2014. Report on the policy, legal and regulatory framework in the extractive industry in Kenya. Retrieved from http://www.americanbar.org/content.

World Bank, 2017. Access to electricity rural. Retrieved from https://data.worldbank.org/indicator/EG.ELC.ACCS.RU.ZS.

World Health Organization, 2016. Indoor air pollution and health. Fact sheet no 292. Geneva: WHO.

Yadoo, A., 2012. Delivery models for decentralized rural electrification: Case studies in Nepal, Peru and Kenya. UK: International Institute for Environment and Development.