

Overview of Energy Efficiency and Conservation Status in Narok County, Kenya

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1 Background

This blog provides an overview of energy efficiency and conservation (EE&C) status and key recommendations for Narok County carried out during the development of the County Energy Plan (CEP). Energy Efficiency (EE) is target 7.3 of SDG7 which seeks to double the global rate of improvement in energy efficiency by 2030.¹ The International Energy Agency (IEA) calls energy efficiency the “first fuel” in clean energy transitions, as it provides some of the quickest and most cost-effective CO2 mitigation options while lowering energy bills and strengthening energy security.² EE also contributes to improved household health and safety.³ At COP 28 last year, 130 Heads of States and Governments, in the [Global Renewables and Energy Efficiency Pledge](#), committed to work together in order to collectively achieve the target 7.3 and to put the principle of energy efficiency as the “first fuel” **at the core of policymaking, planning, and major investment decisions**⁴.

In Kenya, the government in cooperation with several partners, is promoting energy EE&C in multiple ways, including but not limited to enactment of regulations, and calling for its integration in energy plans. The Energy Act 2019, for instance, recognizes the county governments’ role in energy planning including EE&C. Part II section (3) mandates each county government to develop county energy plan (CEP) in respect of its energy requirements. Part VIII of the Act, section 193-196, further proposes specific roles of county governments in promoting energy efficiency and conservation measures.

The energy planning work in Kenya is guided by the Draft Integrated National Energy Planning (INEP) Framework, 2021.⁵ The Framework lists EE&C as a focus area. For the CEPs, the priority areas in the assessment of EE&C are listed as:

- County Public Buildings
- Households
- County Institutions
- Commercial, Industries and transport

The assessment of EE&C in Narok County was based on the above areas. Key policy, regulatory framework as well as the standards on EE&C provided a benchmark for analysis.

The rest of this [blog](#) flows as follows. First, it mentions some of the key policy, regulatory framework and standards that provided a benchmark for EE&C assessment in Narok County. Secondly, it provides a brief analysis of the priority sectors with regards to the key policy, regulatory and standards. Thirdly, it highlights some of the challenges related to EE&C and finally identifies priority recommendations or interventions

¹ [GOAL 7: Affordable and clean energy | UNEP - UN Environment Programme](#)

² [Energy Efficiency - Energy System - IEA](#)

³ [Issue Brief - Integrated Energy Efficiency and Health Services.pdf](#)

⁴ [COP28: Global Renewables And Energy Efficiency Pledge](#)

⁵ [INTEGRATED NATIONAL ENERGY PLANNING FRAMEWORK - 6-5-2021-2.pdf \(seta-kenya.org\)](#)

that the County, citizen, and development partners should work collaboratively on to improve the EE&C situation in the County.

2 Key Energy efficiency policy and regulatory framework in Kenya

In Kenya, besides the 2010 Constitution and Energy Act 2019, EE&C is regulated through various National Regulations and Policy that include:

- The Energy (Energy Management) Regulations 2012 (to be revised) that institutionalized EE&C policies in designated facilities and had provisions for conducting energy audits and implementing recommendations of the audit to realize 50 % of projected savings.⁶
- The Energy (Appliances Energy Performance and Labelling) Regulations 2016 which enforced Minimum Energy Performance (MEP) standards for selected appliances amongst other regulations and policies⁷
- The Kenya National Energy Efficiency and Conservation Strategy (KNEECS), 2020⁸, established under the SE4ALL Action Agenda, to create a road map to realize reduction of the national energy intensity by 2.8% per year and realizing a 30% emission reduction by 2030 relative to Business as Usual (143 MtCO₂e) with a focus on Households, Buildings, Industry & agriculture, Transport and Power utilities.
- The Climate Change Action Plan 2018–2022 has prioritized enhancement of EE&C as one of the priority actions to mitigate climate change in the country⁹.

3 Energy efficiency standards

The following Table 3.1 highlights standards that provided a benchmark in the analysis of EE&C in Narok County. Except for the Kenya Green Building Society (KGBS) Guidelines, these standards are extracted from the policy and regulatory framework mentioned above.

Table 3.1 Energy Efficiency Standards considered in Narok County

Sector	Standard
County Public Buildings	<ul style="list-style-type: none"> ▪ Kenya Green Building Society (KGBS) Guidelines <ul style="list-style-type: none"> ○ Passive building envelope design ○ High efficiency appliances ○ Low-flow water fixtures ○ Water harvesting & recycling ○ Renewable energy source (PV & SWH) ▪ Excellence in Design for Greater Efficiency (EDGE) ▪ Green Buildings App for benchmark improved case ▪ EUI (with efficient fixtures) <ul style="list-style-type: none"> ○ Offices: 25 kWh/m²/yr¹⁰ for Narok ○ Hospital: 175 kWh/m²/yr¹¹ for Narok
Households, Institutions, Health Centers and MSME	<ul style="list-style-type: none"> ▪ Kenya National Energy Efficiency and Conservation Strategy (KNEECS), 2020 <ul style="list-style-type: none"> ○ High efficient lighting & appliance

⁶ [Microsoft Word - THE ENERGY ENERGY MANAGEMENT REGULATIONS, 2012 \(invest.go.ke\)](https://invest.go.ke/energy-act-2019/energy-management-regulations-2012)

⁷ [EnergyAct_Appliances_Energy-Performance-and-Labelling_Regulations_2016.pdf \(epa.go.ke\)](https://epa.go.ke/energy-act-2019/appliances-energy-performance-and-labelling-regulations-2016)

⁸ [kenya-national-energy-efficiency-and-conservation-strategy-2020-1.pdf \(unepccc.org\)](https://unepccc.org/kenya-national-energy-efficiency-and-conservation-strategy-2020-1.pdf)

⁹ [ken190169.pdf \(fao.org\)](https://fao.org/ken190169.pdf)

¹⁰ Modelled in EDGE app

¹¹ Ibid

	<ul style="list-style-type: none"> ○ High efficient cook stove ▪ The Energy (appliances energy performance and labelling) regulations, 2016 ○ MEPS
Commercial Industries & transport	<ul style="list-style-type: none"> ▪ The Energy (Energy Management) Regulations 2012 ○ Energy audits ○ Energy Policy ○ Designated energy manager

4 Overview of Energy Efficiency & Conservation status in Narok County

4.1 Narok County Public Buildings

The assessment of Narok County public buildings showed most buildings were passive in design and operation, (Table 4.1), with higher capability of operation with natural lighting, cooling, and ventilation except for IT and specialty rooms such as in hospitals. Adoption of efficient appliances was moderate on average at 53% for LED lighting and 52% for low flow water appliances. Only 8% of installed air conditioning units meet the MEP standards. Adoption of other EE&C measures such as renewable energy sources and wastewater harvesting and recycling was low.

Table 4.1 Energy efficiency status in public buildings.

Item	Assessment	Adoption Rate
1	Passive design for natural lighting, cooling & ventilation	High
2	Lighting automation (photo for outdoor, occupancy for common areas)	Low
3	High efficiency LED lighting	53%
4	High efficiency air conditioning & refrigeration units (min 1 Star)	8%
5	Efficient low flow water appliances	52%
6	Efficient wastewater harvesting & recycling	0%
7	Renewable energy sources (PV & SWH)	Low

On average, it was estimated the buildings EUI was 32.66 kWh/m²/yr for significantly energy intensive offices that was higher than EDGE modelled benchmark of 25kWh/m²/yr primarily due to significant usage of inefficient lighting and 111.24 kWh/m²/yr for significantly energy intensive hospital that was lower than benchmark of 175kWh/m²/yr. The case of lower EUI for hospitals arises from low adoption of expected hospital equipment in the kitchens, laundry and low adoption of space cooling/heating and water heating. Households, Institutions, Health Centers and SME

The energy efficiency assessment in households, institutions, health centers and SMEs focused on lighting and cooking technologies. The adoption of electrical lighting bulbs is shown in Figure 1. There was a modest adoption of energy efficient LED lighting at 49% in households, 39% in institutions, 35% in health centers and 42% in SME. The usage of incandescent and halogen lighting bulbs that are highly inefficient at totals of 7% of households, 2% of institutions, 8% of health centers and 7% of SME needs to be discouraged.

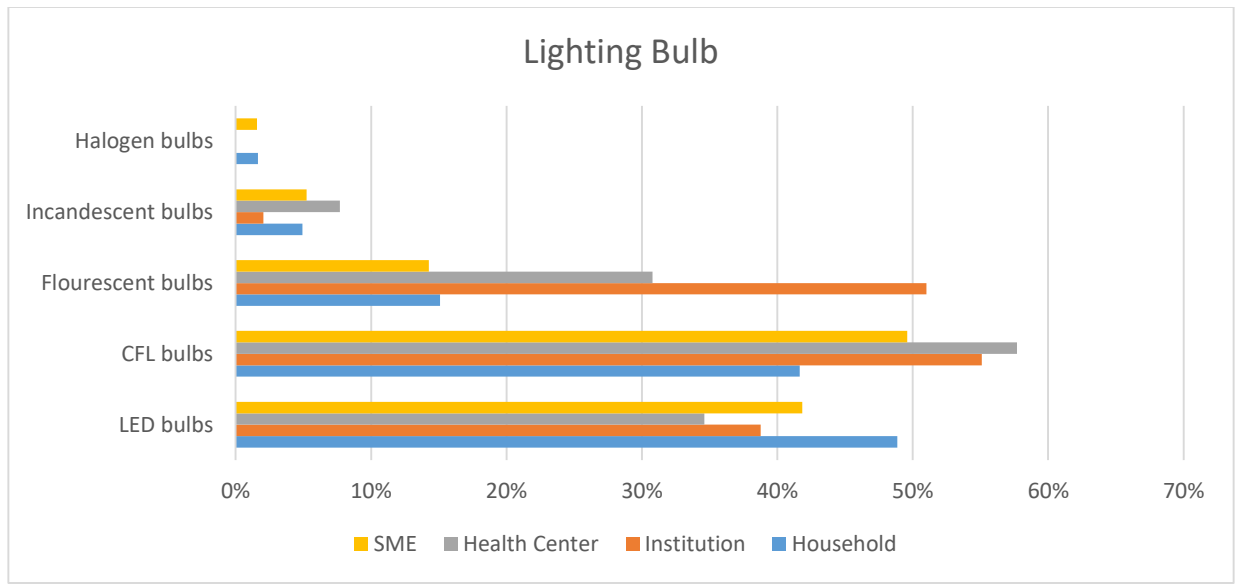


Figure 4-1 Lighting bulbs type across sectors

Adoption of energy efficient cooking technologies (Figure 2) showed 55.6% of households and 43.1% of institutions use inefficient traditional three stone stove. The adoption rates of more efficient biomass cook stoves such as the improved jiko and institutional stoves was less than 15%. This requires additional effort to improve its adoption. Higher efficient stoves such as LPG stoves are less adopted and only significantly used in health centers at 29.6%. LPG is yet to be widely adopted as a first-choice cooking fuel even in health care facilities.

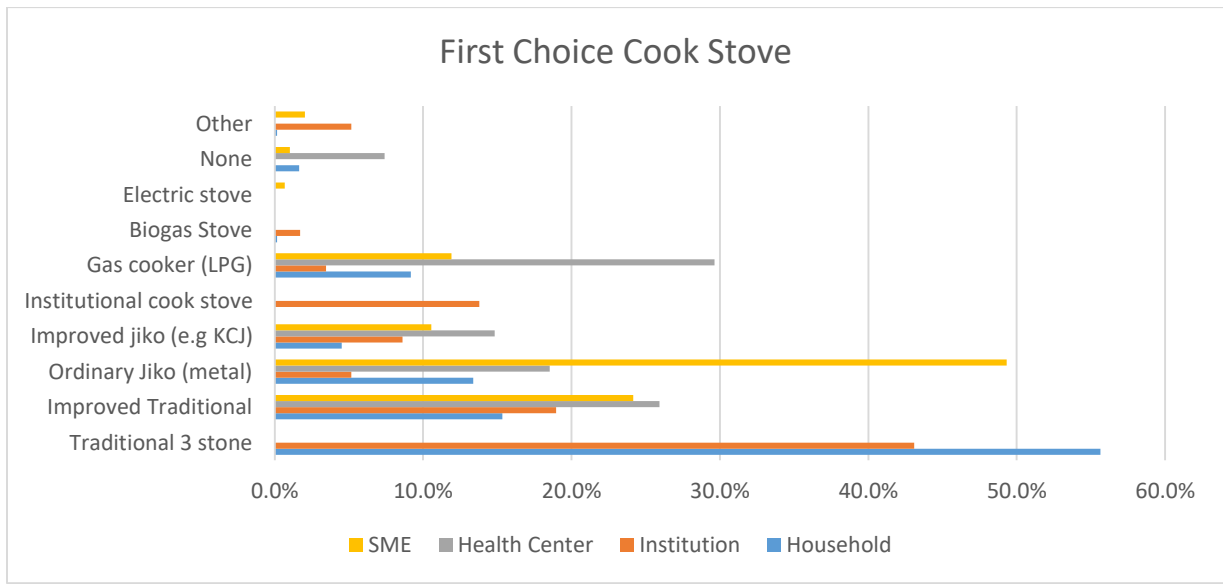


Figure 4-2 1st Choice cook stove

4.2 Commercial & Industries

The dominant industry in Narok County with substantial energy consumption is in hospitality (game lodges) and a few other manufacturing facilities that include one tea factory, one sugar factory, two maize millers and a tannery plant. Commercial buildings such as malls were in Narok Town. Other significant energy

users are large institutions such as the Masai Mara University. According to the Energy and Petroleum Regulatory Authority (EPRA), only 4 facilities have carried out Energy Audits in the Narok County as of June 2022. There additional effort is required to enforce compliance.

5 Challenges in implementing energy efficiency and conservation action.

5.1 Financial Resources

There is inadequate financing of EE&C projects due to many development priorities. Financial resources then remain the biggest constraint in enabling EE&C practice.

5.2 Access to quality appliances

Energy technologies have been changing over the years and appliances are getting cheaper as more product development is undertaken. However, access to such technologies remains a challenge as the County potential due to lacks sufficient subject matter experts to assist in the selection of suitable appliances, as revealed from focus group discussions. The prevalence of low-quality LED lighting in the market is a challenge and has led to cases of failure of new installed energy efficiency LED lighting well before their expected lifetime and eventually replaced with traditional fluorescent lighting, which is a setback in the quest for energy efficiency.

5.3 Energy Management Teams, Governance & Training

There is insufficient expertise in the county on energy issues in general and on EE&C specifically. Training on EE&C is required to upskill and energize teams to focus on the subject. Further efforts are required to complement actions of EPRA in compliance to appliance MEPS and energy efficiency.

6 Priority interventions and/or Recommendations

Whereas efficient energy technologies are priced higher than standard appliances, the investment returns are quick and easily justifiable. The County government, its citizens and development partners should then promote and invest in the following initiatives in households, educational institutions, health centers, SME, county buildings and offices.

<p>Funding and Investment</p> <p>Collaborate with development partners to increase energy efficiency finance at competitive rates to approved projects e.g</p> <ul style="list-style-type: none"> Establish a Consolidated Fund which will allocate funding for priority EE&C initiatives as proposed by the Energy Act (2019). Develop an Investment Prospectus on EE&C for resource mobilization and integration of EE&C projects in the CIDP
<p>Public Building and Institutions Related Recommendations</p> <ul style="list-style-type: none"> Support development of Narok County building code to promote design & construction of passive green buildings, high efficient energy & water technologies and integration of renewable energy technologies such as solar PV and solar water heating in buildings and to align with the Paris Agreement. Building energy codes play a pivotal role in advancing energy efficiency and sustainability in the buildings sector¹² For designated County buildings to comply with Energy management regulations and that require facilities to undertake Energy efficiency audits and implement recommended energy savings.

¹² [Energy Efficiency 2023 \(windows.net\)](https://www.windows.net)

Efficient Cooking Technologies Related Recommendations (Households and MSMEs)
<ul style="list-style-type: none"> • Promote universal access to clean cooking: e.g., switch from traditional three stone and other inefficient cooking technologies to more efficient and cleaner cooking technologies like improved cookstoves, biogas, LPG etc. According to IEA study a switch to clean cookstoves leads to further improvements in efficiency.¹²
Commercial and Industries Recommendations
<ul style="list-style-type: none"> • Develop county laws or policies to promote compliance to Minimum Energy Performance Standards (MEPS).
Capacity building and Behaviour Change Recommendations
<ul style="list-style-type: none"> • Carry out capacity building and training in EE&C for county officers, facility managers and community champions to enhance productivity, reduce energy intensities and compliance to energy management regulations. • Carry out energy saving behaviour change campaigns using multiple channels for wider reach e.g. billboards, local radio, and TV stations. Some of the emerging best practices include showcasing government actions to save energy and working with industry groups and community associations can help amplify a campaign's reach.¹² • Create demonstration centers for energy efficiency

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ⁱUK PACT. (2023). Energy planning tools and data-driven policy making in Narok County. Available at: <https://www.ukpact.co.uk/kenya-strathmore-university-project-landing-page>. (Accessed: 20th March 2023).