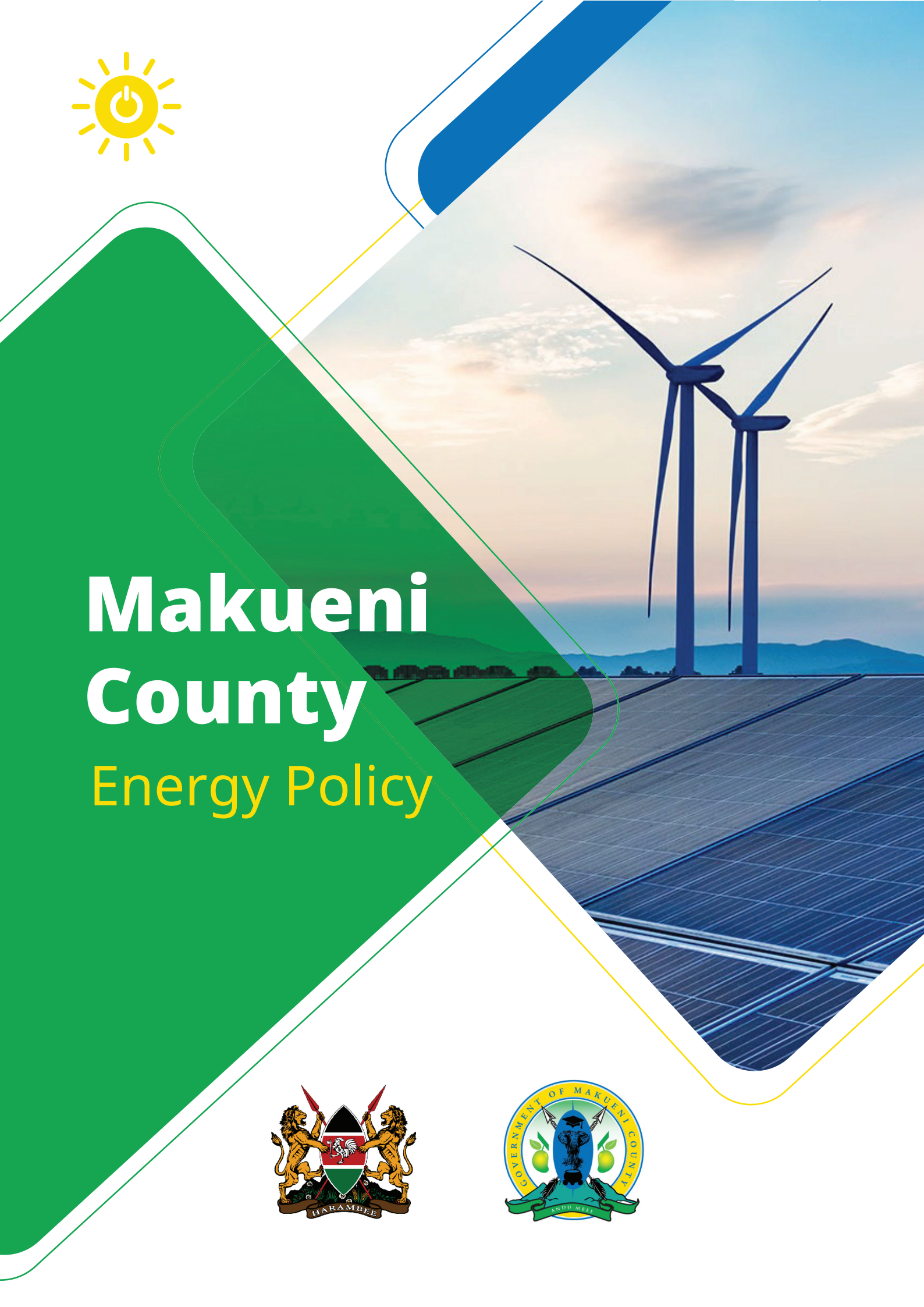

Makueni County

Energy Policy

HARAMBEE

GOVERNMENT OF MAKUENI COUNTY

ANDU MBEE

Makueni County

Energy Policy

Foreword

Energy is the lifeblood of progress—the unseen force that powers dreams, drives economies, and transforms societies. It is with immense pride and a profound sense of responsibility that I present the Makueni County Energy Policy, a transformative framework designed to guide our county toward a future powered by clean, sustainable, and affordable energy. This policy is not merely a document; it is a commitment to the people of Makueni—a promise to reshape our energy landscape, drive economic growth, and improve the quality of life for every resident.

Energy is the backbone of development, and in Makueni, we envision a county where reliable and accessible energy fuels progress in households, schools, health facilities, and businesses. This policy is anchored in the Energy Act 2019 and the Constitution of Kenya 2010 and aligns with with Vision 2030, the Constitution, the Makueni County Interpreted Development Plan (2023-2027) and Makueni energy plan (2023-2032). It reflects our dedication to addressing the pressing energy challenges faced by the people of Makueni.

Our goal is ambitious yet attainable: to achieve access to clean, affordable, reliable and sustainable energy for economic empowerment and improved livelihood This policy outlines a strategic roadmap to harness renewable energy, promote energy efficiency, and foster inclusive growth. It prioritizes powering critical sectors such as agriculture, healthcare, and education, ensuring that our farmers can irrigate crops, our hospitals can operate seamlessly, and our youth can access opportunities through enhanced energy infrastructure and productive use of energy.

The journey to this policy has been marked by rigorous data-driven planning, extensive stakeholder engagement, and inclusivity that amplifies the voices of our communities. It builds on the successes of initiatives like the solarization of Makueni County Referral Hospital, which saves millions annually, and innovative projects like agrivoltaics, which blend renewable energy with food security. These milestones demonstrate that sustainable energy is not just a vision but a practical reality we are already bringing to life.

I extend my gratitude to all our valued development partners from UKPACT, Strathmore University, the World Resources Institute and Just Energy Transitions Africa for the financial and technical support. Your contribution to development of this policy has been invaluable. Appreciations to the county officials, stakeholders in energy sector and Citizens who have contributed to shaping this policy. Together, we are charting a path to a resilient, green, and prosperous Makueni—a county where energy empowers every individual and that is powered by clean, affordable, and sustainable energy, creating a legacy of progress for generations to come.

H.E Mutula Kilonzo Junior CBS,
Governor, Makueni County

Preface

The Makueni County Energy Policy represents a significant milestone in the county's commitment to sustainable development and inclusive growth. It is a timely and strategic response to the growing energy challenges and opportunities within the County. For decades, energy poverty has hindered social and economic progress in many rural and peri-urban communities across Makueni. In response, this policy provides a comprehensive, forward-looking framework to guide coordinated efforts in energy planning, implementation, regulation, and investment.

The Policy recognizes that access to clean, affordable, and reliable energy is more than a development goal. It is a foundation for improved quality of life. Energy drives productivity in agriculture, powers health and education services, strengthens community resilience, and creates jobs and new economic opportunities. The Policy seeks to accelerate access to modern energy services by promoting a diversified energy mix, supporting the productive use of renewable energy, and embedding energy efficiency and conservation practices in all sectors of the economy.

Importantly, the formulation of this Policy was grounded in a robust and inclusive consultative process involving stakeholders from government departments, development partners, private sector actors, civil society organizations, and local communities. Their valuable insights have helped shape a policy that is responsive to real needs on the ground, while being aligned with broader priorities—including national energy priorities, statutory frameworks such as the Energy Act, 2019, and the County Governments Act, and global commitments under the Sustainable Development Goals, the Paris Agreement, and Agenda 2063.The Policy also supports the implementation of the County Energy Plan (2023–2032), the County Integrated Development Plan (2023–2027), and other relevant frameworks aimed at unlocking Makueni's renewable energy potential—particularly in solar, wind, and bioenergy. It outlines clear policy objectives, guiding principles, and implementation mechanisms that will drive inclusive, sustainable, and accountable energy development.

As the County Executive Committee Member responsible for Infrastructure, Transport, Public Works and Energy, I am confident that this Policy provides a solid foundation for a transformative shift in how Makueni produces, distributes, and utilizes energy. I extend my sincere appreciation to all institutions and individuals who contributed to its development. Your expertise, dedication, and collaborative spirit have made this Policy possible.

Let this document serve not just as a policy, but as a commitment to equity, sustainability, and progress. Through collective action and shared responsibility, we can light the path to a brighter and more resilient energy future for the people of Makueni County.

Eng. Peter Mumo
County Executive Committee Member
Department of Infrastructure, Transport, Public Works & Energy,
Makueni County

Acknowledgement

The development of the Makueni County Energy Policy is the result of collaborative effort, dedication, and expert contributions from a wide array of stakeholders. It stands as a testament to the power of collective action and the shared vision for a future where all residents of Makueni County have access to clean, affordable, and reliable energy.

We wish to sincerely thank our development partners for their support both technical support in facilitating stakeholder consultations, analytical work, and validation sessions. The core team of expertise include: Patrick Mwanzia, Sarah Odera, Hilarious Kifalu, Stephen Kiama, John Kioli Anne Njoroge, Victor Otieno, Douglas Ronoh, Mark Odaga and Wairimu Manyara from Strathmore University, the World Resources Institute and Just Energy Transitions Africa. I recognize their technical rigor, attention to detail, and coordination across sectors formed the backbone of this policy. From research and data consolidation to stakeholder engagement and drafting, their role was instrumental in ensuring that the policy was not only evidence-based but also aligned with broader energy access and Sustainable Development Goals. I further wish to thank UKPACT for the financial support they have provided us to support the development of this policy.

Special appreciation also goes to civil society organizations, private sector actors and Makueni County community, whose inputs brought critical on-the-ground perspectives. Their involvement enriched the policy's content by ensuring that the voice of the community, energy consumers, entrepreneurs, and local innovators were well represented. Community leaders and local residents who participated in the consultative forums deserve special mention for their valuable insights and aspirations that helped shape responsive policy interventions.

We are equally grateful for the guidance and policy direction received from the Ministry of Energy and Petroleum, the Council of Governors, and the Energy and Petroleum Regulatory Authority (EPRA). Their input ensured that the policy aligns seamlessly with national energy goals, legal frameworks, and regulatory best practices, while respecting the constitutional responsibilities of county governments under the devolved system.

A special note of thanks goes to the County Energy Technical Working Group from various the departments: Stanlus Matheka, Jackyline Kiting'o, Richard Kamami, Stanley Muinde, Morris Muendo, Dorcus Mwende, Benson Mutuku, kelvin Mutua and Georgina Mbithe for their coordination, technical expertise, and dedication to mainstreaming cross-cutting themes such as gender, climate resilience, and inclusive development into the county's energy policy development processes. Their work ensured that this policy is both forward-looking and grounded in the real needs of the county's residents.

We are confident that this document will serve as a transformative tool guiding investments, informing legislation, strengthening partnerships, and ultimately delivering sustainable energy for improved livelihoods. As we implement this policy, let us continue to work together to turn its vision into reality.

Eng. Naomi Nthambi
Chief Officer - Energy,
Government Makueni County

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Acronyms and Abbreviations

ADP	Annual Development Plan
CEP	County Energy Plan
CIDP	County Integrated Development Plan
CTTI	County Technical Training Institute
EE&C	Energy Efficiency and Conservation
EMR 2025	Energy Management Regulations 2025
ESCOs	Energy Service Companies
EV	Electric Vehicles
HCF	Health Care Facilities
LED	Light Emitting Diodes
LPG	Liquid Petroleum Gas
MEPS	Minimum Energy Performance Standards
MTP	Medium Term Plan
MSEs	Medium and Small Enterprises
MSMEs	Micro, small and medium enterprises
PURE	Productive Use of Renewable Energy
PUE	Power Usage Effectiveness
PV	Photovoltaic
REREC	Rural Electrification and Renewable Energy Corporation
TVETs	Technical and Vocational Education and Training

Introduction

This Energy Policy for the Government of Makueni County establishes the County's overarching goals, commitments and actions in advancing energy development. It serves as the foundation for developing and implementing the County's energy legislative framework, energy plans, strategies, and programmes aimed at enhancing energy access, efficiency, sustainability and resilience. The Policy further integrates cross-cutting issues on land use, environmental sustainability, safety, health, climate change mitigation, and gender and social inclusion. It is grounded in the constitutional and statutory mandates conferred upon county governments, particularly the Constitution of Kenya, 2010, the Energy Act, 2019, (Cap 314), and the County Governments Act (Cap 265). These legal instruments define the functional responsibilities of county governments in energy planning and development, thus providing the legal foundation for this Policy.

This chapter highlights the basis for and role of the Makueni County Energy Policy. It provides background information, identifies key policy issues, sets out the consequent policy objectives and guiding principles, and concludes by laying out the scope and structure of the Policy.

1.1 Background

Energy is a major enabler of sustainable development as emphasized in Kenya's long-term development blueprint—Vision 2030. Kenya has made notable progress towards achieving universal access to electricity and clean cooking technologies. According to the Updated Kenya National Electrification Strategy and the Kenya National Cooking Transition Strategy (2024–2028), the national electricity access rate is 73%. However, access to clean cooking solutions remains comparatively low, with only 31% of the population utilizing clean cooking technologies. In alignment with national development goals and international commitments, Kenya has set an ambitious target to achieve universal access to electricity and clean cooking by the year 2030.

Despite the national progress on energy access, Makueni County, like other rural counties in Kenya, is disproportionately affected by energy poverty. Access to electricity and clean cooking remains below the national average, with only 29% having electricity and approximately 17% using clean cooking solutions. Additionally, 72% of households depend on biomass for cooking, resulting in adverse impacts on health and climate. These challenges are compounded by income poverty, with just over half of the population spending more than 5% of their income on energy access. The lack of access to clean, affordable and reliable energy also hampers productive use of energy and impedes economic development. Despite this, Makueni County boasts significant potential for wind and solar energy in Kenya with wind speeds above 6m/s at a height of 100m in the northern and south-western parts of the County and average Global Horizontal Irradiation (GHI) of 2,008 kWh/m2.

To address the existing energy access gap in the county, the National Government, the Government of Makueni County, and other partners continue to implement electrification and clean cooking initiatives. Some of the initiatives include:

i. Enhanced rural electrification, in partnership with the Rural Electrification and Renewable Energy Corporation (REREC), connecting at least 780 households and businesses as recently as 2023.[1]

1 Government of Makueni County, 'Electrifying Makueni County', https://makueni.go.ke/2023/news/electrifying-makueni-county/

ii. Installation of six high mast floodlights, 78 integrated solar market lights and 63 grid-powered streetlights, enhancing security, livelihoods and wellbeing in the County. [2]
iii. Installation of a solar PV system at Makueni County Referral Hospital that will meet approximately 30% of the hospital's electricity needs, contributing to significant annual cost savings in electricity bills for the County. [3]
iv. Development of a County Energy Plan (2023 – 2032)[4] ,which, among other things, prioritises clean energy development to: meet energy needs of unserved and under-served areas, foster productive use of renewable energy in agriculture, power hospitals and other amenities and unlock rural mobility while decarbonising transport through expansion of e-mobility.

Historically, energy planning and development in Kenya was carried out by the central government. The Constitution of Kenya,2010, established two levels of government: the National Government and the forty-seven county governments, which share energy functions between them. Chapter 11 and the Fourth Schedule of the Constitution outline the diverse functions of the county governments, including responsibilities in energy. The Energy Act, 2019, (Cap 314, Laws of Kenya) detail this structure under Sections 5, 193, 194, 196, 199, 222, and the Fifth Schedule. County governments have specific responsibilities for energy planning, regulation, and project development and operation. It is on this basis that Makueni County Integrated Development Plan (2023–2027) includes energy as a key component, specifically targeting green energy and rural electrification as priorities.[5] Additionally, the County has developed the County Energy Plan and County Energy Investment Prospectus.

Within the legal framework, which devolves some of the energy planning, regulatory and operational functions to county governments[6] , this policy represents the Government of Makueni County's commitment to promoting legal, regulatory and institutional reforms to ensure affordable, reliable and sustainable energy access for all.

1.2 Role of Energy in the County Development

In line with Fourth Medium Term Plan [7] (MTP IV), 2023 – 2027, which recognizes the role of energy as a lever for socio-economic transformation, the Government of Makueni County recognizes energy as an enabler for all economic sectors. While biomass (dominated by wood fuel, particularly charcoal) has been the predominant energy source within the County, there is a recognition that its extensive use has not been sustainable, exacerbating climate impacts and impeding local climate adaptation efforts. Green energy development and promotion is therefore prioritized within the framework of the County Integrated Development Plan (CIDP).

2 Government of Makueni County, Annual Development Plan, 2024, p.29, https://makueni.go.ke/sandbox/site/files/2024/08/MAKUENI-COUNTY-FY-20252026-ANNUAL-DEVELOPMENT-PLAN-ADP-ON-30.8.2024.pdf

3 Makueni Annual Development Plan 2024, p. 29

4 Makueni County Energy Plan (2023 – 2032) https://makueni.go.ke/sandbox/site/files/2024/09/Abridged-Version-Final-Makueni-CEP-Report-2023-2032.pdf

5 Makueni County Integrated Development Plan (2023 –2027) p. 80

6 An overview of the legal and institutional framework appears at Annexure 1 of the Policy

7 The implementation of Kenya's Vision 2023 Agenda has been through successive five-year Medium-Term Plans (MTPSs). The MTP IV 2023 – 2027 is themed: "Bottom-Up Economic Transformation Agenda for Inclusive Growth (BETA)". It implements the BETA, which is geared towards economic turnaround and inclusive growth through a value chain approach. BETA targets sectors with high impact to drive economic recovery. BETA's objectives are: bringing down the cost of living, eradicating hunger, creating jobs, expanding the tax base, improving foreign exchange balances and inclusive growth. This will be achieved through targeted investments in five core pillars, namely: Agriculture; Micro, Small and Medium Enterprises (MSMEs) Economy; Housing and Settlement; Healthcare; and Digital Superhighway and Creative Economy. BETA will be implemented through five MTP IV sectors, namely: Finance and Production; Infra-structure; Social; Environment and Natural Resources; and Governance and Public Administration.

The CIDP also contains the promotion of productive use of renewable energy with a particular focus on the agriculture sector, PUE holds the potential to strengthen agricultural value chains by enhancing productivity and reducing post-harvest losses. This can be achieved through applications such as solar-powered irrigation, food preservation via drying technologies and cold storage facilities within Makueni County. Further, solarization of health facilities presents an opportunity to immensely reduce electricity costs and reinvest the savings in constructing additional model health centres across various wards, thereby improving healthcare access and service delivery. The County also envisions the establishment of energy centres to serve as hubs for demonstrating modern energy technologies. These centres would not only promote job creation but also raise community awareness and uptake of diverse energy solutions, particularly those designed to drive rural development.

In line with the commitment to a just energy transition, the County Government of Makueni is committed to renewable energy deployment anchored by a strong policy regulatory and institutional framework. There is recognition that this holds potential for building a resilient energy sector that provides energy access and security, serves as an engine for job growth, and strengthens climate resilience in the community. As part of its policy priorities, the County Government will promote employment creation in the energy sector, provide incentives for energy infrastructure that enables income generation for landowners, and support energy independence and cost savings through mini-grid and off-grid systems. Recognizing the ongoing challenge of over-reliance on biomass for cooking, the County will also pursue strategic partnerships to accelerate the adoption of clean cooking technologies, thereby reducing dependence on solid biomass fuels.

1.3 Rationale for Government Action

The formulation of this Policy is anchored on the recognition of the important role energy plays as a lever for socio-economic development and in view of the responsibilities of county governments relating to the energy sector. The Policy directions outlined in the document are informed by the provisions of the Constitution of Kenya, 2010, and the Energy Act, 2019, (Cap 314, Laws of Kenya). These laws define energy functions of both the National Government and County Governments.

This Policy sets out the overarching policy objectives and strategies for their achievement, as well as the guiding principles drawn from the national energy policy, which will inform energy sector decision- making within Makueni County. It provides a framework to guide strategic, transparent and inclusive decision-making in the energy sector with the aim of encouraging investment towards energy access that catalyses inclusive growth, job creation and economic empowerment of marginalized groups within Makueni County. These aims are underpinned by Kenya's commitments to the Sustainable Development Goals, East Africa Community 2050, African Union Agenda 2063, and the Paris Agreement.

1.4 Policy Issue(s) Identification

Makueni County is endowed with a rich diversity of renewable energy resources, including solar, wind, biomass, and other locally available raw materials. Despite this natural abundance, the utilization of these resources remains significantly low, resulting in widespread energy poverty across the County. This underutilization is largely attributed to limited investment in energy infrastructure, low levels of technology adoption, and inadequate policy and institutional support for decentralized energy solutions. The situation is further exacerbated by prevailing income poverty, with just over half of the County's population spending more than 5% of their household income on energy access. This disproportionate expenditure places a heavy burden on already constrained livelihoods and limits the ability of households to access clean, reliable, and affordable energy services.

Lack of access to clean, affordable, reliable, and sustainable energy has adverse health impacts on households that continue to rely on biomass for cooking. It is also a barrier to economic development as it limits the productive use of energy. Specifically, it has impeded the development of the County's agricultural potential, with many farmers lacking electricity for irrigation and contributing to loss of produce due to lack of energy for refrigeration and storage. Even for those with access to the grid, affordability and reliability remains a challenge. These challenges call for innovative solutions. While the devolution of energy functions to the counties presents several opportunities, it equally requires policy, regulatory and institutional development. This Policy represents the County's commitment to promoting legal, regulatory and institutional reforms. These include leveraging private sector investment and support from donor partners to address these challenges by scaling of affordable, reliable and energy access solutions for all.

1.5 Policy Goal and Objectives

The goal of this Policy is to promote access to affordable, sustainable, and reliable modern energy to meet the needs of the people of Makueni County. The specific objectives of this Policy are to:

i. To strengthen legal and institutional frameworks and enhance capacity to promote clean, sustainable energy infrastructure in Makueni County.
ii. To enhance sustainable development of energy resources and the associated infrastructure.
iii. To enhance universal electricity and clean cooking access in Makueni County.
iv. To accelerate growth of PUE with an emphasis on renewable energy for improved socio-economic transformation in Makueni County.
v. To promote adoption of Energy Efficiency and Energy Conservation, including Sustainable Transport, and Street Lighting, in Makueni County.
vi. To mobilize financing and other necessary resources towards the implementation of energy projects and programs in Makueni County.
vii. Mainstream environmental and social safeguards and climate-resilient livelihoods in the energy sector.

1.5.1 Guiding Principles

The guiding principles of this Policy are premised on Kenya's national and county laws, relevant regional and international laws and principles, which are referenced in Annex:1. This Policy will be guided by the following principles:

i. **Good Governance:** Upholding transparency, accountability, and efficient resource management and enhancing working procedures that fully comply with the principles of best governance practice.
ii. **Energy Equity and Inclusivity:** Ensuring universal access to affordable and adequate energy while mainstreaming gender and empowering marginalized groups.
iii. **Sustainability:** Ensuring sustainable energy development, service delivery, and effective utilization of energy and financial resources.
iv. **Stakeholder Engagement & Partnerships:** Engagement and effective communication among all partners — including the public — in designing, implementing, monitoring and evaluating energy programmes.
v. **Capacity Building and Employment Creation:** Building human and institutional capacity within the County Government and community, as well as facilitating employment opportunities for all — including the marginalized.

vi. **Environment, Healthy Safety and Climate Change:** Ensuring that energy activities and projects are implemented in accordance with sound health and safety principles. These efforts are aligned with the sustainable management of the environment and natural resources, while adhering to climate change mitigation objectives.

1.6 Policy Development Process

This policy was developed through a consultative and collaborative process involving a multi-stakeholder approach to ensure inclusivity and effectiveness. Stakeholders included the community who were engaged during a public participation process and leadership and officers from other departments in the county. Technical input was also provided by energy sector experts to ensure alignment with best practices.

1.7 Structure of the Policy Document

The Policy is structured into five chapters:

i. **Chapter 1:** introduces the policy framework and context.
ii. **Chapter 2:** Presents a situational analysis detailing the present status, challenges, and opportunities within the energy sector.
iii. **Chapter 3:** Outlines specific Policy statements and interventions targeting multiple thematic areas. The Policy statements are organized based on the Policy objectives.
iv. **Chapter 4:** Provides the monitoring, evaluation, and reporting mechanisms for accountability towards achieving policy goals
v. **Chapter 5:** Focuses on the implementation framework, specifying the governance structure, roles, timelines, and resources for policy implementation.
vi. **Chapter 6:** Focuses on the implementation plan of the policy.

2. Situation Analysis

This chapter provides the status, challenges, and opportunities in the County's energy sector. It examines key aspects, such as energy resources (with a focus on renewable energy), electricity generation, energy access, productive use of energy, energy efficiency, and emerging technologies. Additionally, it highlights critical areas, such as challenges and opportunities that form the foundation for the Policy interventions outlined in the subsequent chapters.

2.1 County Energy Policy and Legislative Framework and Institutional Capacity

The Government of Makueni County has taken several steps to address the energy gaps in the County. These include the development of the County Energy Plan, the County Integrated Development Plan (CIDP) and a draft Electrification, Gas Reticulation and Energy Regulation Policy in 2023. However, in the absence of an energy policy, the County has not developed or passed any county energy legislation that would support the effective implementation of the County Energy Plan and other energy sector initiatives outlined in the CIDP. Institutionally, the Department of Infrastructure, Transport, Public Works Housing and Energy is mandated to ensure access to reliable, sustainable and clean energy in line with national and county energy goals. Towards this end, the County has appointed a Chief Officer in charge of Energy to support the Executive Council Member for Infrastructure, Transport, Public Works and Energy in fulfilling the department's energy mandate. However, the department remains significantly understaffed, as evidenced by the absence of a Director to lead the Energy Directorate. Despite this, the department has, through various initiatives with strategic partners, driven processes to undertake various county energy functions and has notably led the development of Makueni County Energy Plan as well as the formulation of this Policy.

Policy, Legislative and Institutional Capacity Challenges

i. Lack of county energy policy has impeded development of county energy legislation, regulation and guidelines.
ii. Lack of county legislative framework has delayed the creation of a County Energy Fund.
iii. Limited human resources to fulfill its mandate

Opportunities

i. The data-driven energy planning and policy formulation process provides a foundation for legislation and regulation informed by relevant data.
ii. The recently published draft National Energy Policy 2025–2034 sets out the National Government's energy policy objectives and priorities, providing clarity for complementary policy and legislative decision-making at the county level.
iii. Existing collaborations with other partners to support the county energy mandate.
iv. Staff establishment guidelines that provide guidance on the recruitment of additional staff to fulfil the energy mandate.

2.2 Energy Resources & Development

Makueni County is endowed with significant renewable energy sources that include solar, wind, hydro, and bioenergy from a wide range of animal- and crop-based organic resources. However, these resources are largely undeveloped. This section provides the energy resource potential in Makueni County while outlining the challenges that hinder utilization, and presents existing opportunities. These challenges are addressed by the Policy objectives and statements outlined in Chapter 3.

2.2.1 Bioenergy

As in other parts of Kenya, woody biomass in form of firewood and charcoal is the dominant bioenergy for cooking, particularly among rural and peri-urban households, cottage industries and/or Micro, Small, and Medium Enterprises (MSMEs), as well as learning and correctional institutions in the county. Other forms of biomass used as sources of bioenergy include crop residues or animal dung, which provide energy for cooking, heating, drying, and electricity production. Biomass energy resources are derived from forests, woodlands, bushlands, grasslands, farmlands, and plantations, as well as from agricultural and industrial residues.

This section elaborates on the bioenergy potential in Makueni County, including woody biomass (firewood and charcoal), as well as other forms of bioenergy such as crop residues, animal slurry, and biogas. These resources provide energy needs for cooking, heating, drying or electricity production.

2.2.1.1 Firewood and charcoal

The woody biomass resources of Makueni County include public forests, bushland and/ shrub land, and on-farm trees under agroforestry systems. The County's Spatial Plan indicates that forests account for 17% of the total land cover in the County (136,590 ha) while bushlands cover 48% of the County (385,666 ha).[8] The total forest cover, spanning both protected and non-protected areas, including gazetted and non-gazetted lands, is recorded at 136,590 ha. The forestland reported in the County Spatial Plan is assumed to include forests managed by the National Government (including those in protected areas like national parks), county government, or by private entities such as group ranches. The County Spatial Plan further indicates that there are five gazetted forests under the national government, managed by the Kenya Forest Service. These are Makuli, Nthangu, Mbooni, Kibwezi, and Kilungu forests. There are 28 community forests, covering approximately 15,200 Ha, and managed by the County Government, as well as three non-gazetted forests covering 4,000 ha.[9]

This forest cover includes protected and non-protected areas. However, the biomass resources in protected areas are not available for consumption. Distribution of woody biomass in the County is shown in Figure 2 1.

Like the rest of Kenya, tree cover in Makueni County has been decimated substantially due to the expansion of settlement areas, agricultural activities, and charcoal and firewood harvesting. The County lost 2,092 ha of forest cover between 2001 and 2021, relative to a national average of 33ha [10]. Moreover, biomass available in Makueni County is used both for bioenergy and construction, with competition between the two uses occurring at an approximate ratio of 1:1 as per the County Energy Plan.

8 Makueni County Spatial Plan (CSP) 2019-2029

9 County Government of Makueni, 2019

10 Global Forest Watch: Forest Monitoring, Land Use. Available online: https://www.globalforestwatch.org. (Accessed on 8 May 2023)

In view of the above factors, the net annual productivity of wood from farms and forests available for bioenergy purposes is estimated as 19,837 tons (equivalent to 377 TJ) in 2025. However, the demand for woody biomass (aggregating firewood and wood used to produce charcoal) across all the demand segments (households, MSMEs & cottage industries, learning & correctional institutions, and health facilities) in Makueni County is 681,314 tons (equivalent to 12,948 TJ) in 2025. A comparison of consumption and supply reveals that the ounty is experiencing a negative wood fuel balance. This is the main characteristic of the business-as-usual (BAU) scenario, excluding any policy intervention either to increase wood fuel supply or to influence wood fuel demand downward. Aggressive afforestation is therefore required to enhance sustainable supply of woody biomass.

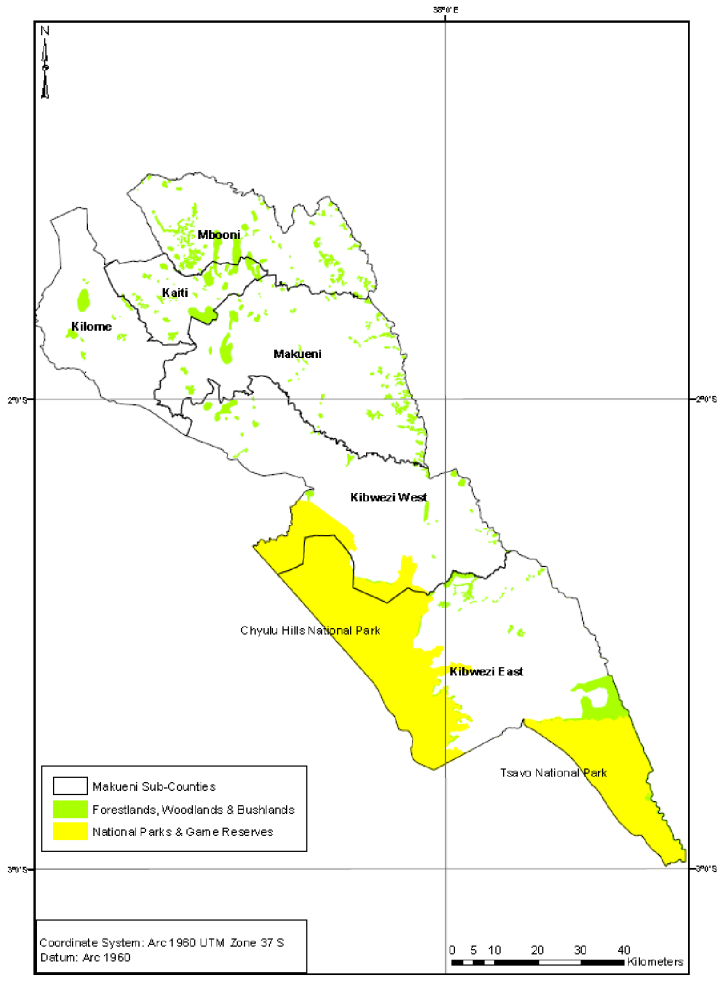

Figure 2 1: Distribution of woody biomass in Makueni County

2.2.1.2 Livestock Manure and Biogas Production

The County has a substantial population of livestock[11] , with beef and dairy cattle and small ruminants (sheep and goats) having pronounced potential for biogas production. The table below indicates the livestock population as at 2023 based on the 2024 County statistical abstract data.

11 County Government of Makueni (2022). Makueni County Statistical Abstract 2022

Table 2 1: Livestock Population

Livestock	Total Number
Cattle	226,870
Sheep	112,731
Goats	867,333
Poultry	1,492,443
Donkeys	38,186
Rabbits	16,541
Pigs	3,082

From cattle, sheep and goats, the total biogas potential is about 1TJ as of 2025. However, the current number of installed units is negligible. Biogas units can be constructed to meet daily energy demand of about 42 households annually, potentially contributing to saving 0.1 ha of forests. The potential of biogas is expected to increase as the livestock population increases. Small and Medium Enterprises (SMEs) within the County can harness this potential and develop local biogas industries for local consumption.

2.2.1.3 Bioenergy production from crop residues (pellets and briquettes)

A large portion (63%) of Makueni County is considered arable. However, productivity is constrained by deficiency in soil moisture as the County is dry for most of the year [2]. Residues from major crops such as maize, coffee, macadamia, sorghum, beans, pigeon peas, cow peas and green grams can be used to produce briquettes or pellets for local consumption. Bioenergy potential from the major crops that can be harnessed as briquettes and pellets is about 4 TJ as of 2025. This could potentially save 0.2 ha of forests and meet daily energy demand of 160 households annually. This potential is expected to increase as production of these crops grows.

Small and Medium Enterprises (SMEs) within the County can harness this potential and develop local industries that produce briquettes and pellets for local consumption. Aggregation of feedstock from small-scale farmers will be necessary for the success of these industries.

2.2.1.4 Biogas production from industrial processing of sisal and mangos

Industrial processing of sisal and mangoes generates waste (substrates and wastewaters) that has potential for biogas production. Mangoes are generally grown in all the six sub-counties of Makueni County. The Makueni Fruit Processing Plant (MFPP) in Kalamba has been processing mangoes into puree since 2017[12] . Mangoes production is expected to increase over the years.

Large sisal plantations are mainly located in Kibwezi East Sub-county, with sisal processing carried out at Dwa Sisal Factory. The coverage of the sisal plantations is not expected to change in the foreseeable future.

Table 2-2 shows the sisal and mango production trends for the years 2019-2023 as per the 2024 Makueni County Statistical Abstract.

12 County Government of Makueni (2022). Makueni County Statistical Abstract 2022

Table 2 2: Sisal and Mango Production

Item	Year				
	2019	2020	2021	2022	2023*
Sisal Fibre (MT	6,792	6,651	6,279	6,975	6,108
Mangoes-Volume processed (MT)	1,987	1,197	1,182	1,800	594

As of 2025, the potential biogas production from both mangoes and sisal processing is about 1 TJ. This could potentially save 0.2 ha of forests annually.

2.2.1.5 Biogas production from slaughterhouses/abattoirs

The meat industry produces large amounts of waste because a substantial amount of animal composition is considered unfit for human and animal consumption. Additionally, meat processing plants and slaughterhouses are known to consume huge volumes of water and big generators of wastewater [13]. In Makueni County, the animals that are slaughtered for consumption are mainly cattle and small ruminants (sheep and goats). Potential biogas production from slaughterhouses/abattoirs as of 2025 is approximately 991 GJ. This could potentially save 0.1 ha of forests annually and is expected to increase proportionate to the projected increase of animals slaughtered.

2.2.1.6 Biogas production from municipal wastes

Different waste-to-energy (WtE) technologies are applicable, including: (i) incineration, (ii) co-processing, (iii) anaerobic digestion (AD), (iv) landfill gas collection, and (v) pyrolysis/gasification. AD (for production of biogas) is considered the most viable technology, since most of the solid waste has a high proportion of organic materials with high moisture content. The County is yet to develop adequate sewerage waste management facilities. From solid wastes, biogas production potential is approximately 14 GJ as of 2025. This could potentially save about 0.001 ha of forests and is projected to increase in proportion to waste collected. This Policy will aim to support harnessing the bioenergy that can potentially be produced from municipal waste across Makueni County.

13 Aleksić et al., 2020

The summary of bioenergy potential from the different sources is provided in Table 2 3

Table 2 3: Summary of Bioenergy potential in Makueni County

#	Bioenergy type	Bioenergy potential from the different sources as of 2025
1	Fuelwood (firewood and charcoal)	12,948 TJ
2	Livestock Manure and Biogas Production	1TJ
3	Pellets and briquettes from crop residues	4 TJ
4	Biogas production from industrial processing of sisal and mangos	1 TJ
5	Biogas production from slaughterhouses/abattoirs	991 GJ
6	Biogas production from municipal wastes	14 GJ

Challenges Facing Production and Use of Bioenergy

i. High dispersal of feedstock, especially those from small-holder farmers who are scattered across the county, coupled with poor infrastructure that affects supply, and high sourcing costs.
ii. Plastic wastes share a substantial proportion of urban solid waste composition. Plastics may potentially complicate the utilization of organic wastes due to challenges of sorting, making the cost of pre-treatment and conversion high.
iii. Few enterprises engaging in alternative bioenergy production.
iv. Limited local capacity to support pairing available feedstock with the most suitable technology fit.
v. Limited technical capacity to undertake operation and maintenance of bioenergy technologies within communities.
vi. Lack of mature technologies for commercial packaging and distribution of biogas.
vii. Underdevelopment of business models that can support penetration of bioenergy technologies and fuels.
viii. Limited financing options at both community and institutional levels to support households, institutions, and entrepreneurs who wish to develop bioenergy technologies and fuels.
ix. High capital costs and low availability of packaging equipment for distribution to markets, especially in the case of pellets and briquettes.
x. Unsustainable consumption of firewood in Makueni County.
xi. Land degradation due to wood-fuel consumption.
xii. Low adoption of clean cookstoves in Makueni County.
xiii. Low awareness of the benefits and potential of biogas technologies.

Opportunities for bioenergy development and use

i. High consumption of woody biomass can serve as an incentive for afforestation and promote landscape restoration initiatives, ensuring a sustainable supply.
ii. The National Government has launched an initiative that aims to achieve 30% tree cover across the Country by 2032.

iii. Makueni County has a history of growing bioenergy crops —such as castor largely grown during the 1980s and 1990s. This indicates a high likelihood of small-holder farmers adopting such initiatives. Moreover, the presence of Eni's Agri Hub in the County indicates a ready market for oil seeds.
iv. The County also has a youthful population and vibrant Small and Medium Enterprises (SMEs) that would be willing to maximize the green opportunities and economically develop local supply chains to aggregate the feedstock from small-scale farmers.
v. In Makueni County, large establishments such as the Kalaba Fruit Processing Factory, Dwa Sisal Processing Plant, and Eni's Agri Hub offer opportunities for developing public-private partnerships (PPPs) related to bioenergy.

2.2.2 Hydropower

Makueni County has a number of water resources with potential for hydropower development, although overall water availability remains limited and many parts of the County face water supply challenges [14]. The Athi River, which traverses the County, presents significant opportunities for large-scale hydropower generation. A notable example is the ongoing construction of the Thwake Multipurpose Dam, which is expected to support water supply, irrigation, and energy generation functions[15] . There are also some seasonal rivers in the County, such as the Kaiti, Tyaa, Nguu, and Kambu rivers, which could provide opportunities for micro- or small- hydropower plants. Furthermore, the Kiboko River, located near the western border of the County, has an estimated generation potential of approximately 0.4 MW. If harnessed, this resource could directly benefit nearby populations and contribute to localized electrification efforts. This also highlights the importance of inter-county collaboration and joint resource assessments in the planning and implementation of regional energy access initiatives.

Challenges

i. Most rivers in Makueni are seasonal except for Athi River, which limits the potential for hydropower generation in the region.
ii. Encroachment of riparian areas threatens long-term resource viability.
iii. Inadequate financial resources and technical capacity for feasibility studies and resource development.

Opportunities

i. The national government's plan to develop Thwake Dam for hydropower generation as documented in the Least Cost Power Development Plan.
ii. The relatively hilly terrain offers opportunities for harnessing water flowing through streams and rivers. This can serve the design of small hydroelectric plants to serve local populations. 16
iii. With Kenya's commitment to renewable energy, there are opportunities for private investments in small hydropower projects, especially with government incentives, funding for clean energy solutions, and Feed-in-Taarif policy in place.
iv. By leveraging community involvement, public-private partnerships, and integration with solar power, Makueni County could benefit significantly from hydropower projects, contributing to sustainable energy access and rural development.

14 NEMA. (2025). Makueni County. Available at: https://www.nema.go.ke/index.php?option=com_content&view=article&id=257&catid=2&Itemid=410. (Accessed 28/03/2025)

15 AFDB. (2024). A Race Against Time: The Thwake Dam Story. Available at: https://www.afdb.org/en/news-and-events/race-against-time-thwake-dam-story-75070#:~:text=It%20is%20a%20cornerstone%20of,irrigate%2040%2C000%20hectares%20of%20land. (Accessed 27/03/2025)

16 Kitetu J, Thoruwa T, Omosa I. Energy needs within the rural community in Makueni County, Kenya. Energy Sci Eng. 2024; 12: 3540-3549. Available at: doi:10.1002/ese3.1839. (Accessed 28/03/2025)

2.2.3 Solar

According to the Global Solar Atlas [17], the solar potential in Makueni is high and viable across the entire County, particularly in Kilome, Kibwezi West and Kibwezi East sub-counties. The solar potential is illustrated using the Global Horizontal Irradiation (GHI), measured in kilowatt hours per square metre (kWh/m2). The GHI considers the long-term energy availability of solar resource at any location in the county. The county is endowed with GHI of about 2,008 kWh/m2 per year. This illustrates very high solar potential, which could be utilized to meet the demand for power in off-grid areas in Makueni through solutions such as solar home systems and solar mini-grids. Solar energy is used for productive uses such as irrigation, water heating, refrigeration, lighting, and other commercial activities. In 2019, 117 public primary schools had solar connectivity, compared to 775 with grid connectivity. By 2022, solar connectivity in public primary schools rose to 134, as grid-connectivity stood at 773.

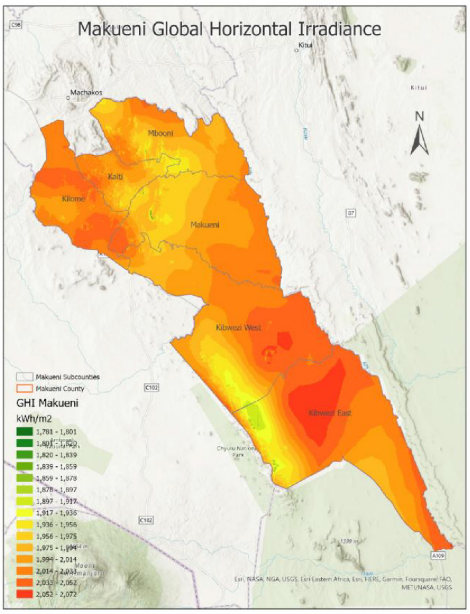

Figure 2 2: Long-term yearly average of global horizontal irradiation (GHI) in kWh/m2 in Makueni County

Challenges to Solar Power Development in Makueni

i. The high initial costs of off-grid solar solutions[18] make them unaffordable to rural communities.
ii. Prevalence of sub-standard solar components undermines the performance of the solar systems.
iii. Inadequate technicians within the County to support the design, installation and maintenance of solar systems.
iv. Limited community awareness of the potential of solar solutions, both solar thermal and photovoltaic, to meet energy needs.
v. Large solar projects face challenges related to: land acquisition, infrastructure development (such as universal coverage of transmission lines and inadequate road protection/maintenance and improvement), and lack of logistical support, such as adequate availability of solar systems components and replacement parts locally[19] .

17 Global Solar Atlas - https://globalsolaratlas.info. Datasets are on long-term yearly average of global horizontal irradiation (GHI) in kWh/m2 and potential photovoltaic electricity production (PVOUT) in kWh/kWp, covering the period 1994-2018.

18 IEA. (2025). How a high cost of capital is holding back energy development in Kenya and Senegal. Available at: https://www.iea.org/commentaries/how-a-high-cost-of-capital-is-holding-back-energy-development-in-kenya-and-senegal. (Accessed 31/03/2025)

19 Government of Makueni County. (2022). Makueni County Transport Policy. Available at: https://makueni.go.ke/sandbox/site/files/2023/05/Makueni-Coun-

Opportunities

i. The County's landscape consists of a mixture of plains and hills providing a varied topography that could be well-suited for large-scale solar installations, including solar farms.
ii. Presence of business models such as pay-as-you-go (PAYG) systems can help accelerate adoption.
iii. There is a growing interest from both local and international investors in solar power projects in Kenya, and Makueni could attract such investments, particularly for decentralized solar solutions and solar farm developments.

2.2.4 Wind

According to the Makueni County Energy Plan, higher wind speeds of above 6m/s at a height of 100m are located towards the northern and south-western parts of the County within Kilome, Kaiti, Mbooni, Kibwezi West and Kibwezi East sub-counties. Figure 2 3 shows the wind speed across the County.

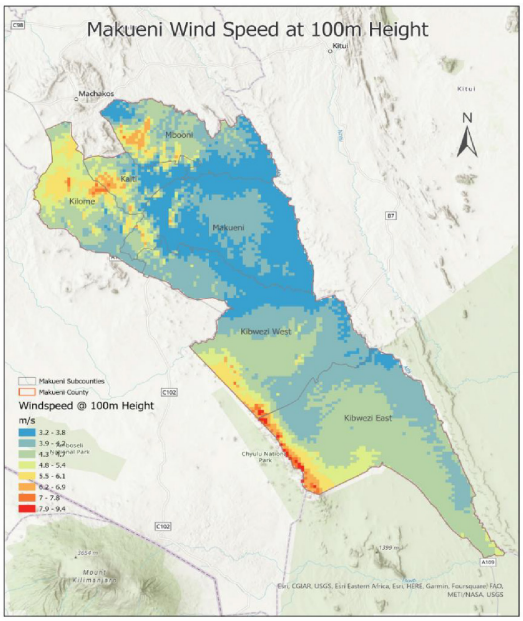

Figure 2 3: Mean annual wind speed at 100 meters heights for Makueni County

Challenges to Wind Power Development in Makueni

i. Inadequate wind regime and resource potential data.
ii. High initial costs and investment costs for installing wind turbines and associated infrastructure (such as wind measurement equipment, transmission lines, and energy storage).
iii. Limited public and investors' awareness of wind energy resource potential and available opportunities in the County.

ty-Transport-Policy.pdf. (Accessed 28/03/2025)

Opportunities for Wind Power Development in Makueni

i. Small-scale and micro- wind power projects could be a feasible options for Makueni, particularly for rural electrification and agriculture.
ii. Integrating wind power with other renewable energy sources, such as solar power can create hybrid systems that are more reliable and efficient.

2.2.5 Geo-energy Resources (Geothermal, Coal, Natural Gas)

The County has not established geo-energy resources exploitation yet. However, preliminary and detailed geoscientific studies and assessment of geothermal resource potential have been undertaken in areas such as Chyulu Hills, where preliminary reconnaissance shows there exists potential for geothermal energy. However, surface exploitation, wells siting, and drilling have not been done yet.

More studies need to be done to explore other potential areas for geothermal energy generation, such as Simba in Kibwezi East Sub-county where the Masamukye hot springs and geysers are located. These are usually indicators of presence of geothermal reservoirs beneath the ground surface.

Challenges

i. Intensive capital for geo-energy resources exploration and development

Opportunities

i. Availability of institutions such as Geothermal Development Company in the country to support exploration of geo-energy resources.
ii. Chyulu Hills has been identified as a potential site for geothermal resources.

2.3 Electricity Access

Makueni is characterized by low electricity grid connections, with solar home systems (SHS) providing access to most of the households in the County. . The overall access rate in 2022 stood at 75% consisting of solar systems at 40.2%, grid at 29.2%, and mini-grid at 5.7%, as shown in Figure 2 4 (CEP, 2024).

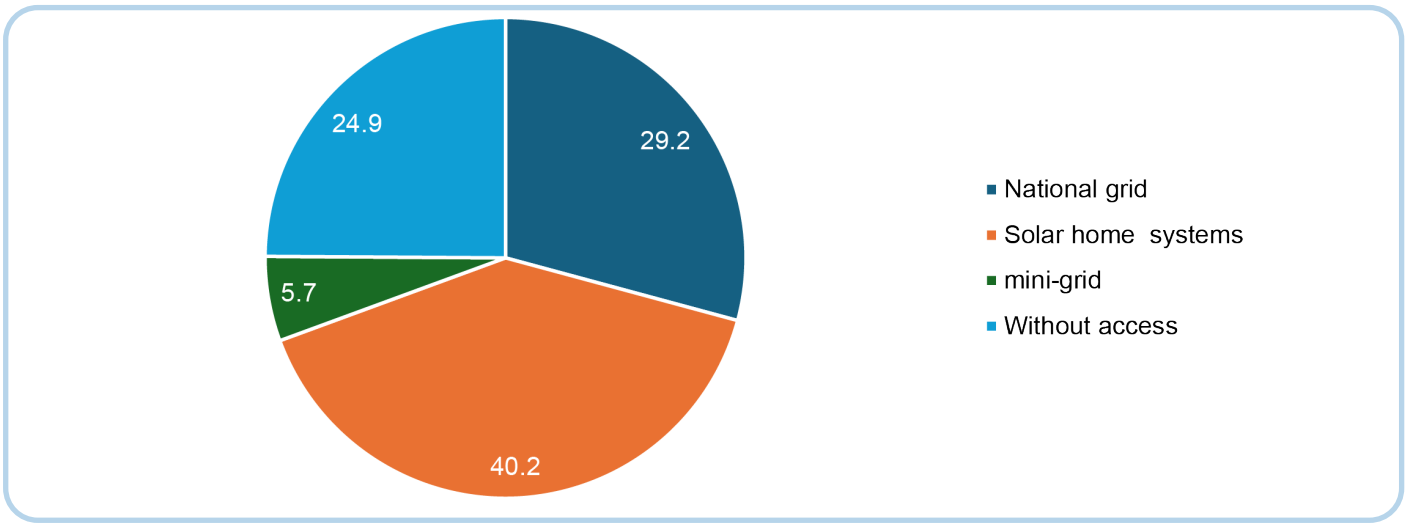

Figure 2 4: Electricity Access by Technology in Households in Makueni County

The percentage of households connected to both grid and mini-grids was 34.9%. Thus, only these households had access to electricity supply that can potentially undertake productive uses of energy. The average electricity connectivity rate for educational institutions stood at 86% in 2022. Despite this high connectivity, 20% of these institutions are unable to use electricity due to incomplete wiring in the facilities, malfunctioning transformers, and meters that are still awaiting commissioning. Markets exhibited better performance, with 96.5% of trade centres being connected to the grid as of 2021. The national grid provided electricity to an average of 80% of SMEs, while solar energy accounted for 10% (Makueni CEP, 2024).

Access to reliable and affordable energy is crucial for quality healthcare service delivery. In 2022, about 16% of rural healthcare facilities in Makueni County were not connected to electricity. Thus, a significant number of healthcare facilities face energy access challenges, impeding their ability to operate essential medical equipment and maintain services. For facilities connected to the grid, high electricity costs strain the county's budget, with the Makueni County Referral Hospital previously incurring monthly bills exceeding Ksh 1.8 million. To address these challenges, the County is exploring renewable energy solutions, particularly solar photovoltaic (PV) systems. An analysis carried out during the development of the County CEP indicated that 73% of healthcare facilities could be electrified using stand-alone solar PV systems, while the remaining 27% would rely on grid power. A notable example is the recent installation of a 205-kilowatt peak solar energy system at the Makueni County Referral Hospital. This system is projected to save approximately Ksh 7 million annually in electricity costs, while also enhancing electricity reliability within the facility.

This Policy aims to accelerate the provision of adequate, reliable, and affordable electricity services that can deliver basic access, or a minimum level of electricity consumption,[20] across all demand locales in Makueni.

Challenges

i. Limited funding from the County budget allocation and partners to implement electricity access programs.
ii. The high initial cost of connection to the national grid remains a barrier, since over 70% of households — and some public facilities— are still not connected despite the good grid coverage.
iii. Lack of adequate power to stimulate productive engagements due to low grid connectivity of households.
iv. Low income levels for households, limiting the affordability of energy services (more than half of Makueni residents have an income of less than Ksh10,000 per month).
v. Unaffordable cost of electricity to most households in the county.
vi. Unreliability and unavailability of grid electricity services due to rampant outages.
vii. Limited granular data to inform planning for electricity access.
viii. Incomplete wiring, malfunctioning transformers, and delayed commissioning of KPLC meters lead to underutilization of electricity connections.

Opportunities

i. Existence of Makueni County Energy Plan and productive use of renewable energy (PURE) Investment Prospectus. These documents highlight key and priority projects and programs to support the achievement of universal energy access.
ii. Good grid network in Makueni County, presenting an opportunity to provide electricity access through grid densification and intensification.

20 Modern-Energy-Minimum-Sept30.pdf

iii. Partnership with the international community places the County in a good position to access global climate and energy financing for energy projects.
iv. Good governance, political goodwill and community involvement in Makueni County regarding energy and related projects.
v. Availability of geospatial and data platforms such as Energy Access Explorer (EAE) that inform policies, planning and investments.
vi. Presence of policies and regulatory frameworks like net meeting regulations can encourage the growth of commercial industrial sector in Makueni

2.4 Clean Cooking Access

Firewood remains the primary cooking fuel for households in Makueni County at an average of 72.5% as of 2022 (CEP, 2024), which is above the national average of 65%. The burden of collecting firewood disproportionately falls on women and children and is a major source of indoor air pollution. Access to clean cooking fuels was 17.9% in 2022, with LPG dominating the fuels at 17.6% as shown in Figure 2 5. Although 29% of households in Makueni had access to grid electricity in 2022, only 0.3% used it to cook.

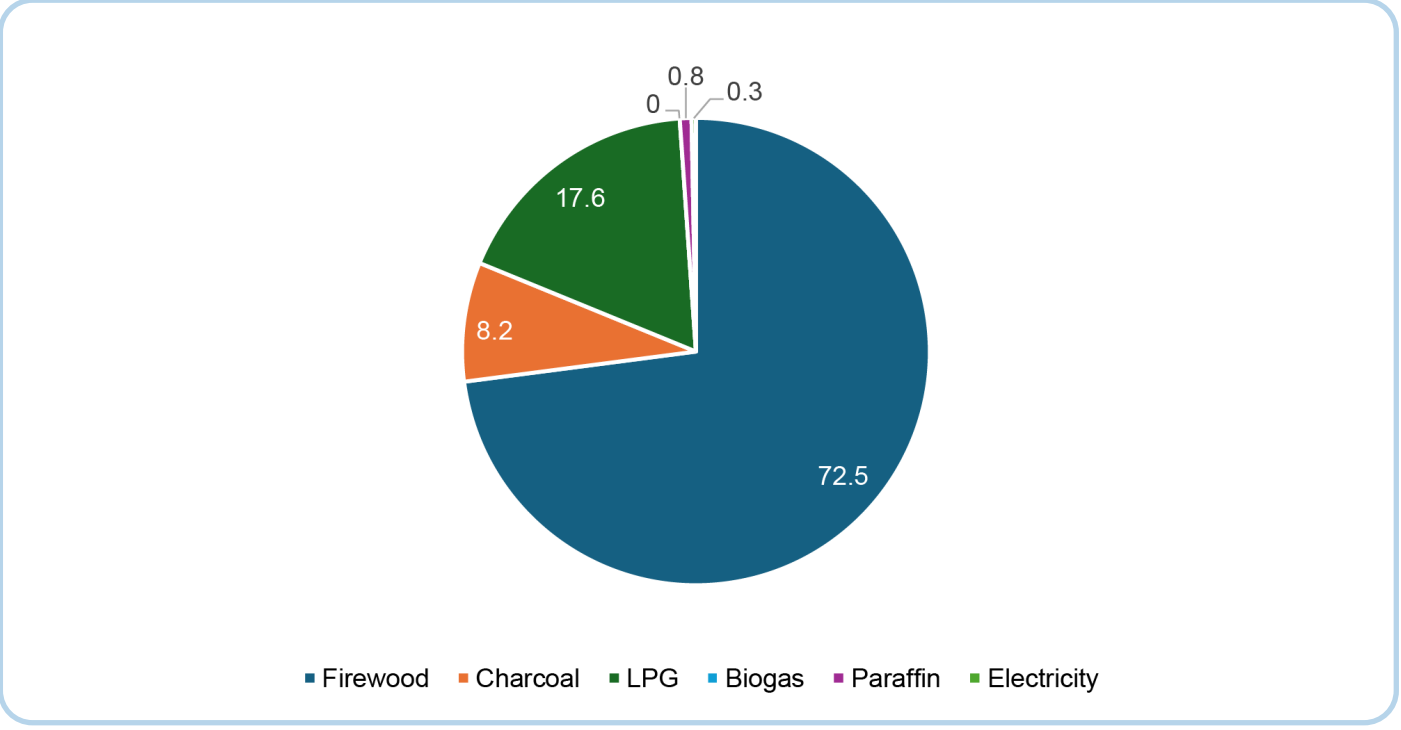

Figure 2 5: Cooking fuels used in households in Makueni County

In terms of cooking technologies, 67% of households in Makueni use inefficient three-stone open fire as the main technology for cooking. This is followed by metallic charcoal stoves (33%) and LPG (21%), with stacking not taken into consideration. About 95% of learning institutions in Makueni County use firewood as the primary cooking fuel. In health care facilities, LPG is the main fuel for cooking, followed by charcoal and firewood, while for MSMEs, firewood is the primary fuel, followed by charcoal, LPG, electricity, kerosene and biogas. Technologies using natural gas, liquefied LPG, electricity, bioethanol, and biogas are considered clean cooking solutions. Improved biomass cookstoves (ICS) of ISO tier 3 rating for thermal efficiency are considered transitional technologies, while traditional technologies include those using kerosene, firewood, and traditional charcoal (KNCTS, 2024).[21]

21 Kenya National Cooking Transition Strategy.pdf

This Policy aims to accelerate transition to cleaner cooking solutions in order to drive gender equality, reduce poverty, slow climate change, and provide enormous health benefits.

Challenges to Clean Cooking Access

i. High upfront cost of clean cooking technologies and equipment.
ii. Price volatility due to inconsistent policies and dependence on imports, both clean cooking technologies and fuels.
iii. Underdeveloped distribution networks for clean cooking fuels and technologies that limit access at the last mile.
iv. Limited awareness of the benefits of clean cooking technologies and fuels. Limited funding for clean cooking solutions.
v. Limited coordination among the different institutions advancing clean cooking.
vi. Limited data availability on clean cooking solutions and programs constraining planning and resource mobilization for projects.
vii. Limited capacity to manufacture/fabricate biomass improved cookstoves locally in Makueni.

Opportunities

i. Increased global focus on clean cooking, globally and nationally.
ii. Presence of the CEP, highlighting specific actions to stimulate clean cooking adoption.
iii. Existence of the national strategies e.g. bioenergy, LPG, and e-cooking that the County can leverage to promote respective clean cooking solutions.
iv. Existence of established clean cooking distributors, such as KOKO Networks, Vivo Energy, BURN to support distribution of clean cookstoves.
v. The Presidential directive to transition all public institutions from firewood to LPG for cooking.
vi. Expanding access to grid-based electricity in Kenya, especially in urban and peri-urban areas can help increase uptake of electric cooking.
vii. Availability of local manufacturers of clean cooking solutions e.g. ICS.
viii. Availability of clean cooking fuel resources e.g. biogas in select areas.
ix. Potential to leverage Carbon Finance and Green Bonds for clean cooking.
x. Potential environment for cassava production to support both production of food and bioethanol especially in Kibwezi sub-counties.

2.5 Productive Uses of Renewable Energy (PURE)

There is no universally agreed definition of Productive Use of Renewable Energy (PURE). However, this policy defines it as the application of energy (mainly electricity) generated from renewable sources, either directly or through energy- efficient technologies, to improve livelihoods and increase income or productivity. Common PURE use cases include renewable energy for irrigation or other uses, such as cold storage and refrigeration, milling, drying, farm mechanization, transportation, SMEs, and light industries, among others.

Limited energy access, especially for agriculture, healthcare, and small enterprises, hinders productivity, innovation, and resilience against climate and economic shocks. Addressing these gaps through targeted investments in renewable energy infrastructure can unlock significant socio-economic benefits. This Policy places specific focus on PURE across the agricultural value chain, health, and light industries/SMEs.

Opportunities for PURE in Makueni County exist across agriculture, healthcare, and various enterprises. In agriculture, solar-powered irrigation, cold storage, and agro-processing can enhance yields, reduce post-harvest losses, and improve market access. In healthcare, solar energy can provide reliable and affordable power for medical facilities, ensuring uninterrupted services, reduced operational costs, and improved patient care. For SMEs and light industries, decentralized renewable energy solutions, such as mini-grids and standalone systems, can provide electricity access while lowering energy costs, therefore enhancing productivity, and enabling expansion.

Given the County's heavy reliance on agriculture, integrating PURE presents a significant opportunity to unlock new economic potential, improve rural livelihoods, and strengthen the County's contribution to national economic growth. Energy is a critical enabler of the agri-food value chain, supporting food production, transportation, storage, and market preparation. However, in Makueni County, only 34.9% of households have access to electricity that can drive productive uses, limiting farmers' ability to enhance productivity, reduce losses, and adapt to climate change. Challenges such as declining agricultural yields and profitability due to erratic rainfall can be mitigated through clean energy solutions like solar irrigation, cold storage, and value addition technologies. While these innovations offer socio-economic and environmental benefits, barriers to adoption persist. Addressing these barriers requires a holistic approach that engages all actors in the value chain— such as farmers, policymakers, private sector players, and financial institutions— to ensure widespread access to sustainable energy and a more resilient agri-food system.

The County has made some initial steps to take advantage of PURE technologies by developing the Makueni County PURE Investment Prospectus, highlighting opportunities in the agricultural value chains and health sector. Although the Investment Prospectus was limited to only 15 projects across few value chains and sectors, this is a first and important step. To realize these 15 opportunities, an estimated investment of approximately $4.9 million is required for the agriculture and livelihoods sectors, with an additional $1.2 million needed to expand solar PV and energy storage for the County's main healthcare facilities.

Challenges in Productive Use of Renewable Energy

i. Limited knowledge and understanding of PURE technologies hinder their adoption, reducing the potential economic and social benefits of energy access.
ii. The capital-intensive nature of PURE technologies, combined with restricted access to affordable financing options, makes adoption difficult for small-holder farmers and enterprises in general.
iii. There is minimal investment in local research and development, resulting in a lack of context-specific solutions and over-reliance on imported technologies.
iv. Absence of well-structured incentives, such as tax breaks, subsidies, or concessional financing, discourages private sector investment in the PURE sub-sector.
v. Limited focus on transforming energy access into economic opportunities, with low productive use of energy constraining demand growth.
vi. Lack of access to suitable electricity technologies that can enable productive uses.
vii. Lack of anchor loads in areas suitable for mini-grids limits their financial viability.

Opportunities in Productive Use of Renewable Energy

i. Presence of initial Makueni County PURE Investment Prospectus, which highlights opportunities in the agricultural value chains and health sector.
ii. Availability of organised farmer groups and cooperatives that can take advantage of PURE solutions.
iii. Existence of anchor loads, such as schools and health centres, can improve mini-grid viability and promote broader access to productive energy use.
iv. Enhancing and incentivizing private sector investments in the County.

2.5.1 Demand Stimulation within Light Industries and Designated Areas

Makueni County has several designated areas which are specific zones allocated for functions that promote sustainable development. Key designated areas include industrial zones such as the fruit processing factory, a bio-diesel manufacturing plant, and several commercial agricultural farms e.g Athi River Agricultural Economic Zone. Other less intensive industries include: several coffee and dairy process plants, grain handling plants, a motorcycle assembly plant, and a horticultural product handling plant. Notably, Kibwezi town has been selected as a flagship agro-processing zone, focusing on processing plants for meat, leather, grain, fruit, sisal, and honey. Under the Makueni County Trade and Public Markets Bill, 2023, certain areas have been designated for specific types of trade such as grain markets, and Jua-kali (informal sector) trade centres. Additionally, Makueni County hosts part of Konza Technopolis, also known as Silicon Savannah, a technological development designated zone aimed at attracting business processes such as software development, data centers, and other tech industries.

These designated areas are significant drivers of energy demand, as their operations depend on a consistent and sufficient energy supply. However, the availability of reliable energy, particularly from renewable sources, remains inadequate and the designated areas experience frequent grid power outages hindering their efficiency, sustainability of and capacity to attract new investment. This policy aims to promote energy investments into these zones to simulate industrial investments, job creation and to ensure they have adequate available and reliance electricity.

Challenges in Access to Energy within Makueni's Designated Areas

i. High cost of electricity.
ii. Unreliable electric grid supply, resulting in overreliance on diesel generators with low energy efficiency and high operational cost of fuel.
iii. High capital cost in acquiring alternative energy supply, such as solar PVs.

Opportunities within Makueni's Designated Areas

i. Existence of specific zones identified as designated areas in Makueni County.
ii. Existence of the Kenya Special Economic Zones Authority (SEZA) that can support, attract, and facilitate investment in the Special Economic Zones (SEZs).
iii. Availability of captive solar solution providers and investors.
iv. Availability of policies and regulatory frameworks such as net metering, which electricity consumers can take advantage of.

2.6 Energy Efficiency and Conservation (EE&C)

Energy Efficiency entails using less energy to perform an equivalent task, without affecting the quality of the products or services. This is attained through the adoption of energy-efficient technologies and processes. Energy Conservation, on the other hand, is associated with reducing energy consumption through the prevention of energy waste. The use of alternative renewable sources of energy also contributes to energy conservation efforts. The key objectives of EE&C are: to reduce the costs associated with energy supply at the utility level and energy consumption at the end-user level; to enhance sustainability; and to contribute to climate change mitigation through reduced emission.

In energy-scarce counties such as Makueni, heavy reliance on biomass energy to meet cooking energy needs persists, presenting a challenge in terms of affordability.

Considering this, EE&C measures targeting households and institutional consumers are critical. This includes basic awareness of energy conservation measures, such as switching off lights when not in use. It also involves knowledge dissemination on energy-efficient cookstoves and other appliances for heating, cooling or lighting that are currently approved for distribution within the country.

Whereas the adoption rate for efficient lighting bulbs is relatively high in households – at 80% (as per the County Energy Plan), partly driven by the use of LED light bulbs bundled with solar home systems — much lower adoption rates are observed in other sectors. Learning institutions report an adoption rate of only 16%, health centres (levels 1 to 3) at 17%, and MSMEs and cottage industries at 18%. Similarly, the adoption rate of improved biomass cookstoves remains low – with households at 26%, learning institutions at 49%, and MSMEs at 15%. However, health facilities had a higher adoption rate for LPG fired cookstoves, whose efficiency is higher than biomass stoves.

In County public buildings, such as offices and level 4 to 5 health facilities, the adoption rate for efficient lighting was at 52%. However, only 39% of installed air conditioning units and 15% of refrigerators met the minimum thresholds of required minimum energy performance. Regarding cooking technologies, it was observed that most County buildings used LPG, resulting in relatively higher efficiency cooking solutions. However, only 27% of installed water heating appliances were energy-efficient with low flow technologies.[22]

As of 2023, only one designated facility had carried out an energy audit in line with the Energy Management Regulations (EMR) of 2025.

Challenges in Implementing EE&C Measures in Buildings and Industries

This section outlines the challenges in implementing EE&C measures in buildings, including affordable housing programs and across various industries. The types of buildings covered include residential single-family dwellings, commercial and multi-dwelling units, public service buildings, learning institutions, and health facilities. The industries covered include manufacturing, agriculture and related services, commercial and hospitality, cottage and MSMEs, and general services industries.

i. Inadequate awareness of the benefits of EE&C. This includes information on appliance efficiency and quality, which leads to low adoption rates of efficient appliances in Makueni County.
ii. High upfront investment costs of energy (and water) efficient technologies in comparison to standard efficiency technologies.
iii. Limited capacity to enforce EE&C provisions in the national building code.
iv. Absence of County Government EE&C building standards and regulations.
v. Inadequate data and information necessary for effective planning and setting EE&C targets.
vi. Inadequate technical expertise in both private and public sectors to support EE&C activities.
vii. Inadequate incentives and financing opportunities to scale up the uptake of energy-efficient products by households, social institutions, and local enterprises.
viii. Poor power quality, which leads to frequent failure of efficient appliances, and discourages their uptake.

Lack of comprehensive energy audits in designated facilities, as required by the EMR 2025, largely due to limited awareness of the existing EMR 2025 and Energy (Appliance Energy Performance and Labelling) Regulations of 2016.

22 Makueni CEP 2024

Opportunities in Implementing EE&C Measures in Buildings and Industries

i. Existence of facilities already installed with high efficiency designs and appliances that can be used as demonstration centres.
ii. Local TVET centres in partnership with the County Government and development partners can be used in the training of professionals and champions in EE&C.
iii. There are existing National EE&C policies and strategies that can be cascaded to the County.
iv. The Energy Act, 2019, empowers county governments to inspect equipment and appliances for compliance to MEPS and establishing a fund for the purposes of promotion of efficient use of energy and its conservation within the counties.
v. County Government officials and Technical Officers in public facilities have been capacitated on energy efficiency, as well as carbon markets, and can therefore support the cascading of EE&C programs and alternative sources of funding programs.
vi. The EMR 2025 provides for Energy Services Companies (ESCOs) that the County can partner with to fund EE&C projects.

Opportunities in Buildings and Industries

i. Facilities installed with high efficiency designs and appliances can be used as demonstration centers.
ii. TVET centers in partnership with County Government and development partners can be used in the training of professionals and champions in EE&C
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vi. The EMR 2025 provides for Energy Services Companies (ESCO) that the county can partner with to fund EE&C projects

2.6.1 Energy and Road Transport

The County recognizes that an efficient transport network is central in facilitating the movement of goods, services and people, thus significantly fostering social economic development and poverty reduction in Makueni County. Like the rest of Kenya, the current transport system in the County is a significant energy consumer, heavily dependent on fossil fuels, with road transport accounting for nearly 98% of transport demand[23] . For road transport, alternatives to fossil fuels include biofuels (such as bioethanol and biodiesel, either on their own or blended with fossil fuels), synthetic fuels (such as Fischer-Tropsch diesel), and electricity. Makueni County has a biofuel manufacturing facility that sources raw materials such as castor from local small-scale farmers. However, the County does not have any electric charging stations, thus limiting the potential for Electric Vehicles (EV) adoption.

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Challenges in Road Transport Efficiency and Adoption of E-mobility & Biofuels

i. Slow uptake of alternative fuels, such as biofuels and electrified vehicles (EV).
ii. Inadequate infrastructure to support rapid adoption of EV, such as charging networks and enhanced electricity grid.
iii. Unexploited potential for production of biofuels in the County.
iv. Inadequate investment in biofuels.
v. Inadequate infrastructure, such as parking zones to support fuel-efficient high mass road passenger and cargo transportation.
vi. Slow transformation of low to high mass transport systems such as high-capacity commuter buses.

Opportunities in Road Transport Efficiency and Adoption of E-mobility & Biofuels

i. Adoption of electric motorcycles is rapidly increasing. They currenty constitute more than 3.3% of new registered motorcycles in the country[24] .
ii. Electric motorcycles were comparable in cost to internal combustion vehicles by the mid-2020s.
iii. Areas that can potentially support charging stations for e-bikes in the County have already been identified.
iv. The County has a biofuels small-scale farming and manufacturing facility. Expansion of production and processing can provide cleaner fuels for transport and other residential or commercial uses and will provide additional income to small-scale farmers and employment opportunities to local communities.
v. The Mombasa-Nairobi Highway transverses the County. Additional infrastructure, such as parking zones, will enhance fuel-efficient mass and cargo transport, including the designation of safe areas for flammable material carriers.
vi. The Government of Makueni County currently operates several four- and two-wheel internal combustion vehicles that can be replaced with EV in future purchases. A pilot project on EV adoption for county vehicles will encourage private adoption rate of EV.

2.6.2 Crude Oil and Liquid Petroleum products

Makueni County has no proven petroleum resources. This section is therefore limited to downstream petroleum products. Increased availability of diesel, petrol and LPG through improved supply chains will be essential in meeting the basic energy needs of many residents in the County.

Challenges

i. High cost of petroleum fuels due to low availability, high logistical costs, and weak supply chains.
ii. Inadequate storage and distribution facilities for petroleum products.
iii. Price fluctuations for petroleum products.
iv. Negative environmental concerns related to petroleum use.
v. Lack of adherence to safety standards and regulations, especially in the retail sector, leading to sale of sub-standard appliances.
vi. Vandalism of petroleum pipelines.

Opportunities

i. Makueni County enjoys the largest stretch of the Kenya pipeline infrastructure, with a depot at Malili.

24 Report on Emobility (Emobility Conference at KICC 4th and 5th May 2025

2.6.3 Street Lighting

The County recognizes that street lighting is an integral part of the road and footway infrastructure. The benefits of street lighting include improved security, increased economic activity after sunset, and reduced night traffic accidents. These benefits lead to improved standards of living for the citizens, especially school-going children.

Challenges

i. Lack of comprehensive regulatory guidelines, standards and specifications for street lighting.
ii. Vandalism, damage, theft, leading to high cost of repairing vandalized items.
iii. High electricity bills affects the sustainability of street-lighting projects.
iv. Inadequate personnel capacity and equipment for maintenance of streetlights.
v. Unreliable power supply from the grid for powering the street lighting.
vi. Inadequate budgetary allocation for installation of streetlights, maintenance, repair and payment of electricity bills.

Opportunities

i. Availability of alternative street light solutions, such as solar street lighting.
ii. Availability of efficient street lights.

2.6.4 Energy Financing

The County Energy Plan identifies key investment priorities, including electricity access, clean cooking solutions, productive use projects and renewable energy development. Currently, energy projects in Makueni County rely on funding from county budget allocations, national government transfers through the equitable share, and conditional grants from development partners. Energy is significantly underfinanced with the financing requirements for the identified energy projects collectively exceeding the County's current investment capacity, creating a significant financing gap (over 90% in the last financial year). This gap is further widened by the capital-intensive nature of energy infrastructure, which typically requires substantial upfront investment with extended payback periods.

Climate finance presents a particularly promising avenue for addressing this funding shortfall, especially as several African countries embrace innovative financing approaches such as Nigeria's public issuance of green bonds. Kenya's high vulnerability to climate change, with a majority of its population dependent on climate-sensitive livelihoods, has elevated climate resilience to a priority agenda at both national and county levels. The National Treasury serves as the designated authority for key climate funds and maintains a specialized Climate Finance Unit. Additionally, the 2016 Climate Change Act mandates the establishment of dedicated Climate Change Units across all counties to mainstream climate considerations within planning and budgeting processes.

The Constitution of Kenya, 2010, under Articles 209 and 212 encourages county governments to source their own funds for the implementation of projects within their mandate. This includes climate-resilient projects where renewable energies can be incorporated to complement adaptation efforts. Makueni County has strategically positioned itself to capitalize on climate finance opportunities through its established Climate Change Action Plan, Climate Change Policy, and the Makueni Climate Change Act of 2021. The County has committed to allocating 2% of its annual budget specifically to climate action initiatives and is a signatory to the Financing Locally-Led Climate Action Program (FLLOCA) participation agreement. This proactive stance enables the County to effectively lobby for and secure funding for climate-resilient energy projects. In addition, the Energy Act, 2019, provides for county governments to establish County Energy Funds.

Challenges in Accessing Energy Finance in Makueni County

i. Inadequate financial resources to support energy projects.
ii. Low funding allocation to energy projects by local financial institutions due to perceived high risks among rural populations.
iii. The County's budget allocation for energy initiatives remains underfunded compared to other developmental sectors, such as healthcare and agriculture.
iv. The County Government's heavy reliance on National Government funding creates significant vulnerabilities in financing energy projects due to occasioned delayed disbursements.
v. Limited technical expertise within the county energy departments hinders development of comprehensive, bankable energy project proposals that meet the requirements of potential funders.
vi. The absence of a county-level public-private partnership (PPP) framework creates uncertainty on the engagement guidelines with private investors, who often require guarantees for investment in energy projects.
vii. Weak coordination mechanisms between national and county governments, as well as among various relevant county departments, impede effective resource mobilization for energy projects.

Opportunities for Energy Financing in Makueni County

The existence of a guiding framework on integrated planning and budgeting in Makueni County supports the resolution of coordination challenges and can unlock more financing for clean energy initiatives.

i. Availability of alternative financing sources, such as green bonds and carbon markets, which have not been adequately utilized.
ii. The mandate stipulated by the County Energy Act, 2019, for counties to establish an Energy Fund presents an opportunity to mobilize financial resources for clean energy projects at scale.

2.7 Cross-Cutting Issues

2.7.1 Land and Energy

Vision 2030 acknowledges that land is a basic factor of production and calls for sustainable management of land resources. As such, land is an important resource necessary for the development of energy infrastructure. Due to competing interests in land utilization, the sector faces significant challenges, particularly in wayleave acquisition. Additionally, energy development projects can have a range of impacts on communities where they are implemented, with key among concerns being economic and physical displacement.

Challenges

i. Inadequate review and updating of physical plans and land use frameworks.
ii. Absence of a comprehensive and fair compensation mechanism
iii. High costs due to variation from the preferred land use required for development.
iv. Absence of a National and County Resettlement Action Plan.

Opportunities

i. Presence of a public participation framework that has created a strong culture of community engagement in the County.

2.7.2 Environment, Health, Safety and Climate Change

The Constitution of Kenya, 2010, provides for every person's right to a clean and healthy environment. The National Environment Management Authority (NEMA) enforces this by ensuring that projects are implemented in line with safety, health and environmental standards. This is necessary because energy generation, transmission, and consumption pose various dangers to human life and the environment. A significant health and safety risk exists in the transport sector, as Makueni County has the longest section of the Mombasa-Kisumu-Eldoret Highway. This makes it a common stopover for petroleum tankers whose drivers often park within the County to take breaks. These tankers are highly explosive, and haphazard parking can cause fires. Safe parking is therefore essential. The challenge for players in the energy sector is providing affordable, competitive, reliable and sustainable energy whilst upholding people's rights to a safe, healthy and secure environment—and mitigating climate change. The County Government also recognizes the tension between environmental conservation, climate change mitigation, and social protection, due to the high dependence on biomass for cooking. Low income, marginalized and vulnerable community members depend on firewood for cooking. Additionally, many engage in charcoal production to generate income, which puts them at odds with environmental conservation efforts. Therefore, while seeking to provide energy services, measures need to be put in place to safeguard the community well-being while preventing environmental degradation and climate change.

Challenges

i. High poverty rates make it difficult for the community to transition to other fuels for cooking and reduce biomass dependence.
ii. Lack of adequate parking for petroleum tankers in the county.

Opportunities

i. Strong culture of environmental conservation in the county.

2.7.3 Gender Equality, Diversity and Social Inclusion in Energy (GEDSI)

Women and men experience different roles, responsibilities, and levels of participation within households, markets, and community settings. In many households, women are primarily responsible for sourcing firewood and carrying out cooking duties. These tasks consume substantial amounts of time that could otherwise be invested in income-generating activities, education, or rest. Additionally, reliance on traditional biomass fuels exposes women to harmful indoor air pollution, leading to various health complications. Even where efforts have been made to adopt improved cookstoves, many women face challenges due to proliferation of substandard products that often fail prematurely.

Persons with disabilities, particularly those with limited mobility, encounter significant barriers in accessing clean energy solutions due to inadequate distribution systems. Their prolonged presence at home further increases their exposure to indoor air pollution from the use of inefficient energy sources, further compounding their vulnerability.

On the other hand, youth are disproportionately affected by the high rates of unemployment across the country, which limits their economic capacity to invest in clean energy technologies. This financial constraint hinders their ability to transition to sustainable and healthier energy options.

2.7.4 Data Management and ICT

Accurate and timely data is essential for the continuous advancement of the energy sector, as it provides insights into energy needs, resource availability, and potential investment opportunities. Specifically, data on energy demand and consumption helps identify investment priorities, while data on energy resources can inform strategic development and planning. However, such data is often fragmented: demand-related data is dispersed across various county departments while consumption data is primarily community-based, and resource data is often housed in national or global databases. To support the effective formulation of energy strategies, including the County Energy Plan, it is crucial to establish robust systems for data collection, management, and integration. Equally important is the sharing of data across departments, with development partners and the private sector, to facilitate coordinated planning and implementation of energy projects.

Information and Communication Technology (ICT) can play a pivotal role in streamlining data collection and enabling centralized storage that ensures accessibility to relevant stakeholders. To safeguard the integrity and privacy of this data, the development of comprehensive frameworks and guidelines for its collection, sharing, and storage is necessary. Free and secure platforms, such as the Energy Access Explorer, offer open-access solutions with built-in data protection features. Additionally, application of emerging technologies such as Artificial Intelligence (AI) can be explored and adopted to enhance the County's capacity in data storage, analysis, and decision-making.

3. Energy Policy Objectives, Statements and Strategies

This chapter outlines the energy policy statements that provide strategic direction and actionable measures to address the challenges and opportunities identified in the preceding chapter, which provided a situation analysis. The goal is to ensure access to inclusive, affordable, adequate, reliable, sustainable and modern energy for all in Makueni County.

The Policy objectives discussed in this chapter were introduced in section 1.5. The Policy statements are aligned with the Policy objectives and focus on key thematic areas described in the preceding chapter, including energy resource development, electricity and clean cooking access, productive use of energy, energy efficiency, and crosscutting issues. Policy strategies are crafted in a manner to provide tangible action that can be undertaken to attain the policy statements and policy objectives.

Policy Objective 1: To strengthen legal and institutional frameworks and enhance capacity to promote clean, sustainable energy infrastructure in Makueni County.

Policy Statement 1: Create and maintain an enabling policy and regulatory environment to enhance development and investment clean and sustainable energy infrastructure, ensuring efficiency, inclusivity, and resilience across the energy value chain.

Policy Strategies:

i. Formulate and enact necessary legislations to stimulate bioenergy feedstock supply chains, encourage adoption of clean cooking solutions, promote productive use of renewable energy, and drive energy efficiency and conservation measures (see appendix for proposed legislations & guidelines).
ii. Review existing policies and regulatory frameworks addressing renewable and non-renewable resources.
iii. Periodically review and report on implementation of the County Energy Plan in line with the Energy Act and INEP.
iv. Enact establishment and operationalisation of the Makueni County Energy Fund.
v. Develop incentives framework to encourage private sector participation in Makueni's energy sector.
vi. Develop inter-governmental frameworks for policy coordination.
vii. Develop county-level public-private partnerships framework to scale collaborations with private sector and multilateral agencies in order to attract energy investments.
viii. Adopt and use guiding framework and tools to steer mainstreaming of Integrated Planning & Budgeting (IPB)

Policy Statement 2: Strengthen institutional capacity at the county level to effectively implement the devolved energy functions.

Policy Strategies:

i. Enhance capacity building, trainings and skills development to plan, design and implement energy programs across the energy value chain. These include mobilizing projects financing, energy access; PURE, EE&C, bioenergy; clean cooking; integrated planning and budgeting.
ii. Develop and implement Energy Management Information System.
iii. Mainstream energy in county development plans e.g. CIDP, ADP, Budget, county trade and industrial policies to ensure cross-sector synergy.

Policy Statement 3: Strengthen public awareness and capacity-building programs to support the energy sector value chain.

Policy Strategies:

i. Hold community awareness campaigns on afforestation, sustainable use of biomass, renewable energy technologies, energy efficiency and conservation, clean cooking solutions, PURE technologies, bioenergy.
ii. Collaborate with CTTI and other partners to develop and implement customised training on energy-related programs.
iii. Establish energy centres for demonstration of renewable energy technologies, energy efficiency and conservation, clean cooking solutions, PURE technologies, bioenergy etc.
iv. Support establishment of enterprises within the energy value chain with focus on marginalized entrepreneurs.

Policy Objective 2: To enhance sustainable development of energy resources and the associated infrastructure.

Policy Statement 1a: Promote sustainable exploitation and utilization of bioenergy resources.

Policy Strategies:

i. Conduct feasibility studies for commercial bioenergy potential, including biogas, other biofuels, and waste-to-energy.
ii. Promote collection and transportation of bioenergy to aggregation centres for processing
iii. Promote sustainable charcoal production by campaigning for tree growing or restoration targets as condition for recruitment, registration and licensing charcoal producers in designated zones.

Policy statement 1b: Promote sustainable supply of bioenergy feedstock, including bio-crops and (re) afforestation.

Policy Strategies:

i. Partner with stakeholders to increase the County tree cover to at least 30% by 2032
ii. Promote development and use of alternative bioenergy fuels
iii. Facilitate annual mapping of the woody biomass stock, annual net increase and demand for wood fuel in the County.
iv. Develop County Restoration Opportunities Profile (CROP) for each Sub- County.

Policy Statement 2: Promote the development of energy resources (solar, hydro, wind, geothermal) for electricity generation (both grid and off-grid) and other applications such as solar thermal technologies and wind-powered water pumping.

Policy Strategies:

i. Map and develop database for energy resources (solar, wind, hydro and geothermal)
ii. Undertake feasibility studies and data collection of renewable energy resources for electricity generation and other applications.
iii. Promote development hybrid renewable energy systems such as solar-hydro, wind-solar, wind-hydro or wind-solar-hydropower systems to mitigate climate risks and resources variability.
iv. Promote other applications of the renewable energy resources, e.g. solar water heating, solar thermal, wind for pumping
v. Facilitate land acquisition and wayleaves for energy infrastructure.

Policy Objective 3: To enhance universal electricity and clean cooking access in Makueni County.

Policy Statement 1: Support the provision of affordable, reliable, sufficient, and sustainable electricity access to meet all electricity needs including for Productive Uses

Policy Strategies:

i. Develop and implement electricity access programs for residential & public facilities through appropriate least cost electrification options (e.g. grid, mini-grid and standalone systems)
ii. Collaborate with energy service providers to strengthen grid infrastructure to improve the power reliability, availability and ability to handle the growing demand
iii. Promote quality standalone systems products/components like solar photovoltaics including in the design, installation and maintenance

Policy Statement 2: Policy Statement 2: Accelerate rapid transition to affordable cleaner cooking solutions for households, MSMEs and public institutions.

Policy Strategies:

i. Develop and implement programs to increase adoption of cleaner cooking fuels e.g. LPG, bioethanol, improved cook-stoves, biogas, e-cooking and renewable solid biomass households, MSMEs and public institutions.
ii. Create incentives for stove and fuel distributors, including business permit waivers, to expand their distribution networks to last mile and build LPG infrastructure
iii. Support local manufacturing and production of clean cooking solutions
iv. Leverage partnerships and communities. with organizations supporting clean cooking programs to promote clean cooking in schools

Policy Objective 4: To promote growth of PUE with an emphasis on renewable energy for improved socio-economic transformation in Makueni County.

Policy statement 1: Promote the adoption of PURE by agriculture and allied enterprises for improved socio-economic transformation in Makueni County.

Policy Strategies:

i. Review and expand Investment Prospectus (IP), demonstrating PURE opportunities in the County to help investors with investment decisions.
ii. Support pilot projects that test locally designed PURE solutions tailored to Makueni's economic activities to enhance jobs creation.
iii. Provide support (e.g. technical assistance, reduced licensing fees etc.) to various end users e.g. farmer groups, cooperative societies and businesses to utilize PURE solutions for enhanced agricultural productivity, storage and transportation and value addition.

Policy statement 2: Promote growth of light industries and investments in designated areas through provision of reliable electricity services.

Policy Strategies:

i. Attract energy-intensive industries
ii. Map and integrate energy needs of designated areas
iii. Implement infrastructure projects such as road networks to facilitate access to designated & last mile areas and products movement, including energy products

Policy Objective 5: To promote adoption of Energy Efficiency, Energy Conservation, and Sustainable Transport, including Street Lighting, in Makueni County.

Policy Statement 1: Enhance the adoption of EE&C measures in Makueni County in households, buildings, institutions and industries including designated areas.

Policy Strategies:

i. Develop and enforce green building energy codes
ii. Promote energy audits for large consumers according to EMR, 2025
iii. Support households and public facilities connection with efficient energy technologies and appliances.

Policy Statement 2: Enhance adoption of alternative and efficient fuels and technologies for transportation and streetlighting

Policy Strategies:

i. Develop infrastructure for electric mobility (charging stations)
ii. Increase adoption of electric vehicles especially two and three wheelers.
iii. Support non-motorized transport infrastructure (e.g., bike lanes, walkways)
iv. Adopt solar-powered and energy-efficient street-lighting technologies
v. Undertake a county-level demand assessment study for electric vehicles (two-, three- and four-wheelers).

Policy Objective 6: To mobilize financing and other necessary resources towards the implementation of energy projects and programs in Makueni County.

Policy Statement 1: Increase financing for energy and energy-related initiatives through various methods, such as climate financing, and other financing mechanisms.

Policy Strategies:

i. Increase allocation of resources for the implementation of the energy policy and energy plan.
ii. Engage development partners and private sector for resource mobilization

Policy Statement 2: Tap into Carbon Credits for Renewable Energy Projects.

Policy Strategies:

i. Develop list of projects and programmes that are eligible for carbon credit funding
ii. Partner with accredited carbon credit aggregators to enhance its utilization
iii. Develop a mechanism for equitable sharing of carbon credit revenues

Policy Statement 3: Establish Makueni County Energy Fund as envisioned in the Energy Act, 2019 and County Energy Plan (2023-2032) to finance programs and initiatives across the energy value chain.

Policy Strategies:

i. Develop comprehensive operational guidelines detailing application procedures, eligibility criteria, appraisal methodologies, disbursement mechanisms, and monitoring frameworks.
ii. Allocate seed capital through the annual budget process and develop strategies to attract additional resources from development partners, private sector, and other stakeholders.
iii. Build a pipeline of investment projects in covering renewable energy development, energy access for underserved communities, clean cooking solutions, bioenergy, energy efficiency initiatives, and productive uses of renewable energy.

Policy Objective 7: To mainstream environmental and social safeguards and climate resilient livelihoods in the energy sector.

Policy Statement 1: Increase the energy-driven County landscape restoration initiatives for sustainable wood fuel access.

Policy Strategies:

i. Promote agroforestry and energy woodlots
ii. Integrate environmental and social safeguards into all energy projects

Policy statement 2: Enable inclusive growth of energy access and productive use of energy in Makueni County.

Policy Strategies:

i. Develop gender-inclusive tracking mechanisms
ii. Support energy access and productive energy use for women, youth, PWDs, and the elderly.

4. Implementation Framework For The Energy Policy

This chapter provides coordination and administration mechanisms for the energy policy implementation. These are the institutional, legal and regulatory reforms that will be undertaken for successful implementation of the Policy.

4.1 Coordination Framework and Administrative Mechanisms

The implementation of the energy policy will adopt a coordinated, multi-sectoral approach, integrating efforts across County Government Departments and Agencies, National Government Departments and Agencies, private sector stakeholders, development partners, civil society organizations, other key sector actors, and the citizens of Makueni County. The Directorate of Energy will provide leadership in coordinating the operations and ensuring the effective implementation of the Policy objectives.

Table 4 1presents an overview of the various institutions and stakeholders involved in the energy sector, detailing their roles and contributions towards achieving the Policy's goals.

Table 4 1: Role of Institutions and stakeholders in Implementation of the Policy

Institutions/Stakeholders	Responsibilities
Government of Makueni County	i. Provide overall leadership toward implementation of the Policy. ii. Collaborate with all stakeholders to ensure coordinated implementation. iii. Lobby for resources from national, regional and international partners and ensure enhanced partnerships.
County Directorate of Energy	i. Coordinate sector operations and ensure the effective implementation of the Policy. ii. Spearhead county energy planning. iii. Formulate County energy policies and regulations. iv. Undertake county energy functions in accordance with the laws and constitution.
County Treasury and Economic Planning	i. Budgetary allocation for the implementation of the Policy and other energy programs and initiatives. ii. Establishment of the County Energy Fund.
Other County Government Departments/Institutions	i. Collaboration with the County Directorate of Energy in policy formulation and implementation. ii. Implementation of crosscutting projects and programmes according to their mandates.

County Assembly	i. Oversight, representation and enactment of laws and regulations. ii. Approval and appropriation of the budget.
Community of Makueni County	i. Participation in policy formulation, implementation and support sector initiatives. ii. Support the development and implementation of energy policies through community participation and championing energy sector matters, projects and programmes.
Ministry of Energy and Petroleum	i. Formulate and implement National energy policy development and management. ii. Coordinate sector resource mobilization and capacity building. iii. Coordinate and oversee integrated energy planning. iv. Lead the exploration and development of energy resources. v. Establish national, regional and international partnerships. vi. Research, innovation and knowledge dissemination.
Rural Electrification and Renewable Energy Corporation (REREC)	i. Oversee the implementation of the Rural Electrification programmes. ii. Manage the Rural Electrification Programme Fund. iii. Develop and update the rural electrification master plan in consultation with the County Government. iv. Support the establishment of Energy Centres in the counties. v. Undertake feasibility studies and maintain data for renewable energy resources in collaboration with the County Government. vi. Promote the development of appropriate local capacity for manufacturing, installation, maintenance and operation of renewable technologies.
Geothermal Development Company (GDC)	i. Undertake geothermal resource development and management of steam fields.
Kenya Power	i. Build and maintain the power distribution and transmission network

Energy Petroleum and Regulatory Authority (EPRA)	i. Regulate the generation, importation, exportation, transmission, distribution, supply, and use of electrical energy. ii. Regulate importation, transportation, storage and sale of petroleum and petroleum products. iii. Set, review and approve electricity and petroleum tariffs. iv. Collaborate with the County to ensure energy-efficient and cost-effective appliances and equipment used in the County.
Energy and Petroleum Tribunal	i. Adjudicate and arbitrate disputes referred to it in the energy and petroleum sector.
National Environmental Management Authority (NEMA)	i. Exercise general supervision and co-ordination of all matters relating to the environment.
Research and Academic Institutions	i. Research, development, training and capacity building to support the community and Government of Makueni County
Development Partners	i. Provide financial and technical support toward the implementation of the Policy. ii. Enhance regional and international partnerships.
Private Sector	i. Mobilize capital for energy programs and initiatives. ii. Develop and implement innovative energy solutions, programs, and initiatives across the energy sector value chain to support Policy implementation.
Civil Society Organizations	i. Support the development and implementation of energy policies through advocacy and community participation in energy sector matters, projects, and programmes. ii. Monitor energy sector activities to promote transparency and good governance.

4.2 Funding Arrangements

The resources, both financial and technical, required to implement the Makueni Energy Policy will be sourced from the County Government, the National Government and its agencies, development partners, the private sector, civil society, the people of Makueni, and other funding agencies. Resource mobilization will also entail leveraging on PPPs, Carbon Finance and Green Bonds, and proactive engagement with donor and investor communities.

To ensure effective and efficient utilization of the funding, the County will exercise good governance, adopt cost-effective operations, maintain County policies and provide regulatory stability, and remain adaptable and flexible to changing dynamics. Above all, the County will ensure the implementation of this policy interventions lead to impact.

4.3 Implementation Plan

The policy shall be implemented inline with the framework documented in Table 4 2

Table 4 2: Implementation Plan

Strategy	Expected Output	Key Performance Indicator	Timeframe	Estimated Cost (Ksh Million)	Funding Sources	Responsibilities/ Actors
Policy Objective 1: To formulate and strengthen legal and institutional frameworks that promote clean and sustainable energy development.						
Policy Statement 1: Create and maintain a conducive and enabling environment to allow the energy sector to thrive.						
Formulate and enact legislation and guidelines to stimulate the energy sector.	Legislation and guidelines developed and approved	No. of guidelines developed and approved	2025-2026	3	County Government, Development Partners	Department responsible for Energy/County Attorney
Review existing policies and regulatory frameworks addressing renewable and non-renewable resources	Acts and policies reviewed	No. of Acts and policies reviewed	2026	5	County Government	Department responsible for Energy/County Attorney
Periodically review the County Energy Plan to ensure alignment with national integrated energy planning	County Energy Plan reviewed or updated every three years	No. of times County Energy Plan reviewed or updated	2025-2034	5	County Government	Department responsible for Energy
	Annual Implementation Report developed	No. of Annual Implementation Reports developed	2025 – 2034	0.5	County Government	Department responsible for energy

Establish and operationalize Makueni County Energy Fund	Makueni County Energy Fund established and operationalized	Makueni County Energy Fund established and operationalized	2026-2027	100	County Government, Devt. partners	Department responsible for Energy
Develop an Energy Incentives Framework to encourage private sector participation in Makueni's energy sector	Energy Incentive Framework developed	Incentive Framework	2027	1	County Government, Devt. partners	Department responsible for Energy/Finance
Develop intergovernmental frameworks for policy coordination	Framework for intergovernmental partnership and collaboration developed	No. of Intergovernmental and collaboration frameworks developed	2026	2	County Government, Devt. partners	Department responsible for Energy
Develop county-level public-private partnerships framework to scale collaborations with private sector and multilateral agencies to attract energy investments	County-level public-private partnerships framework developed	No. of PPP Framework developed No. of personnel with expertise in energy sector integrated in the PPP office to support investor engagements	2025-2034	3	County Government, Devt. partners	Department responsible for Energy/County Secretary

Adopt and use guiding framework and tools to steer mainstreaming of Integrated Planning & Budgeting (IPB)	Integrated planning and budgeting adopted and utilized	No. of departments adopting IPB Amount of financial resources mobilized due to IPB	2026-2034	5	County Government, Devt. partners	All departments
Policy statement 2: Strengthen institutional capacity to effectively implement the devolved energy functions.						
Enhance capacity building, trainings and skills development to plan, design and implement energy programs across the energy value chain. These include mobilizing projects financing, energy access; PURE, EE&C, bioenergy; clean cooking; integrated planning and budgeting	Staff recruited & trained on energy development across energy value chain	No. of staff trained on energy development across energy value chain No. of new staff recruited	2025-2034	1	County Government, Devt. partners	Department responsible for Energy
Develop and implement Energy Management Information System	Energy Management information system developed	Energy Management Information System	2026-2027	3	County Government, Devt. partners	Department responsible for Energy/ICT

Mainstream energy in county development plans e.g. CIDP, ADP, Budget, county trade and industrial policies to ensure cross-sector synergy	Increased budget allocation on energy projects/ programmes	Percentage of the development budget allocation to projects/ programmes	2026/2027-2033/2034	-	All	Department responsible for Energy/Planning
Policy statement 3: Enhance community capacity through awareness campaigns to accelerate the energy transition.						
Hold community awareness campaigns on afforestation, sustainable use of biomass, renewable energy technologies, energy efficiency and conservation, clean cooking solutions, PURE technologies, bioenergy	No. of community awareness campaigns fora held	No. community awareness campaigns fora held No. of campaign channels utilized, disaggregated by type. % of population utilizing clean energy technologies	2025-2034	7	County Government, Devt. partners	Department responsible for Energy/ Public Participation
Collaborate with CTTIs and other partners to develop and implement customised training on energy-related programs	Energy-related programs developed and implemented in CTTIs	No. of energy-related programs developed and implemented	2026	20	County Government, Devt. partners	Department responsible for Energy/Education

Establish energy centres for demonstration of renewable energy technologies, energy efficiency and conservation, clean cooking solutions, PURE technologies, bioenergy	Energy centres established and operationalized	No. of energy centres established and operationalized Type of technologies/ solutions demonstrated in the energy centres	2027	20	County Government, Rural Electrification and Renewable Energy Corporation (REREC), Devt. partners	Department responsible for Energy
Support establishment of enterprises within the energy value chain with focus on marginalized entrepreneurs	Energy value- chain-related enterprises established	No. of energy value-chain-related enterprises established No. of marginalized-groups-driven-enterprises supported within the energy value chain	2026-2028	10	County Government, Devt. partners	Department responsible for Energy/ Trade

Policy Objective 2: To enhance sustainable development of energy resources and associated infrastructure.						
Policy Statement 1a: Promote sustainable exploitation and utilization of bioenergy resources.						
Conduct feasibility studies for commercial bioenergy potential, including biogas, other biofuels, and waste-to-energy	Feasibility studies conducted	No. of feasibility studies reports on bioenergy available	2026-2034	8	County Government, Devt. partners	Department responsible for Energy
Support development and use of alternative bioenergy fuels	Alternative bioenergy fuels (e.g., briquettes, pellets, biogas, bioethanol) developed and promoted	Tons/volume of alternative bioenergy fuel produced No. of acreage under bioenergy crops farming	2026-2028	15	County Government, Devt. partners	Department responsible for Energy/Public Participation

Promote collection and transportation of bioenergy to aggregation centres for processing	Bioenergy aggregation centres established and operationalized	No. of bioenergy aggregation centres established and operationalized	2027	10	County Government, Devt. partners	Department responsible for Energy
	Bioenergy Farmers cooperatives established and supported	No. of bioenergy-farmers' cooperatives established and supported	2026-2034	3	County Government, Devt. partners	Department responsible for Energy/Agriculture
Promote sustainable charcoal production by campaigning for tree growing or restoration targets as condition for recruitment, registration and licensing charcoal producers in designated zones	Registered charcoal producers vetted and assigned restoration targets	No. of registered charcoal producers vetted No. of hectares of initially degraded areas restored through tree growing by charcoal producers	2026-2034	5	County Government, Devt. partners	Department responsible for Energy

Policy statement 1b: Promote sustainable supply of bioenergy feedstock, including bio-crops and (re)afforestation						
Partner with stakeholders to increase the county tree cover to at least 30% by 2032	County trees cover increased	Percentage increase of county tree cover achieved	2025-2032	20	County Government, Devt. partners/ Forestry/KWS	Department responsible for Forestry
Promote development and use of alternative bioenergy fuels	Alternative bioenergy fuels (e.g., briquettes, pellets, biogas, bioethanol) developed and promoted	Tons of alternative bioenergy fuel produced No. of acreage under bioenergy crops farming	2025-2032	20	County Government, Devt. partners	Department responsible for Energy
Facilitate annual mapping of the woody biomass stock, annual net increase and demand for wood fuel in the County	Woody biomass stock mapped Increased use of wood fuel	Percentage of woody biomass stock mapped Proportion of the population using wood fuel	2026-2034	5	County Government, Devt. partners	Department responsible for Environment/ Energy

Develop County Restoration Opportunities Profile (CROP) for each Sub- County	County Restoration Opportunities Profile (CROP) completed	No. of sub counties with fully completed CROPs	2026	2	County Government, Devt. partners	Department responsible for Environment
Policy statement 2: Promote the development of energy resources (solar, hydro, wind, geothermal) for electricity generation (both grid and off-grid), as well as for other applications such as solar thermal technologies and wind-powered water pumping						
Map and develop database for energy resources (bioenergy, solar, wind, hydro and geothermal)	Energy resources mapped and database developed	Type and geographical coverage of resources mapped Database developed	2025 2026	4	County Government, Devt. partners	Department responsible for Energy
Undertake feasibility studies and data collection of renewable energy resources for electricity generation and other applications	Feasibility studies undertaken	No. of feasibility studies reports aggregated by type of renewable energy resource	2026-2028	8	County Government, Devt. partners	Department responsible for Energy
Promote and develop hybrid renewable energy systems	Hybrid renewable energy systems developed	No. of hybrid renewable systems developed	2026-2034	12	County Government, Devt. partners	Department responsible for Energy

Promote other applications of the renewable energy resources, e.g. solar water heating, solar thermal, wind for pumping	Applications of the renewable energy resources adopted	Proportion of the population using other renewable energy applications	2025-2034	10	County Government, Devt. partners	Department responsible for Energy
Facilitate land acquisition and wayleaves for energy infrastructure	Wayleaves and land secured for energy projects	No. of energy projects with secured land/ wayleaves	2025-2034	5	County Government, Devt. partners	Department responsible for Energy

PolicyObjective 3: Accelerate rapid transition to affordable cleaner cooking solutions for households, MSMEs and public institutions.						
Policy Statement 1: Support provision of affordable, reliable and sustainable electricity access to meet all the electricity needs including for Productive Use of Energy in Makueni County.						
Develop and implement electricity access programs for households, public facilities and PURE enterprises through appropriate least cost electrification options (e.g. grid, mini-grid and standalone systems)	Electrification programs developed and implemented	Name & type/ nature of electrification programs developed	2025-2034	2	County Government, Devt. partners	Department responsible for Energy
		% of households & public facilities connected to electricity, aggregated by electrification technology	2025-2034	300	County Government, Devt. partners	Department responsible for Energy
		No. of mini-grids developed under public- private partnership models for electrification projects	2025-2034	120	County Government, Devt. partners	Department responsible for Energy
	New high mast floodlights installed	No. of new high mast floodlights installed	2025-2034	80	County Government, Devt. partners	Department responsible for Energy
	Markets equipped with lighting	No. of markets with adequate lighting	2025-2034	50	County Government, Devt. partners	Department responsible for Energy

Collaborate with energy service providers to strengthen grid infrastructure, improving power reliability, availability, and capacity to meet the growing demand	Reduction in no. and duration of outages	% reduction in no. and duration of outages	2025-2034	150	County Government, KPLC, Devt. partners	Department responsible for Energy
Strategy 3: Promote quality standalone systems products/ components like solar photovoltaics including in the design, installation and maintenance.	Available trained and certified technicians	No. of trained and certified technicians in the County	2025-2034	30	County Government, Devt. partners	Department responsible for Energy
	High quality standalone system products like Solar PV, batteries available.	No. of registered outlets for solar PV products in the County	2025-2034	-	County Government, Devt. partners	Department responsible for Energy

Policy Statement 2: Accelerate rapid transition to affordable cleaner cooking solutions for households, MSMEs and public institutions.						
Promote increased adoption cleaner cooking fuels e.g. LPG, bioethanol, improved cook-stoves, biogas, e-cooking and renewable solid biomass by households, public facilities, MSMEs	Clean cooking programs developed	Name & type/nature of clean cooking programs developed	2025-2034	20	County Government, Devt. partners	Department responsible for Energy
	Households adopting cleaner cooking fuels and technologies in households	% of households with access to cleaner cooking fuels and technologies	2025-2034	200	County Government, Devt. partners	Department responsible for Energy
	Public facilities and institutions adopting cleaner cooking fuels and technologies	No. of public institutions with access to cleaner cooking fuels and technologies	2025-2034	90	County Government, Devt. partners	Department responsible for Energy
	MSMEs adoption of cleaner cooking fuels and technologies	No. of MSMEs with access to cleaner cooking fuels and technologies	2025-2034	90	County Government, Devt. partners	Department responsible for Energy
Create incentives for stove and fuel distributors, including business permit waivers to expand their distribution networks and build LPG infrastructure	Enterprises per ward active in clean cooking	No. of stove and fuel distributors per ward	2025-2034	40	County Government, Devt. partners	Department responsible for Energy

Leverage partnerships and communities. with organizations supporting clean cooking programs to promote clean cooking in schools	Partnerships leveraged	No of partnerships leveraged for clean cooking	2025-2034	2	County Government, Devt. partners	Department responsible for Energy
Support local manufacturing and production of clean cooking solutions	Locally manufactured clean cooking solutions increased to promote job creation and affordability of cleaner cooking solutions	No. of designated spaces for clean cooking solution manufacturers No. of jobs created by the supported enterprises	2025-2034	-	County Government, Devt. partners	Department responsible for Energy
Policy Objective 4: To promote growth of PUE with an emphasis on renewable energy for improved socio-economic transformation in the County.						
Policy Statement 1: Promote adoption of PURE by agriculture and allied enterprises for improved socio-economic transformation in Makueni County.						
Review and expand Investment Prospectus (IP) highlighting PURE opportunities	Investment Prospectus published and disseminated	No. of PURE projects implemented	2025-2026	3	County Government, Devt. partners	Department responsible for Energy/ Trade/ Investments

Support pilot projects that test locally designed PURE solutions tailored to Makueni's economic activities to enhance jobs creation	PURE piloted projects implemented	No. of PURE projects implemented No. of jobs created from PURE projects	2025-2027	20	County Government, Devt. partners	Department responsible for Energy
	Jobs created					
Provide support (e.g. technical, reduced licensing fees etc.) to various end users e.g. farmer groups, cooperative societies and businesses to utilize PURE solutions for enhanced agricultural productivity, storage and transportation and value addition	PURE solutions adoption by various end users enhanced	No. of end users using PURE technologies e.g. cold rooms, solar pumps, chillers etc.	2025-2030	50	County Government, Devt. partners	Department responsible for Energy
Policy statement 2: Promote growth of light industries and investments in designated areas through provision of reliable electricity services.						
Attract energy-intensive industries	Growth in energy intensive industries	No. of new industries established	2026-2034	200	County Government, private sector	Department responsible for Energy/Trade

Mapping of energy supply needs of designated areas	Energy needs of designated areas mapped	No. of designated areas with energy needs mapped	2026-2030	10	County Government, KURA, Devt. partners	Department responsible for Energy/Trade
	Designated areas have access to adequate & reliable energy services	No. and size of energy projects developed in designated areas	2026-2030	10	County Government	Department responsible for Energy
Implement infrastructure projects such as road networks to facilitate access to designated & last mile areas and products movement, including energy products	Accessibility of the designated areas and last mile communities	Kms of roads built and accessible	2026-2032	100	County Government, KURA, Devt. partners	Department responsible for Infrastructure
Policy Objective 5: To promote adoption of sustainable Energy Efficiency and Energy Conservation practices in the County.						
Policy Statement 1: Enhance the adoption of EE&C measures in the County						
Develop and enforce building energy codes	Building energy codes developed	No. of building energy codes developed	2026-2028	5	County Government, EPRA	Department responsible for Energy
	Integration of EE&C codes in building designs	% of new buildings complying with EE&C codes	2025-2034	5	County Government, EPRA	Department responsible for Energy/Public Works

Promote energy audits for large consumers according to EMR 2025	Energy audits conducted and implemented	No. of energy audits conducted	2025-2034	15	County Government, Devt. partners	Department responsible for Energy
Support connection of households and public facilities to efficient energy technologies and appliances	Households and public facilities adopting efficient technologies and appliances	% of households and public facilities adopting efficient technologies and appliances	2025-2034	50	County Government, Devt. partners	Department responsible for Energy/ Finance
Policy Statement 2: Promote adoption of alternative transport fuels and technologies as a pathway towards a more sustainable, efficient, and equitable transportation.						
Develop infrastructure for electric mobility (charging stations)	EV charging stations established	No. of EV charging stations established and operational	2026-2032	30	County Government, Private sector	Department responsible for Energy/Transport
Increase adoption of electric vehicles	Electric vehicles uptake	% adoption electric vehicles by the county	2026-2030	100	County Government, Devt. partners	Department responsible for Energy/Transport
	Clean transport technologies uptake in PSV enhanced (*bodaboda*)	% adoption of electric vehicles (two wheelers) for public service	2026-2034	40	County Government, SACCOs, Devt. partners	Department responsible for Energy/Transport
Support non-motorized transport infrastructure (e.g., bike lanes, walkways)	Non-motorised transport infrastructure developed	Kms of non-motorized transport infrastructure developed	2026-2034	60	County Government, Devt. partners	Department responsible for Energy/Transport

Strategy 4: Undertake a county-level demand assessment study for electric vehicles (two-, three- and four- wheelers).	County-level demand assessment study	County-level demand assessment study report	2026-2034	3	County Government, Devt. partners	Department responsible for Energy/Transport
Strategy 5: Adopt solar-powered and energy-efficient street-lighting technologies	New efficient and/ or solar streetlights installed	No. of new solar and efficient streetlights installed disaggregated by roads, markets, urban spaces etc.	2026-2034	10	County Government, Devt. partners	Department responsible for Energy/Transport
Policy Statement 3: To provide a sustainable and appropriate level of street lighting to the road network, markets and urban areas at the appropriate times and costs.						
Adopt solar-powered and energy-efficient street lighting technologies.	New efficient and/ or solar streetlights installed	No. of new solar and efficient streetlights installed disaggregated by roads, markets, urban spaces etc.	2025-2030	40	County Government, Devt. partners	Department responsible for Energy
	New floodlights installed	No. of new floodlights installed	2025-2030	40	County Government, Devt. partners	Department responsible for Energy

Policy Objective 6: To mobilize financing and other necessary resources towards the implementation of energy projects and programs in the County.						
Policy Statement 1: Increase financing for the energy and energy-related initiative through various sources - climate financing and other financing mechanisms.						
Increase allocation of resources for the implementation of the energy policy and energy plan	Resources allocated to county energy and energy-related projects and programs	%increase of resources allocated to energy and energy-related projects and programs	2026-2034	20/yr	County Government	Department responsible for Energy/ Environment/ Budget
Engage development partners and the private sector for resource mobilization	Project funding from development partners increased	No. of proposals developed, submitted and funded	2026-2034	5/yr	County Government, Devt. partners	Department responsible for Energy/Economic Planning CS
		% of funds obtained from development partners for energy projects	2026-2034	20	County Government, Devt. partners	Department responsible for Energy
Policy statement 2: Tap into Carbon Credits for Renewable Energy Projects.						
Develop a list of projects and programmes that are eligible for carbon credit funding	List of projects and programmes eligible for Carbon credit developed	No. of projects validated for carbon crediting	2026-2034	10	Devt. partners, carbon aggregators	Department responsible for Energy/ Environment/ Climate Change

Partner with accredited carbon credit aggregators to enhance its utilization	Partnerships framework developed	No. of framework partnerships developed No. of partnerships established	2026-2034	-	Government, Devt. partners, carbon aggregators	Department responsible for Energy/ Environment/ Climate change
Develop a mechanism for equitable sharing of carbon credit revenues	Revenue-sharing mechanism developed and implemented	No. of operational revenue-sharing mechanisms	2026-2034	1	Government, Devt. partners, carbon aggregators	Department responsible for Energy/ Environment/ Climate change
Policy Statement 3: Establish Makueni County Energy Fund as envisioned in the Energy Act, 2019 to finance programs and initiatives across the energy value chain.						
Develop comprehensive operational guidelines detailing application procedures, eligibility criteria, appraisal methodologies, disbursement mechanisms, and monitoring frameworks	Comprehensive operational guidelines developed	No. of comprehensive operational guidelines developed	2026	2	County Government	Department responsible for Finance/ Investments/ Economic Planning

Allocate seed capital through the annual budget process and develop strategies to attract additional resources from development partners, the private sector, and other stakeholders	Seed capital allocated	Amount of seed capital allocated into the County Energy Fund	2027-2034	300	County Government	Department responsible for Finance, Investments and Economic Planning
Build a pipeline of bankable projects for Energy Fund investment, including those owned by marginalized community members	List of vetted, ready to implement projects	No. of projects in the Energy Fund pipeline % of bankable projects owned by marginalized community members	2027-2030	3	County Government	Department responsible for Energy/ Finance/ Investments/ Economic Planning
Policy Objective 7: To mainstream environmental and social safeguards and climate-resilient livelihoods in the energy sector.						
Policy Statement 1: Increase the energy-driven County landscape restoration initiatives for sustainable wood fuel access.						
Promote agroforestry and energy woodlots	Agroforestry and woodlot established	Ha or Acres of land under agroforestry and woodlot	2025-2032	50	County Government, KFS, Devt. partners	Department responsible for Energy/Agriculture/ Environment

Integrate environmental and social safeguards into all energy projects	Integration report (E&S risk mitigation measures included) developed	No. of projects with E&S risk mitigation measures	2025-2034	10	County Government/NEMA	Department responsible for Energy/Planning
Policy Statement 2: Support the inclusive growth of energy access and productive use of energy in the County.						
Develop gender-inclusive tracking mechanisms	Energy access tracking system developed and operationalized	Energy access tracking systems developed and operationalized	2026	5	County Government, Devt. partners	Department responsible for Energy/ Finance/ICT/ Gender
Support energy access and productive energy use for women, youth, PWDs, and the elderly	Support to women, Youth, PWDs, and elderly-led households and enterprises	No. of women, Youth, PWDs and elderly-led households and enterprises supported	2025-2030	20	County Government, Devt. partners	Department responsible for Energy/ Finance

5 Monitoring, Evaluation, Learning & Reporting

5.1 Overview

This chapter outlines the process of tracking the progress and evaluating the impact of the actionable policy statements and strategies to ensure full implementation. It also contains the Key performance indicators (KPIs) to be tracked and set target, data source, frequency and person responsible.

5.2 Monitoring

The Department will ensure continuous tracking of progress and performance of policy statements and strategies outlined in the Makueni Energy Policy. This will be done through the existing M&E framework provided in the County Energy Plan. Timely dissemination and sound feedback mechanisms for M&E report findings will aid in implementation of this policy to ensure the intended outcomes and impacts are achieved. The monitoring process will be participatory, involving stakeholders at various levels to enhance transparency and accountability in the implementation.

5.3 Evaluation

The Directorate of Monitoring and Evaluation in collaboration with the Directorate of Energy will undertake Mid-term and End-term evaluations. To enhance objectivity and expertize, they may co-opt External Evaluator who has expertise in Energy area. However, in case of significant unexplained variation in performance in the critical performance area during the monitoring, either positive or negative, an Ad-hoc evaluation will be conducted to inform the decision for intervention.

5.4 Reporting

The County department responsible for Energy will provide data and information in periodic (bi-annual) reports aimed at identifying successes, gaps and areas for improvement, which will be made accessible to relevant actors.

5.5 Learning

Learning will be integrated into every aspect of the Policy implementation. The information generated from M&E will be analysed and shared with all actors. This will include the information on what worked and what adjustment during the implementation needs process to improve on the subsequent processes thus enhance effectiveness. The reports will identify and document best practices. This will be disseminated for replication and scaling up in other areas by stakeholders.

5.6 Policy Review

The policy shall be reviewed after 5 years or on need basis with approval of the County Executive Committee Members upon request from the Department responsible for energy. The review will ensure among others that the policy remains relevant and addresses the emerging issues and trends at international, national and county level. It shall involve all key stakeholders.

Table 5 1: Key performance indicators

Strategy	Expected Output	Key Performance Indicator	Timeframe/ Frequency	Responsibilities/ Actors
Strategy 1: Formulate and enact legislations and guidelines	Legislations and guidelines developed and approved	No. of guidelines developed and approved	Annually	Department responsible for Energy/County Attorney
Strategy 2: Review existing policies and regulatory frameworks addressing renewable and non-renewable resources	Acts and policies reviewed	No. of Acts and policies reviewed	Annually	Department responsible for Energy/County Attorney
Strategy 3: Periodically review and report on implementation of the County Energy Plan	County Energy Plan reviewed or updated, and reports presented on status of implementation	Implementation Status Report prepared, and County Energy Plan Review/Update undertaken	Annually (Implementation Report) Every 3 years (CEP Review/ Update)	Department responsible for Energy
	Annual Implementation Report developed	No. of Annual Implementation Reports developed	Annually	Department responsible for Energy
Strategy 4: Enact establishment and operationalisation of the Makueni County Energy Fund	Makueni County Energy Fund developed and operationalised	Makueni County Energy Fund developed and operationalised	Annually	Department responsible for Energy
Strategy 5: Develop incentives framework to encourage private sector participation in Makueni's energy sector	Incentive Framework developed	No. of incentive Framework developed	Annually	Department responsible for Energy/Finance

Strategy 6: Develop inter-governmental frameworks for policy coordination	Framework for inter-governmental partnership and collaboration developed	No. of Inter-governmental and collaboration frameworks developed	Develop inter-governmental frameworks for policy coordination	Framework for inter-governmental partnership and collaboration in place
Strategy 7: Develop county-level public-private partnerships framework to scale collaborations with private sector and multilateral agencies to attract energy investments	County-level public-private partnerships framework developed	No. of PPP Framework developed No. of personnel with energy sector expertise integrated in the PP office to support investor engagements	Annually	Department responsible for Energy/County Secretary
Strategy 8: Adopt and use guiding framework and tools to steer mainstreaming of Integrated Planning & Budgeting (IPB)	Integrated planning and budgeting adopted and utilised	No. of departments adopting IPB Amount of financial resources mobilized due to IPB	Annually	All departments
Policy statement 2: Strengthen institutional capacity to effectively implement the devolved energy functions				
Strategy 1: Enhance capacity building, trainings and skills development to plan, design and implement energy programs across the energy value chain. These include mobilizing projects financing, energy access; PURE, EE&C, bioenergy; clean cooking; integrated planning and budgeting	Staff recruited & trained on energy development across energy value chain	No. of staff capacity built on various topics across the energy value chain No. of new staff recruited	Annually	Department responsible for Energy

Strategy 2: Develop and implement Energy Management Information System	Energy Management Information System developed and operationalised	Energy Management Information System	Quarterly	Department responsible for Energy/ICT
Strategy 3: Mainstream energy in county development plans e.g. CIDP, ADP, Budget, county trade and industrial policies to ensure cross-sector synergy.	Increased budget allocation on energy projects/ programmes	Percentage of the development budget allocation to energy projects/ programmes	Annually	Department responsible for Energy/Planning
Policy statement 3: Enhance community capacity through awareness campaigns to accelerate the energy transition				
Strategy 1: Hold community awareness campaigns on afforestation, sustainable use of biomass, renewable energy technologies, energy efficiency and conservation, clean cooking solutions, PURE technologies, bioenergy	Community awareness campaigns held	No. of community awareness campaigns held	Biannually	Department responsible for Energy/ Public Participation
		No. of participants in community awareness campaigns, disaggregated by gender, age, etc.		
Strategy 2: Collaborate with CTTI and other partners to develop and implement customised training on energy-related programs	Energy-related programs developed and implemented in CTTIs	No. of energy-related programs developed and implemented	Annually	Department responsible for Energy/Education

Strategy 4: Establish of energy centres for demonstration of renewable energy technologies, energy efficiency and conservation, clean cooking solutions, PURE technologies, bioenergy etc.	Energy centres established and operationalised	No. of energy centres established and operationalised	Annually	Department responsible for Energy
Strategy 5: Support establishment of enterprises within the energy value chain with focus on marginalized entrepreneurs	Energy value chain related enterprises established	No. of energy value chain related enterprises established	Annually	Department responsible for Energy/Trade
		No. of marginalized groups' driven enterprises supported within the energy value chain		
Policy Objective 2: To enhance sustainable development of energy resources and associated infrastructure.				
Policy Statement 1a: Promote sustainable exploitation and utilization of bioenergy resources.				
Strategy 1: Conduct feasibility studies for commercial bioenergy potential, including biogas, other biofuels, and waste-to-energy.	Feasibility studies conducted	No. of feasibility studies reports on bioenergy available	Annually	Department responsible for Energy
Strategy 2: Promote collection and transportation of bioenergy to aggregation centres for processing	Bioenergy aggregation centres established and operationalized	No. of Bioenergy aggregation centres established and operationalized	Annually	Department responsible for Energy
	Bioenergy farmers cooperatives established	No. of bioenergy farmers cooperatives established	Annually	Department responsible for Energy/Agriculture

Strategy 3: Promote sustainable charcoal production by campaigning for tree growing or restoration targets as condition for recruitment, registration and licensing charcoal producers in designated zones.	Registered charcoal producers vetted and assigned restoration targets	No. of registered charcoal producers vetted No. of hectares of initially degraded areas restored through tree growing by charcoal producers	Annually	Department responsible for Energy/Agriculture
Policy statement 1b: Promote sustainable supply of bioenergy feedstock, including bio-crops and (re)afforestation,				
Strategy 1: Partner with stakeholders to increase the County tree cover to at least 30% by 2032	County tree cover increased	Percentage increase of County tree cover achieved	Annually	Department responsible for Energy/ Environment
Strategy 2: Promote development and use of alternative bioenergy fuels	Alternative bioenergy fuels (e.g., briquettes, pellets, biogas, bioethanol) developed and promoted	Tons of alternative bioenergy fuel produced	Annually	Department responsible for Energy/ Agriculture
		No. of acreage under bioenergy crops farming	Annually	Department responsible for Energy/ Agriculture
Strategy 3: Facilitate annual mapping of the woody biomass stock, annual net increase and demand for wood fuel in the County	Wood supply balance report	Percentage change in wood fuel balance	Annually	Department responsible for Environment/ energy
Strategy 4: Develop County Restoration Opportunities Profile (CROP) for each Sub-county.	County Restoration Opportunities Profile (CROP)	No. of sub-counties with County Restoration Opportunities Profile (CROP)	Annually	Department responsible for Environment/ Energy

Policy statement 2: Promote the development of energy resources (solar, hydro, wind, geothermal) for electricity generation (both grid and off-grid) as well as for other applications like solar thermal technologies and wind-powered water pumping.				
Strategy 1: Map and develop database for energy resources (solar, wind, hydro and geothermal)	Energy resource mapped and database developed	Type and geographical coverage of resources mapped Database developed	Annually	Department responsible for Energy
Strategy 2: Undertake feasibility studies and data collection of renewable energy resources for electricity generation and other applications.	Feasibility studies undertaken	No. of feasibility studies reports aggregated by type of renewable energy resource	Annually	Department responsible for Energy
Strategy 3: Promote and develop hybrid renewable energy systems	Hybrid renewable energy systems developed	No. of hybrid renewable systems developed	Annually	Department responsible for Energy
Strategy 4: Promote other applications of the renewable energy resources, e.g. solar water heating, solar thermal, wind for pumping	applications of the renewable energy resources adopted	No. of other renewable energy applications established	Annually	Department responsible for Energy
Strategy 5: Facilitate land acquisition and wayleaves for energy infrastructure	Wayleaves and land secured for energy project	No. of energy projects with secured land/ wayleaves	Annually	Department responsible for Energy

Policy Objective 3: To enhance universal electricity and clean cooking access in Makueni County.				
Policy Statement 1: Support provision of affordable, reliable and sustainable electricity access to meet all the electricity needs, including for Productive Use of Energy in Makueni County.				
Strategy 1: Develop and implement electricity access programs for households/ public facilities through appropriate least cost electrification options (e.g. grid, mini-grid and standalone systems)	Electrification programs developed and implemented	Name & type/ nature of electrification programs developed	Annually	Department responsible for Energy
		% of households & public facilities connected with electricity aggregated by electrification technology	Annually	Department responsible for Energy
		No. of mini-grids developed under public-private partnership models for electrification projects	Annually	Department responsible for Energy
	New high mast floodlights installed	No. of new high mast floodlights installed	Annually	Department responsible for Energy
	New streetlights installed	No. of new streetlights installed	Annually	Department responsible for Energy
	Market lighting improved	No. of markets with adequate lighting	Annually	Department responsible for Energy

Strategy 2: Collaborate with energy service providers to strengthen grid infrastructure to improve the power reliability, availability and ability to handle the growing demand	Reduction in no. and duration of outages	% reduction in no. and duration of outages	Annually	Department responsible for Energy
Strategy 3: Promote quality standalone systems products/ components like solar photovoltaics including in the design, installation and maintenance.	Technicians trained and certified High quality standalone system products like Solar PV, batteries available.	No. of trained and certified technicians in the County	Annually	Department responsible for Energy
		No. of registered outlets for PV in the County	Annually	Department responsible for Energy
		No. of installations done with County Government's approval	Annually	Department responsible for Energy
Policy Statement 2: Accelerate rapid transition to affordable cleaner cooking solutions for households, MSMEs and public institutions.				
Strategy 1: Promote increased adoption of cleaner cooking fuels e.g. LPG, bioethanol, improved cook-stoves, biogas, e-cooking and renewable solid biomass by households, public facilities, MSMEs	Cleaner cooking fuels programs developed and implemented	Name & type/ nature of clean cooking programs developed	Annually	Department responsible for Energy
		% of households with access to cleaner cooking fuels and technologies	Annually	Department responsible for Energy
		% of public institutions with access to cleaner cooking fuels and technologies	Annually	Department responsible for Energy
		% of MSMEs with access to cleaner cooking fuels and technologies	Annually	Department responsible for Energy

Strategy 2: Create incentives for stove and fuel distributors, including business permit waivers, to expand their distribution networks and build LPG infrastructure	Enterprises per ward active in clean cooking	No. of stove and fuel distributors per ward	Annually	Department responsible for Energy
Strategy 3: Leverage partnerships and communities. with organizations supporting clean cooking programs to promote clean cooking in schools	Partnerships leveraged	No of partnerships leveraged for clean cooking	Annually	Department responsible for Energy
Strategy 4: Support local manufacturing and production of clean cooking solutions	Locally manufactured clean cooking solutions increased to promote job creation and affordability of cleaner cooking solutions	No. of designated spaces for clean cooking solution manufacturers	Annually	Department responsible for Energy
		No. of jobs created by the supported enterprises		
Policy Objective 4: To promote growth of PUE with an emphasis on renewable energy for improved socio-economic transformation in the County.				
Policy Statement 1: Promote adoption of PURE by agriculture and allied enterprises for improved socio-economic transformation in Makueni County.				
Strategy 1: Review and expand Investment Prospectus (IP), demonstrating PURE opportunities in the County to help investors with investment decisions	Investment Prospectus published and disseminated	No. of PURE projects implemented	Annually	Department responsible for Energy/Trade

Strategy 2: Support pilot projects that test locally designed PURE solutions tailored to Makueni's economic activities to enhance jobs creation	PURE piloted projects implemented Jobs created	No. of PURE projects implemented	Annually	Department responsible for Energy
		No. of jobs created from PURE projects		
Strategy 3: Provide support (e.g. technical assistance, reduced licensing fees etc.) to various end users e.g. farmer groups, cooperative societies and businesses to utilize PURE solutions for enhanced agricultural productivity, storage and transportation and value addition.	PURE solutions adoption by various end users enhanced	No. of PURE solutions installed disaggregated by technology e.g. cold rooms, solar pumps, chillers etc.	Annually	Department responsible for Energy
Policy statement 2: Promote growth of light industries and investments in designated areas through provision of reliable electricity services.				
Strategy1: Attract energy-intensive industries	Increased energy intensive industries	No. of new industries established	Annually	Department responsible for Energy/Trade
Strategy 2: Integrate energy needs of designated areas	Energy needs of designated areas mapped	No. of designated areas with energy needs mapped	Annually	Department responsible for Energy/Trade
	Designated areas have access to adequate & reliable energy services	No. and size of energy projects developed in designated areas	Annually	Department responsible for Energy

Strategy 3: Implement infrastructure projects such as road networks to facilitate access to designated & last mile areas and products movement, including energy products	Increase accessibility of the designated areas and last mile communities	Kms of roads developed and accessible	Annually	Department responsible for Infrastructure
Policy Objective 5: To promote adoption of sustainable Energy Efficiency and Energy Conservation practices in the County, including Transport, Street- Lighting, cooking, among others).				
Policy Statement 1: Enhance the adoption of EE&C measures in the County (including households, institutions, business buildings, industries, designated areas etc.)				
Strategy 1: Develop and enforce building energy codes	Building energy code developed	No. of building energy codes developed	Annually	Department responsible for Energy
	Integration of EE&C codes in building designs	% of new buildings complying with EE&C codes	Annually	Department responsible for Energy/Public Works
Strategy 2: Promote energy audits for large consumers according to EMR, 2025	Energy audits conducted and implemented	No. of energy audits conducted	Annually	Department responsible for Energy
		No. of energy audits implemented	Annually	Department responsible for Energy
Strategy 3: Support households and public facilities connection with efficient energy technologies and appliances	Households and public facilities adopting efficient technologies and appliances	% of households and public facilities adopting efficient technologies and appliances	Annually	Department responsible for Energy/ Finance

Policy Statement 2: Promote adoption of alternative transport fuels and technologies as a pathway towards a more sustainable, efficient, and equitable transportation.				
Strategy 1: Develop infrastructure for electric mobility (charging stations)	EV charging stations established	No. of EV charging stations established and operational	Annually	Department responsible for Energy/Transport
Strategy 2: Increase adoption of electric vehicles	Electric vehicles uptake	% adoption rate of electric vehicles by the County	Annually	Department responsible for Energy/Transport
	Uptake of electric vehicles (two wheelers (bodaboda)	% adoption of electric vehicles (two wheelers) for public service	Annually	Department responsible for Energy/Transport
Strategy 3: Support non-motorized transport infrastructure (e.g., bike lanes, walkways)	Non-motorised transport infrastructure developed	Kms of non-motorized transport infrastructure developed	Annually	Department responsible for Energy/Transport
Strategy 4: Undertake a county-level demand assessment study for electric vehicles (two-, three- and four- wheelers).	County-level demand assessment study	County-level demand assessment study report	Annually	Department responsible for Energy/Transport
Strategy 5: Adopt solar-powered and energy-efficient street-lighting technologies	New efficient and/ or solar streetlights installed	No. of new solar and efficient streetlights installed disaggregated by roads, markets, urban spaces etc.	Annually	County Government, Devt. Partners
Policy Objective 6: To mobilize financing and other necessary resources towards the implementation of energy projects and programs in the County.				
Policy Statement 1: Increase financing for the energy and energy-related initiatives through various sources such as climate financing and other financing mechanisms.				
Strategy 1 : Increase allocation of resources for the implementation of the energy policy and energy plan	Resources allocated to county energy and energy-related projects and programs	% increase of resources allocated to energy and energy-related projects and programs	Annually	Department responsible for Energy/ Environment/ Planning

Strategy 2: Engage development partners and private sector for resource mobilization	Project funding from development partners increased	No. of proposals developed, submitted and funded	Annually	Department responsible for Energy/CS
		% of funds obtained from development partners for energy projects	Annually	Department responsible for Energy
Policy statement 2: Tap into Carbon Credits for Renewable Energy Projects.				
Strategy 1: Develop list of projects and programmes that are eligible for carbon credit funding	List of projects and programmes for Carbon credit developed	No. of projects validated for carbon crediting	Annually	Department responsible for Energy
Strategy 2: Partner with accredited carbon credit aggregators to enhance its utilization	Partnerships framework developed	No. of framework partnerships developed No. of partnerships established	Quarterly	Department responsible for Energy
Strategy 3:Develop a mechanism for equitable sharing of carbon credit revenues	Revenue-sharing mechanism developed and implemented	No. of operational revenue-sharing mechanisms	Annually	Department responsible for Energy/ Finance
Policy Statement 3: Establish Makueni County Energy Fund as envisioned in the Energy Act, 2019, to finance programs and initiatives across the energy value chain.				
Develop comprehensive operational guidelines detailing application procedures, eligibility criteria, appraisal methodologies, disbursement mechanisms, and monitoring frameworks	Comprehensive operational guidelines developed	No. of the comprehensive operational guidelines developed	Once	Department responsible for Energy/Finance

Allocate seed capital through the annual budget process and develop strategies to attract additional resources from development partners, private sector, and other stakeholders	Seed capital allocated	Amount of seed capital allocated to the County Energy Fund	Annually	Department responsible for Energy/Finance
Build a pipeline of bankable projects for Energy Fund Investment, including those owned by marginalized community members	List of vetted, ready-to- implement projects	No. of projects in the Energy Fund pipeline % of bankable projects owned by marginalized community members	Annually	Department responsible for Energy/Finance
Policy Objective 7: To mainstream environmental and social safeguards and climate resilient livelihoods in the energy sector.				
Policy Statement 1: Increase the energy-driven County landscape restoration initiatives for sustainable wood fuel access.				
Strategy 1: Promote agroforestry and energy woodlots	Agroforest and woodlot established	Ha or Acres of land under agroforestry and woodlot	Annually	Department responsible for Energy/Agriculture
Strategy 2: Integrate environmental and social safeguards into all energy projects	Integration report (E&S risk mitigation measures included) developed	No. of projects with E&S risk mitigation measures	Annually	Department responsible for Energy
Policy Statement 2: Support the inclusive growth of energy access and productive use of energy in the County.				
Develop gender-inclusive tracking mechanisms	Energy access tracking system developed and operationalized	Energy access tracking systems developed and operationalized	Annually	Department responsible for Energy
Support energy access and productive energy use for women, youth, PWDs, and the elderly.	Women, Youth, PWDs and elderly-headed households and livelihood enterprises supported	No. of new Women, Youth, PWDs and elderly-led households and livelihood enterprises supported	Annually	Department responsible for Energy

ANNEX:1

Policies, Strategies, and Plans at the Regional and National Level

The Makueni Energy Policy is guided by several legislations, policies, blueprints, and plans. These include:

i. **Sustainable Development Goals (SDGs):** Goal 7 on affordable and clean energy aims to ensure access to affordable, reliable, sustainable, and modern energy for all by 2030. Goal 13 addresses climate change mitigation.

ii. **Africa Union Agenda 2063:** It aims to accelerate Africa's transition from traditional to modern sources of energy and ensure access to clean, affordable, and sustainable energy. Individual countries are expected to develop and implement policies, strategies, and regulations that promote sustainable growth in the energy sector. East Africa Community Vision 2050: The Vision aims at making the region globally competitive, and upper-middle-income with a high quality of life for its population, based on the principles of inclusivity and accountability. Realizing this vision will require through long-term transformation, value addition, and infrastructure development, with energy needed for accelerating momentum for sustained growth over the long term. To support the realisation of the vision, the East African Community has developed a Policy on Energy and Petroleum. The objective of the Policy is to ensure sustainable, adequate, affordable, competitive, secure and reliable energy supply to meet regional needs at the least cost, while protecting and conserving the environment. The region will thus emphasize access, capacity, efficiency, and sustainability of energy. Makueni County, supporting Kenya's commitment to this vision, is enhancing exploration and development of energy resources in the County and investing in energy infrastructure to enhance access to energy products and services in the County.

iii. **Kenya Vision 2030:** This blueprint seeks to transform Kenya into an industrializing middle-income country providing a high quality of life to its citizens in a clean and secure environment.14 Energy is an enabler towards this realization. The national development goals of the Government of Kenya, as outlined in Vision 2030, are:

   a. Accelerated economic growth;
   b. Increased productivity of all sectors;
   c. Equitable distribution of national income;
   d. Poverty alleviation through improved access to basic needs;
   e. Enhanced agricultural production;
   f. Industrialization; and
   g. Accelerated employment creation and improved rural-urban balance.

   The realization of these goals will be feasible if quality energy services are provided in a sustainable, competitive, cost-effective, and affordable manner to all sectors of the economy.

iv. **Medium Term Plans (MTPs):** Vision 2030 is implemented through MTPs, which set targets to be achieved within five years. Kenya is currently executing the fourth and final MTP (2023-2027) under Vision 2030. This plan outlines the Country's strategic priorities in the energy sector, emphasising increased energy supply, enhanced efficiency, and reduced costs. Key energy initiatives under the current MTP include nuclear energy development, geothermal expansion, floating solar projects, and waste-to-energy initiatives.15

v. **The Energy Act, 2019:** The Energy Act aligns the legal and regulatory framework of the energy sector with the Constitution of Kenya, 2010. It was enacted in response to calls to consolidate energy laws; promote renewable energy; promote exploration, recovery, and commercial utilization of geothermal energy; and regulate midstream and downstream petroleum and coal activities.

vi. **National Energy Policy, 2018:** The overall objective of this policy is to ensure an affordable, competitive, sustainable and reliable supply of energy at the least cost, while protecting and conserving the environment.

vii. **Gender Policy in Energy, 2019:** The Policy is designed to promote the role of energy in meeting the practical needs and well-being of women, men, boys, and girls. Availability of clean, sustainable and affordable energy sources facilitates the participation of both men and women in the socio-economic growth of the Country, while improving the environment. 9. The Bioenergy Strategy 2020–2027: The strategy aims to guide the development and promotion of bioenergy as a formal industry for Kenya's economic development. It embodies the national and county governments' renewable energy priorities and intentions to deliver modern energy solutions from available bioenergy feedstock through innovation and consultation. The strategy will support the development of bioenergy to meet the long-term sustainable energy demand.

viii. **The Kenya Ethanol Cooking Fuel (ECF) Masterplan:** The objective of the masterplan is to provide potential investors, policymakers, and researchers with an evidence base to guide the development of ECF infrastructure and distribution systems in Kenya. It also provides policy recommendations on how the Government of Kenya and other sector stakeholders can support the industry.

ix. **Kenya National Energy Efficiency and Conservation Strategy (NEECS), 2020:** The NEECS was developed to enhance ongoing efforts, by providing a roadmap towards achieving energy efficiency goals.

x. **Feed-In-Tariff Policy, 2021:** This is an instrument for promoting the generation of electricity from renewable energy sources namely; hydro, wind, solar, geothermal, biomass and biogas. A Feed-in-Tariff Policy allows power producers to sell electricity to an off-taker at a pre-determined tariff for a given period.

xi. **Renewable Energy Auctions Policy (REAP), 2021:** The REAP applies to solar, wind, and other renewable energy projects larger than 20 MW. It recognizes the potential for localized energy generation and aims to procure renewable energy capacity at competitive prices, in line with the Least Cost Power Development Plan (LCPDP) and the Integrated National Energy Plan (INEP).

xii. **The Least Cost Power Development Plan (LCPDP) 2020-2040:** The LCPDP is intended to articulate the government's commitment to the power sector growth through the development of requisite generation infrastructure. The plan is updated on a 2-year rolling basis to incorporate emerging changes in the power sector and modelling the Country's electricity demand-supply outlook over a 20-year period.

xiii. **The Petroleum (Exploration and Production) Act, 2019:** The Petroleum Act was enacted to regulate the negotiation and conclusion by the Government of petroleum agreements relating to the exploration for development, production, and transportation of petroleum.

xiv. **The National Climate Change Action Plan (NCCAP) 2018-2022:** The NCCAP outlines Kenya's 5-year action plan in response to climate change and overall reduction in greenhouse gas emissions. NCCAPs are developed in conformity with the Kenya Climate Change Act, 2016, to guide mainstreaming of climate change into sector functions. The NCCAP aims to further Kenya's development goals by providing measures required to achieve a low carbon climate resilient development pathway. It recognizes the importance of increasing the climate resilience of vulnerable groups, including women, youth, persons with disability, and marginalized and minority communities.

xv. **Energy Transition and Investment Plan:** The goal of the plan is to help Kenya frame an energy transition agenda that will attract investment, while at the same time ensuring a just transition and fully supporting Kenya's rapid economic growth trajectory.

xvi. **Kenya National Electric Cooking Strategy, 2024:** The Strategy lays out a roadmap to transition 10% of Kenyan households from polluting fuels to eCooking by 2028. It provides a roadmap for building the foundation for a sustainable eCooking marketplace for the first five years of its implementation, which will then enable an accelerated scale up over the next two decades to facilitate the 2050 Net Zero transition.

xvii. **Climate change Act, 2016:** The objective of the Climate Change Act is to provide a regulatory framework for an enhanced response to climate change, and to provide mechanisms and measures to improve resilience to climate change and promote low carbon development.

xviii. **The Kenya National Electrification Strategy(KNES), 2018:** KNES is the roadmap to achieving universal access to electricity as a key driver of powering the country's development agenda.

Alongside the preceding principal Acts, other Acts that impact the energy sector include:

i. The **Standards Act; Chapter 496 of the Laws of Kenya** provides for the establishment of minimum quality specifications, modes, materials, and apparatus for energy used in the country.

ii. The **Environmental Management and Coordination Act of 1999**, regulates the environmental aspect of the energy sector.

iii. The **County Government Act, 2012** provides for the regulation required to implement the provisions relating to devolved government. It also gives effect to chapter 11 of the Constitution, to provide for county government powers, functions and responsibilities to deliver services and for connected purposes.

iv. The **Land Act, 2012** provides for matters relating to public, private, and community land.

v. The **Community Land Act, 2016** provides for the recognition, protection and registration of community land rights, management and administration of community land, and provides for the role of the county governments in the unregistered community land.

vi. The **Physical Planning Act, Chapter 286 of the Laws of Kenya** provides for zoning of areas for storage, distribution, and retailing of petroleum fuels and construction of electric power substations and other infrastructure.

vii. The **Public Procurement and Asset Disposal Act** provides procedures for efficient public procurement and assets disposal by public entities and state organs.

viii. The **Weights and Measures Act, Chapter 513 of the Laws of Kenya** under which storage tanks and dispensing equipment for the sale of petroleum products are calibrated and regulated for accuracy.

Policies, Strategies, and Plans at the County Level

i. **Makueni Climate Change Act, 2022:** The object of the Act is to provide a framework for the County to respond efficiently to the effects of climate change through mitigation and adaptation strategies. In recognition of the importance of renewable energy in the climate change governance framework, the Act provides for inclusion of the Chief Officer responsible for energy or a representative in the composition of the Climate Change Board.

ii. **Makueni County Water Act, 2020:** The Makueni County Water Act provides a framework for water management, utilization, and distribution in the County. The Act provides for management of water resources in a manner that is beneficial to all residents of Makueni. It also provides a legal framework on how water from different sources shall be managed and how efficiency will be enhanced while ensuring the right tools and technologies are employed in water management, supply and utilization. Energy is a key resource in the effective and efficient distribution of water.

iii. **Makueni County Finance Act, 2023:** The Act addresses the need for a comprehensive legal framework to regulate the imposition and collection of county fees, charges, licenses, rents and rates for various services. This addresses previous gaps in revenue collection mechanisms and emphasises the need for standardized rates and charges across different sectors including lands, advertisements, markets, county vehicles, public health, and infrastructure. It also highlights the need to establish proper enforcement mechanisms and penalties for non-compliance to enhance revenue collection efficiency and service delivery.

iv. **Makueni County Vision 2025:** This is a development blueprint aimed at socio-economic transformation of the County by 2025. The vision aims to achieve accelerated and inclusive economic growth and development, improved access to quality water and health services, enhanced access to quality education, increased job creation, increased household incomes, and sustainable food security. The strategies to be pursued include green energy generation (solar and wind) through public-private partnerships, promotion of the use of green energy (solar, wind and biogas) at the household level, and lighting of markets and streets.

v. **Makueni County CIDP (2023-2027):** The Makueni County Integrated Development Plan 2023-27 is the third generation of the five-year county plans since devolution, as mandated by Section 102 (h), 104 (1) and 108 of the County Government Act, 2012. The overall vision of the plan is to have a prosperous value-based county with a high quality of life.16 The CIDP, whose theme is 'A resilient economy for sustainable development' was developed through a participatory approach with the involvement of Sector Working Groups and diverse stakeholders. The CIDP recognizes renewable energy development and promotion as a key priority sector. Regarding access to reliable and clean energy, the sector plans to collaborate with key development partners. This collaboration seeks to enhance energy resource development, improve both rural and urban electrification, promote uptake of green energy sources, and continuously maintain energy assets across the County.

vi. **Makueni Environment and Climate Change Policy:** The Policy provides a framework for the mainstreaming of sustainable environmental management, including low carbon and climate change resilience in the county's sectoral development plans. The Policy seeks to transition the County from over reliance on charcoal and firewood to the use of renewable energy.

vii. **Makueni County Spatial Plan (CSP) (2019-2029):** The County Spatial Plan outlines a Spatial Development Framework (SDF) for the County, which is a strategic vision that guides the overall spatial distribution of current and desirable land uses. The SDF aims to promote sustainable functional and integrated human settlements, maximize resource efficiency, and enhance regional identity and unique character of a place. The development strategies envisioned in the CSP include Economic development strategy, Agricultural development strategy, Settlement development strategy, Environment and natural resource strategy, Transportation development strategy, and social infrastructure and services development strategy. Energy is a key driver of these development strategies.

viii. **Makueni County Energy Plan 2023–2032:** The overarching goal of this plan is to ensure the provision of clean, sustainable, reliable, and affordable energy for socio-economic development to improve livelihoods in Makueni County. This goal is supported by the main objectives, which are: to provide a medium-term planning framework for advancing clean, sustainable, reliable and affordable energy within the county; to ensure proactive compliance with the provisions outlined in the Constitution of Kenya, 2010 and the Energy Act,2019, regarding energy planning and administration; and to address the challenges hindering universal energy access and capitalize on opportunities for productive use of energy at the county level.

ix. **Makueni Draft County Electrification, Gas Reticulation and Energy Regulation Policy 2023:** This Policy framework provides the necessary legal instrument and mechanism for coordination and development of the County's energy infrastructural development. The Policy addresses the following issues: county energy planning, energy regulation, and county energy operations and development. It also ensures that there is strict adherence to energy regulations and standards in the County.

x. **Makueni County Annual Development Plan (CAPD):** The CADP serves as a strategic roadmap aimed at guiding our community towards a resilient economy and sustainable development. The goal of the 2025/26 County Annual Development Plan is to lay the groundwork for the County Government's budgeting process for 2025-26. The theme for the CADP 2025/26, "Stimulating Local Economies for Shared Prosperity" highlights the importance of local economic actors in both agricultural and non-agricultural enterprises, including institutions within our rural communities.

xi. **Makueni Trade and Investment Policy:** The Policy strives to define a policy environment that facilitates the development of trade and trade infrastructure within Makueni County. This will be achieved through creation and diversification of markets, development and enhancement of productive capacities with a focus to value addition and employment creation. The Policy further seeks to develop a more articulate and coherent approach to trade development within Makueni County and also address trade gaps, paying attention not only to the quantity but also to the quality of trade.

xii. **Makueni Agriculture and Livestock Policy, 2021:** This Policy has been developed to address challenges hampering agricultural growth and development in Makueni County. It identifies key technical inadequacies, coordination weaknesses, and proposes solutions for the identified challenges. The Policy not only seeks to improve the food and nutrition security and safety but to also improve the economic standing and wellbeing of the County and ensure wealth creation and employment.

xiii. **Makueni Public Participation Policy:** This policy is aimed at addressing the noted gaps and challenges thereof, in order to strengthen public participation and civic and development education in development, accountability, transparency and governance processes. The Policy reaffirms the County Government's commitment to public participation. It specifies the interventions that the government will take to address the challenges that hinder the realization of effective public participation, including the adoption of best practices.

Makueni Youth Policy: The Policy comprises a vision, principles, aims and goals, and suggests actions that can be taken to support the positive development of the youth in Makueni County. It focuses on key sectors for better results and recognizes youth employment creation as a growing challenge. The Policy attempts to provide other County Departments with the opportunity to restructure and realign their implementation, coordination, and monitoring mechanisms for effective service delivery to the youth.

Institutional Frameworks in the Kenya Electricity Sector

i. **Ministry of Energy and Petroleum:** This is the government ministry in charge of creating energy policies and setting the strategic direction for the growth of the energy sector in Kenya.

ii. **The Energy and Petroleum Regulatory Authority (EPRA):** EPRA is a state authority mandated to regulate the generation, importation, exploration, transmission, distribution, supply, and use of electrical energy. It is also mandated to monitor the production, conversion, distribution, supply, marketing, and use of renewable energy; as well as the exploration, extraction, production, processing, transportation, storage, exportation, importation, and sale of petroleum and other forms of energy.

iii. **The Kenya Electricity Generating Company Limited (KenGen):** KenGen is a state corporation that generates approximately 72 percent of electric power consumed in the Country. It is listed on the Nairobi Securities Exchange (NSE) after the Government of Kenya sold 30 percent of its stake in the company in 2006. The Kenya Power and Lighting Company Ltd (KPLC): KPLC's mandate is the distribution of electricity. In exercising this mandate, it is responsible for purchasing electrical energy in bulk from KenGen and other IPPs through bilateral agreements or power purchase agreements approved by EPRA. The government has a controlling stake at 50.1 percent of shareholding with private investors at 49.9 percent. KPLC is also listed on the NSE.

iv. **The Kenya Electricity Transmission Company Limited (KETRACO):** KETRACO is a wholly state-owned company mandated to construct, own, and operate the transmission grid network in the Country. In 2021, KETRACO was mandated to serve as the system operator, a role previously undertaken by KPLC.

v. **Geothermal Development Corporation (GDC):** GDC is a wholly state-owned company established under the Geothermal Resources Act, 1982, to fast-track the development of geothermal resources in Kenya. Its mandates include drilling steam wells, supplying steam for the generation of electric power, managing geothermal reservoirs, and entering into steam supply contracts with IPPs.

vi. **Rural Electrification and Renewable Energy Corporation (REREC):** REREC is the successor to the Rural Electrification Authority (REA). In addition to rural electrification, REREC has an expanded mandate in relation to renewable energy that puts it at the centre of policy formulation, research and development, international cooperation, and the promotion of renewable energy use amongst the local population.

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