



MINISTRY OF ENERGY

**INTEGRATED NATIONAL ENERGY PLANNING
FRAMEWORK**

APRIL, 2021

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ACRONYMS

| | | |
|---------|---|---|
| CBO | - | Community Based Organisations |
| CCAK | - | Clean Cooking Alliance of Kenya |
| CEO | - | Chief Executive Officer |
| CEP | - | County Energy Plan |
| CEPC | - | County Energy Planning Committee |
| CIDP | - | County Integrated Development Plan |
| CIMES | - | County Integrated Monitoring and Evaluation System |
| CoG | - | Council of Governors |
| CoK | - | Constitution of Kenya |
| COMESA | - | Common Market for East and Southern Africa |
| DER | - | Distributed Energy Resources |
| DOSHS | - | Directorate of Occupational Safety and Health Services |
| EAC | - | East Africa Community |
| EHS | - | Environment Health and Safety |
| EPRA | - | Energy and Petroleum Regulatory Authority |
| EPT | - | Energy and Petroleum Tribunal |
| EPZ | - | Export Processing Zone |
| FiT | - | Feed-in Tariff |
| GDC | - | Geothermal Development Company |
| GESIP | - | Green Economy Strategy and Implementation Plan |
| HH | - | Households |
| ICT | - | Information Communication Technology |
| IEA | - | International Energy Agency |
| INEPC | - | Integrated National Energy Planning Committee |
| INEP | - | Integrated National Energy Plan |
| IPP | - | Independent Power Producers |
| ISO | - | International Organisation for Standardization |
| IOT | - | Internet of Things |
| KAM | - | Kenya Association of Manufacturers |
| KCAA | - | Kenya Civil Aviation Authority |
| KenGen | - | Kenya Electricity Generation Company PLC |
| KEPSA | - | Kenya Private Sector Alliance |
| KETRACO | - | Kenya Electricity Transmission Company |
| KMA | - | Kenya Maritime Authority |
| KNBS | - | Kenya National Bureau of Statistics |
| KPLC | - | Kenya Power and Lighting Company PLC |
| KSH | - | Kenya Shillings |
| LAPSSET | - | Lamu Port - South Sudan - Ethiopia - Transport corridor |
| LCPDP | - | Least Cost Power Development Plan |
| LPG | - | Liquefied Petroleum Gas |
| MDA | - | Ministries, Departments and Agencies |
| M&E | - | Monitoring and Evaluation |
| MoE | - | Ministry of Energy |
| MTF | - | Multi-tier Framework |
| MTP | - | Medium Term Plan |
| MoE | - | Ministry of Energy |
| NEMA | - | National Environment and Management Authority |
| NIMES | - | National Integrated Monitoring and Evaluation System |
| NGO | - | Non Governmental Organisations |
| NG-CDF | - | National Government Constituency Development Fund |

| | | |
|-------|---|--|
| NMT | - | Non-Motorised Transport |
| NuPEA | - | Nuclear Power and Energy Agency |
| PPA | - | Power Purchase Agreement |
| PPP | - | Public Private Partnership |
| PV | - | Photovoltaic |
| R&D | - | Research and Development |
| REREC | - | Rural Electrification and Renewable Energy Corporation |
| SEZ | - | Special Economic Zone |
| SDG | - | Sustainable Development Goals |
| SME | - | Small and Medium Enterprises |
| SPV | - | Special Purpose Vehicle |
| SWERA | - | Solar and Wind Energy Resource Assessment |
| VRE | - | Variable Renewable Energy |
| WHO | - | World Health Organisation |

FOREWORD

The energy sector is undergoing a fundamental transformation. The drivers of this transformation include structural changes in the energy sector, new and improved energy technologies, changing customer / societal expectations and needs. In order to provide reliable and affordable energy for all, there has to be a paradigm shift from the traditional energy planning to adequately respond to the evolving global energy market, the changing roles and responsibilities across the energy value chain.

Section 5 of the Energy Act, 2019 (the Act) provides for the development of the Integrated National Energy Plan (INEP) as an energy sector inter-governmental document to guide on the short, medium and long-term energy requirements based on evolving economic, socio-political and technical issues. The objective of the INEP is to ensure a coherent and coordinated approach to meeting the country's energy needs. Specifically, the INEP shall cover the following:

- i. All spheres of energy access: households, productive uses and community facilities, differentiated by gender.
- ii. All forms of energy access: electricity, cooking, heating and mechanical power.
- iii. All feasible and appropriate means of energy provision: grid connected, mini-grid, and stand-alone.

Effective energy planning and efficient regulatory oversight are the essential elements and key prerequisites for attracting timely and efficient investments. The potential benefits of INEP include:

- a. The plan helps policymakers to make informed decisions with regard to energy provision.
- b. As a guide to energy sector regulator, the plan clarifies executive and legislative energy policy directives besides offering an additional basis for priority regulatory actions and utility planning.
- c. INEP will help energy utilities make balanced investment decisions that are not only relevant to them but also to the government, private sector and the public.
- d. INEP provides an opportunity for interested vendors to identify relevant partnerships and opportunities available.
- e. As an educational document for consumers and businesses, the plan shall send a clear message that the government is cognizant of the importance of reliable, sustainable and affordable energy.
- f. As a legacy framework for future policy and regulation, the plan is a roadmap that provides recommendations and action items that will establish shared priorities, opens market opportunities, and sets short- and long-term measurable goals.
- g. An integrated plan provides transparency and accountability.

The development of INEP and in turn achievement of the Country's energy objectives will demand increased collaboration between and among key actors who include; the national government, county governments, institutions of higher learning, development partners, national energy service providers, businesses, Non-Governmental Organisations (NGOs), civil society, community groups, and individual consumers. In this regard, the government is committed to providing an enabling policy, legal, regulatory and institutional framework to facilitate the participation of all stakeholders in the INEP development process.

Effective and efficient energy planning is critical in delivering universal energy access by the year 2030 and also meeting the various objectives of all actors in the value chain. The planning process will therefore require the determination of the country's socio-economic background, supply and demand analysis, energy balance and policy formulation. Further, the task will require mobilisation of both human and financial resources to meet the energy objectives as specified in the energy policy and other government plans.

The Ministry of Energy (MoE) has developed a new and responsive Integrated National Energy Planning Framework (the Framework) which will guide the sector achieve the INEP objectives and in turn ensure universal access to energy by the year 2030. The Framework sets out the procedures for preparation of the energy plans at both national and county levels. This will bring about necessary collaboration between the two levels of government as we deliver on energy for all Kenyans. It also provides structures for engaging other key stakeholders across the energy value chain.

The Framework will go a long way in enhancing energy planning in the country. I look forward to the development of the first Integrated National Energy Plan and more importantly delivering energy for all Kenyans.

Hon. Charles Keter, EGH

Cabinet Secretary,
Ministry of Energy.

PREFACE

The development of this framework has been necessitated by the requirement in Sections 5 of the Energy Act, 2019 which provides for the development of an Integrated National Energy Plan (INEP). The framework will be the basis for development of INEP and will also facilitate the development of energy plans. The framework sets out coherent and systematic guidelines to facilitate the development of energy plans by the Ministry of Energy (MoE), National Energy Service Providers and County Governments that will eventually feed into the development of INEP as envisioned in the Act.

The framework has been developed through a collaborative process involving all of the energy entities, departments and key stakeholders. This was aimed at building support and ensuring that framework developed is agreed upon. The framework has identified areas upon which energy plans will be developed and monitored. These include: Energy sources, Energy access, Energy efficiency and conservation, Bio-energy and Electricity. Priority should therefore be accorded to activities, projects and programmes which contribute directly to the objectives under these areas.

There is need for adequate resource allocation for; the development and implementation of the energy plans and adequate capacity building in energy planning. An implementation matrix has been provided to ensure that the programmes continually and consistently address the societal and customers' needs. Further, a Monitoring and Evaluation (M&E) framework is in place for ensuring that activities are specific enough, accountability is defined and the expected results are measurable.

Development of energy plans will require the concerted efforts of those involved in the energy planning process. The MoE will work closely with National Energy Service Providers, County Governments and other Ministries, Departments and Agencies (MDAs) to ensure harmonized development of INEP. Deliberate efforts will be made to ensure full participation of all the stakeholders with the MoE largely playing regulatory and enabler roles.

I therefore, call upon all the stakeholders to pool their energies and work towards the realization of the sector objectives.

On behalf of the Ministry, I pledge our commitment towards ensuring that the INEP is developed and successfully implemented.

Dr. Eng. Joseph K. Njoroge, CBS
Principal Secretary,
Ministry of Energy.

ACKNOWLEDGEMENT

The process of developing the Integrated National Energy Planning framework was spearheaded by the Taskforce on the Implementation of the Energy Act, No. 1 of 2019, with the Cabinet Secretary providing the overall leadership and guidance.

The Taskforce acknowledges the support and leadership of the Cabinet Secretary for Energy, Hon. Charles Keter, EGH, the Principal Secretary, Dr. Eng. Joseph K. Njoroge, CBS, the staff from the Ministry of Energy and sector agencies: EPT, EPRA, KPLC, KenGen, REREC, KETRACO, NuPEA and GDC in the process of development of this INEP framework.

The Team also wishes to recognize the coordination role and support of the sector Implementation Committees of the Energy Act, 2019 for their valuable contributions in the entire process.

Mr. William O. Mbaka

Chairman,

Taskforce on the implementation of the Energy Act, 2019

EXECUTIVE SUMMARY

Section 5 of the Act requires the development of an Integrated National Energy Plan (INEP) that will be reviewed after every three years. This Framework has been developed to guide the planning process for the INEP. In the preparation of INEP, the following principles shall apply:

- a. It shall take into consideration the national values and principles of governance as given in Article 10 (2) of the Constitution;
- b. It shall have clear objectives;
- c. It shall be comprehensive;
- d. It shall offer a deliberate and vetted plan of action that lays clear recommendations and activities that are set within measurable and achievable goals; and
- e. It shall be flexible to anticipate and respond to change.

In addition, INEP shall contain the following key components:

- a. Goals, scope and objectives;
- b. Policies guiding energy development;
- c. Vision for the energy sector;
- d. Assessment of energy resources and supply technologies;
- e. Assessment of the current energy profile, industries, and institutional capacity;
- f. Energy outlook, forecast or projection of future needs, including supply, demand, supply-demand balance, supply system configuration and evolution of energy costs;
- g. Challenges to be addressed;
- h. Set of prioritized and specific actions with implementation timelines;
- i. Identification of potential financing and funding mechanisms to support implementation of the recommended actions; and
- j. Coordination and M&E frameworks.

INEP shall also be aligned to other national plans such as Kenya Vision 2030, Big 4 Agenda, Medium Term Plans and the National Spatial Plan. It will further be aligned to international commitments such as the Sustainable Development Goals (SDGs) and Africa's Agenda 2063. Such alignment will ensure harmony as well as effective and efficient use of scarce resources.

This Framework recommends 11 stages to be followed for a comprehensive energy planning process:

- a. Stage 1: Preliminaries
- b. Stage 2: Establish the Integrated National Energy Planning Committee
- c. Stage 3: Identify and engage stakeholders
- d. Stage 4: Formulate a vision and re-assess objectives
- e. Stage 5: Conduct situational analysis of the energy sector
- f. Stage 6: Develop energy goals and strategies
- g. Stage 7: Identify and prioritize actions
- h. Stage 8: Develop funding and financing strategy
- i. Stage 9: Develop a blueprint for implementation of INEP
- j. Stage 10: Plan to monitor and evaluate
- k. Stage 11: Refine, adopt and publicize the INEP.

This Framework is divided into the following Seven (7) parts:

Part One: Overview of Integrated National Energy Plan and Framework

This part emphasizes the importance of developing the Framework. Other issues covered include: the purpose of the Framework, rationale for integrated national energy planning, guiding principles for the development of the Framework, roles and responsibilities of key players in the preparation of the INEP, essential components of the INEP, choice of planning tools for INEP, INEP preparation,

implementation of the INEP, and linkages of the INEP with other national and international planning tools.

Part Two: Legal, Regulatory and Institutional Framework

This part outlines the legal, regulatory and institutional frameworks currently guiding the energy sector. It covers policy and legislation, distribution of the energy functions between national and county governments, and the energy sector institutional structure.

Part Three: Preparation of The Energy Plans and INEP

The section provides a step-by-step process for creating a robust INEP that meets the identified objectives. In addition, the cross cutting issues to be mainstreamed in INEP are also discussed.

Part Four: Mainstreaming of Cross-Cutting Issues in Energy Plans and INEP

This section provides key issues that should be taken into consideration in selecting policies and objectives, identifying key stakeholders, carrying out analysis and review of data, scenario development and identification of interventions, implementation of programme/projects, and monitoring, evaluation and reporting of Energy plans and INEP programmes/projects. They include: Gender; Innovation, research and development; communication; disaster and risks management; and Environment, Health and Safety (EHS).

Part Five: Outline of Energy Plans for National Energy Service Providers

This section presents the step-by-step process of developing energy plans for the national energy service providers as well as an outline of these plans.

Part Six: Outline for Energy Plans for Counties

This section presents the step-by-step process of developing County Energy Plans (CEPs) as well as an outline for these plans.

Part Seven: Outline of the Integrated National Energy Plan

This section presents the structure of the INEP as well as an outline of the various chapters and annexes. It proposes the following areas: preliminaries, introduction, policy, legal and regulatory framework guiding the energy sector, energy access, energy efficiency and conservation, bio-energy, electricity, programmes/projects, implementation matrix and M&E framework.

PART ONE: OVERVIEW OF INTEGRATED NATIONAL ENERGY PLAN AND FRAMEWORK

1.0. Background information

The Integrated National Energy Plan (INEP) is an inter-governmental document intended to guide the energy sector on short, medium- and long-term energy requirements based on evolving economic, socio-political and technical issues. The preparation of INEP is stipulated in Sections 5 and 6 of the Act which provide among others that:

- a. The Cabinet Secretary shall in consultation with the relevant stakeholders, develop, publish and review energy plans in respect of coal, renewable energy and electricity so as to ensure delivery of reliable energy services at least cost.
- b. Each national energy service provider (MoE, EPRA, KPLC, KenGen, REREC, KETRACO, GDC and NuPEA) shall develop and submit to the Cabinet Secretary, plans for provision of energy services in accordance with its mandate.
- c. Each County Government shall develop and submit a county energy plan to the Cabinet Secretary in respect of its energy requirements.
- d. The Cabinet Secretary shall consolidate the national energy services providers' plans and county governments' energy plans into an Integrated National Energy Plan (INEP), which shall be reviewed after every three years.
- e. The energy plans shall:
 - i. Take into account the national energy policy;
 - ii. Serve as a guide for energy infrastructure investments;
 - iii. Take into account all viable energy supply options; and
 - iv. Guide the selection of the appropriate technology to meet energy demand.
- f. The Cabinet Secretary shall prescribe regulations on the content and timelines for the preparation of the energy plans.
- g. Within three months after the end of each financial year, the Cabinet Secretary shall prepare and publish a report on the implementation of the national integrated energy plan.

This integrated national energy planning framework is meant to facilitate engagement between the national and county governments and all the stakeholders, in the preparation of their energy plans and eventually the INEP. This framework may be reviewed from time to time on a need basis.

1.1. Purpose of the Integrated National Energy Planning Framework

The Integrated National Energy Planning Framework (the Framework) is intended to ensure clarity, harmony, and standardization in the preparation of energy plans and INEP. It is an important tool for establishing an effective and efficient energy planning process. Specifically, the Framework shall:

- a. Guide in the identification of energy objectives, visions, and deliverables.
- b. Provide a framework for ensuring that global best practices are applied in energy planning processes.
- c. Assist all the stakeholders in the preparation of energy sector plans and INEP and give guidelines under which the proposed programmes/projects will be implemented.
- d. Ensure that the interventions identified by the national energy service providers and county governments contribute to the achievement of INEP objectives.
- e. Provide a mechanism for ensuring that energy planning is aligned with National planning.
- f. Define the roles and responsibilities of various stakeholders in the energy planning process and project implementation.
- g. Provide for enhanced participation of energy stakeholders in energy planning with a view to promoting collaboration among and between energy stakeholders. These are national

government, county governments, development partners, private sector players, and non-governmental organizations, among others.

1.2. Rationale for integrated national energy planning

The energy sector is undergoing a fundamental transformation that is expected to continue and accelerate. The drivers to this transition include:

- a. Energy policy and other government policies
- b. Declining renewable energy technology costs that has led to increased deployment of large-scale Variable Renewable Energy (VRE) resources and Distributed Energy Resources (DER).
- c. Improvements in, and greater deployment of, information and communications technology (ICT) in the energy sector including digitalization such as Big Data, Internet of Things (IOT), smart metering including the upcoming beyond the meter technologies. This has led to significant changes to the number of service providers and has subsequently expanded energy customer choices and control.
- d. Declining load growth.
- e. Changing customer preferences.
- f. Environmental concerns that require the sector to conserve the environment and limit emission of greenhouse gases.
- g. Emerging technologies.
- h. Other broad societal goals besides provision of energy that government expects the energy sector to meet.

The drivers above are challenging the traditional energy planning in several ways. They will:

- i. Change the dynamics of investment decisions. Investment decisions were historically driven primarily by incremental load growth and resource adequacy focused on capacity. Increasingly, environmental regulations, low-cost energy resources, customer preferences and investments, and risk management will drive investment decisions.
- ii. Create higher uncertainty and risk. Due to changing regulations, costs, technology, demand patterns, and customer behaviour, energy service providers now face more uncertainty, from a greater variety of sources, than at any time in the industry's history.
- iii. Challenge long-standing assumptions. Long-standing rules-of-thumb in traditional energy planning may require revisiting. The traditional energy value chain was linear with energy carriers produced centrally and distributed to a passive end user.
- iv. Enable more sophisticated analysis but require new forms of transparency. ICT improvements and deployment will enable higher resolution data collection and more sophisticated models and analysis. At the same time, resource planners will need to balance increased sophistication with the continued need for transparency and comprehensibility.
- v. Require coherence between short- and long-term planning horizons. Ensuring least-cost compliance with public policy goals that have multi-decadal compliance periods may require greater attention to outlying years and a greater focus on longer-term transition.

The energy sector transformation is also impacting on the roles and responsibilities of energy players which include energy service providers, national and county governments, development partners, private sector players and energy users in how they source and consume energy and how they interact within the value chain.

The transformation requires a paradigm shift for the sector to continue meeting its objectives. The integrated national energy planning is aimed at assessing and clarifying roles of energy stakeholders in the evolving and interconnected energy value chain. The emerging decentralized and interconnected energy value chain is characterized by distributed energy resources, technology-

enabled collaboration, as well as new roles and business models. The energy user is a participatory player that can take multiple roles to suit their business model.

1.3. Attributes of an Integrated Energy Plan

An integrated energy plan shall be simple, realistic, comprehensive, consistent, precise, and facilitative in terms of policy and resource outlay for effective project implementation. Therefore, in the course of the preparation of the INEP, it is necessary that the following features are taken into account:

- a. National values and principles of governance as provided in Article 10 (2) of the Constitution:
 - i. Patriotism, national unity, sharing and devolution of power, the rule of law, democracy and participation of the people;
 - ii. Human dignity, equity, social justice, inclusiveness, equality, human rights, non-discrimination and protection of the marginalized;
 - iii. Good governance, integrity, transparency and accountability; and
 - iv. Sustainable development.
- b. **Clear guiding objectives:** The plan provides a framework that allows the making of informed decisions based on agreed objectives. The objectives for planning may include reliability, socio-economic considerations, energy security, cost minimisation, environmental considerations (e.g., carbon reduction), and policy constraints (e.g., renewable targets). These typically lead the list of planning objectives. In regions with low access to electricity such as in rural communities, electrification is likely a core objective.
- c. **Comprehensiveness:** The plan reflects a holistic perspective of the country's' energy profile, including all energy resources, services and end-use sectors, as well as inputs from key public and private stakeholders. Diverse public and stakeholder engagement is especially important in planning processes that fundamentally rely on efforts to gain necessary support from the various constituencies.
- d. **Strategic:** The plan includes a deliberate and vetted plan of action with clear recommendations and initiatives that are set within measurable and achievable goals. The purpose of an integrated plan is not merely to identify a preferred resource portfolio to develop or acquire but shall also focus on the outcomes, including, achieving all relevant objectives, reducing investment risks, attracting investors, and earning public acceptance/support for necessary infrastructure investments.
- e. **Adaptable:** The plan is flexible and can anticipate and respond to change. It can project future energy supply and demand. It can also model the potential impacts of supply shifts, geopolitical risks and uncertainties, technological changes and other factors that affect short and long-term needs.
- f. **Use of best available data:** The power system is transforming rapidly around the globe, and this is attributed to new technologies and changing public policy priorities. In particular, the capabilities and the costs of new technologies are changing at a rapid pace. Fossil fuel prices are volatile and renewable energy costs are declining so rapidly that data can become obsolete or misleading within a year or two of publication. INEP processes must endeavour to keep abreast of these changes by using the most current and locally applicable sources of data for all elements of the planning process.

1.4. Key components of the Integrated Energy Plan

An integrated energy plan shall include the following key components:

- a. Goals, scope and objectives.
- b. Policies guiding energy development.
- c. Vision for the energy sector.
- d. Assessment of energy resources and supply technologies.
- e. Assessment of the current energy profile, industries, and institutional capacity.
- f. Energy outlook, forecast or projection of future needs, including, supply, demand, supply-demand balance, supply system configuration and evolution of energy costs.
- g. Challenges to be addressed.
- h. A set of prioritized and specific actions with implementation timelines.
- i. Identification of potential financing and funding mechanisms to support implementation of the recommended actions.
- j. Coordination and M&E framework.

1.5. Roles and responsibilities of key players in the INEP implementation

1.5.1. Ministry of Energy

- a. Provide leadership including capacity building in the preparation of INEP.
- b. In collaboration with other stakeholders, develop a framework for the preparation of the INEP and energy plans.
- c. Organise stakeholders' engagements in the preparation of INEP.
- d. Develop and publish the INEP. An outline for the preparation of INEP is provided in Part Four (4) of this Framework.
- e. Provide an Energy Planning Online Platform for use in INEP, CEP and National Energy Service Providers plans.
- f. Review the INEP after every three (3) years in line with the Act and regulations.
- g. Ensure there are adequate policy, regulatory and institutional frameworks for successful implementation of INEP. A standardised brief of the policy, regulatory and institutional frameworks shall be circulated to county governments for purposes of developing County Energy Plans(CEP).
- h. Monitor the implementation of INEP.
- i. Report on the progress of the implementation of INEP.

1.5.2. National Energy Service Providers

The National Energy Service Providers include the MoE, EPRA, KPLC, KenGen, REREC, KETRACO, GDC and NuPEA. Under this heading, MoE's role as a national energy service provider is limited to licencing of geothermal and downstream coal.

- a. Prepare energy plans relevant to their mandate and submit the same to the Cabinet Secretary for incorporation into INEP. An outline for the preparation of service providers' energy plans is provided in **Part Five** of this Framework.
- b. Provide resources for implementation of energy plans relevant to their mandate.
- c. Build the energy planning capacity of their staff.
- d. Monitor and report on the progress of the implementation of their energy plans relevant to their mandate.
- e. Collaborate with County Governments during planning and implementation of energy projects

1.5.3. County Governments

- a. Prepare their county energy plans and submit them to the Cabinet Secretary for incorporation into INEP. County governments will use the template given in **Part Six** of this planning framework during the preparation of their county energy plans.
- b. Follow-up on data gaps and ensuring adequacy of information and data in their energy plans.
- c. Collaborate with national energy service providers during planning and implementation of energy projects
- d. Consult with other relevant national energy service providers to get data.
- e. Provide resources for implementation of their energy plans.
- f. Build the energy planning capacity of their staff.
- g. Monitor and report on the progress of the implementation of the county energy plans.

1.5.4. Other National Government Ministries, Departments and Agencies (MDAs)

- a. Propose interventions in the INEP.
- b. Provide resources for implementation of interventions relevant to their mandate.
- c. Monitor and report on the progress of the implementation of INEP relevant to their mandate.

1.5.5. Council of Governors

- a. Coordinate all the forty-seven (47) county governments in the preparation of the energy plans.
- b. Coordinate capacity building for county governments in energy planning.

1.5.4. Development partners

- a. Participate in the preparation and implementation of INEP.
- b. Provide resources for capacity building, development and implementation of INEP.

1.5.5. Private sector players and non-governmental organizations

- a. Participate in the preparation and implementation of INEP by providing their projects for consideration and inclusion in the INEP matrix as provided in **Annex 1**.
- b. Provide resources for capacity building, development and implementation of INEP.

1.6. Advisory on undertaking of energy projects

The assessment, exploitation, generation, transmission and distribution of energy resources are regulated activities. Therefore, any stakeholder willing to participate in such activity needs to exercise due diligence before committing budgets and including them in the energy plan, e.g. establishing clarity on land ownership before acquisition or lease.

Counties or non-governmental organizations will engage MoE with respect to the plans of relevant national energy service providers before concluding county plans. Specifically;

- a. Consult MoE with respect to policies, regulations and energy resource development.

- b. Consult KPLC with respect to planned distribution lines, substations and wayleaves, to ensure complementarities of county energy plans to those of the national agencies.
- c. Consult EPRA with respect to applicable regulations and licenses.
- d. Consult REREC with respect to planned electrification in rural areas, renewable energy programmes and energy centre development.
- e. Consult KETRACO with respect to planned transmission lines and associated substations.
- f. Consult NuPEA with respects to planned nuclear programmes, research and development and capacity building.
- g. Consult GDC with respect to planned geothermal development and resource management programmes.
- h. Consult KenGen with respect to planned geothermal development, resource management and generation programmes.

National Energy Service Providers will engage with relevant County Governments with regards to their county energy plans and energy requirements.

In addition, counties will seek national reticulation plans and geospatial maps from MoE and statistics from Kenya National Bureau of Statistics (KNBS) or their updates whenever done.

Clearances are required in energy development and marketing. The details are published on the Renewable Energy Portal (<http://www.renewableenergy.go.ke/index.php/license/browse>). They include the type and number of clearances required depending on the technology option and capacity of the project. Clearance is a collective term referring to permits, licences, approvals, agreements and payments. All project developers will have to operate through a registered company (local or abroad) and have access to land (through purchase or lease).

Registration of companies (www.attorney-general.go.ke) and land acquisition procedures (www.lands.go.ke) are not featured on the Renewable Energy Portal. These requirements apply to all grid-connected projects and commercial off-grid developments. The water abstraction permit, Kenya Civil Aviation (KCAA) clearance, geothermal resource licence (concession) and the geothermal exploration licence, apply only to hydro, wind and geothermal projects respectively.

Electricity projects with capacities covered within the Feed-in Tariff (FiT) policy will be negotiated with Power Purchase Agreements (PPA) under the policy while those outside will be negotiated based on the existing/relevant PPA regime. Off-grid commercial projects are not required to negotiate a PPA with the Government utility.

1.7. Choice of planning tools for INEP

One of the key stages in the development of INEP is scenario analysis. This analysis will require tools and specific software to model. A number of modelling software are widely available in the market. The tools or software to be used in analysis should be universally acceptable and have the following attributes:

- a. **Exhaustive account of all energy carriers:** The model shall account for all types of energy carriers available presently and also in the future, at least within the planning horizon.
- b. **Flexibility:** Some degree of model flexibility shall be maintained in the context of adding and deleting energy systems as may be necessary. As such, a resource that may dominate the national energy scenario in future may be accounted for in this model.
- c. **Introduction of Competition:** Long-term energy plans call for better vision of the future. Thus, all types of energy carriers (present, future, imported, domestic), energy conversion and energy producing technologies are allowed to compete in order to achieve a global optimization.

- d. **Scenario Analysis:** Central to any model building, scenario simulation studies are key elements in any energy policy analysis. The uncertain global energy situation and technological changes may necessitate analysis of the effect of such changes towards energy plans in the short- to long-term planning.
- e. **Stepwise Development:** The development of an energy model must be made dynamically. A stepwise development is proposed such that the introduction of several types of energy and technologies shall be made as the model optimization allows.
- f. **Data Maintenance:** Several supporting tools, computer packages, technologies, economic, and natural resources data bases shall be created and maintained to enable the model to access new information.
- g. **Optimization Technique:** Any optimization technique chosen shall cater for the needs and purposes of the model and its users.

1.8. Linkages of INEP

The INEP gives an overall framework for the energy development of energy in the country and aims at coordinating the efforts of both levels of government, private sector and development partners in a coherent manner to provide energy services to all Kenyans.

1.8.1. Cross-sector linkages

The energy sector is a major enabler of economic and social development. As such, it has both backward and forward linkages with other sectors and, Government Ministries, Departments and Agencies (MDAs). This shall be taken into account in the development of INEP. Some of these linkages are as illustrated in Table 1.8.1.

Table 1.8.1: Cross-Sectoral Linkages with INEP

| | Entity/MDAs | Cross-sectoral linkages with INEP |
|-----------|--|---|
| 1. | Ministry of Energy | Robust integration of National energy plans such as LCPDP into the Integrated National Energy Plan. |
| 2. | County Governments | Robust integration of County energy plans into the Integrated National Energy Plan as prescribed in the Act. |
| 3. | The National Treasury and Planning | Resource mobilisation, fiscal policies, and funding of the INEP development, and implementation |
| 4. | Ministry of Interior and Co-ordination of National Government | a) Co-ordination of National Government projects. b) Providing security to energy infrastructure. |
| 5. | Ministry of Transport, Infrastructure, Housing, Urban Development and Public Works | a) Electrification of the Standard Gauge Railway. b) E-mobility infrastructure like charging ports to be incorporated on road network infrastructure and in housing plans and parking infrastructure among other areas to encourage adoption of e-mobility (electric vehicles, bicycles and tuk-tuks) c) Lamu Port-South Sudan-Ethiopia Transport (LAPSSET) Corridor project. d) Facilitation of transport as well as safety and security. |
| 6. | Ministry of Lands and Physical Planning | National Land Commission: a) Facilitation of acquisition of land and rights of way for energy infrastructure. b) Facilitation of gazettement of areas suitable for conservation and management of energy resource or is |

| | Entity/MDAs | Cross-sectoral linkages with INEP |
|-----|---|--|
| | | suitable for the promotion of energy development projects as energy resource areas |
| 7. | Ministry of Industry, Trade & Co-operatives | a) Kenya Bureau of Standards: Formulation and enforcement of standards of energy services. b) Industrial Parks including Special Economic Zones (SEZ) and Export Processing Zones(EPZ) |
| 8. | Ministry of Foreign Affairs | Coordination of bilateral joint cooperation on energy initiatives with other countries through regional and international infrastructure projects. |
| 9. | East African Community (EAC) and Regional Development | a) Coordination of East Africa Community regional infrastructure projects such as power interconnectors. b) Northern corridor integration projects |
| 10. | Ministry of Petroleum and Mining | a) Explorations and development of coal, oil and gas. b) Development of pipelines and other infrastructure from successful oil or gas fields to refineries/ports. |
| 11. | Ministry of Environment and Forestry | a) Conservation and rehabilitation of degraded water catchments and water towers. b) Facilitate production, conveyance and supply of energy. c) Environmental and Social Impact assessments and feasibility studies. |
| 12. | Ministry of Information, Communications and Technology | a) Development of Technopolis cities e.g. Konza. b) Collaboration in use of energy infrastructure to mainstream ICT |
| 13. | Ministry of Water and Sanitation | a) Research and water catchment areas conservation. b) Collaboration and facilitation of access to water resources e.g. hydro-power development |
| 14. | Ministry of Tourism and wildlife | Facilitate production, conveyance and supply of energy (national parks) |
| 15. | Office of the Attorney General | a) Representation in legal issues and provision of legal advice. b) Processing of legal instruments |
| 16. | Ministry of Education and institutions involved in training, research, innovation and development | Facilitation of training , research, innovation , development and capacity building in the energy |

1.8.2. Linkage with other National and International Development Goals and Plans

To promote harmony as well as effective and efficient use of scarce resources, the INEP shall be aligned to other national plans such as Kenya Vision 2030, Big 4 Agenda, Medium Term Plans, the National Spatial Plan, County Integrated Development Plan, Least Cost Power Development Plans and international commitments such as the Sustainable Development Goals and Africa's Agenda 2063, to promote harmony as well as effective and efficient use of scarce resources.

a. Kenya Vision 2030 and Medium Term Plans

Energy is an enabler towards the realization of Kenya's Vision 2030, which seeks to transform Kenya into a newly industrialising middle-income country providing a high quality of life to its

citizens in a clean and secure environment. The overall national development goals of the Government of Kenya as set out in Vision 2030 are:

- i. Accelerated economic growth;
- ii. Increased productivity of all sectors;
- iii. Equitable distribution of national income;
- iv. Poverty alleviation through improved access to basic needs;
- v. Enhanced agricultural production;
- vi. Industrialisation; and
- vii. Accelerated employment creation and improved rural-urban balance.

The realisation 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. Vision 2030 is implemented through Medium Term Plans (MTPs). MTPs set the targets to be implemented within a medium term of five years. Energy is considered as an enabler of other government objectives and projects.

b. County Integrated Development Plan (CIDP)

CIDP is the planning tool in county governments. It is linked to various planning frameworks at national and county level. It highlights how the county is contributing towards achieving the aspirations of the policies and plans of the country.

c. Least Cost Power Development Plan (LCPDP)

The LCPDP is a Kenya Energy Sector Report Plan that guides on generation expansion opportunities, transmission and distribution infrastructure development, and the related resource requirements.

d. The ‘Big Four’ Agenda

The Government’s “Big 4 Agenda” which was, unveiled by the President in 2017 and seeking seeks to improve Food Security, expand Manufacturing, increase Affordable Housing and achieve Universal Health Coverage, and is dependent on the provision of adequate and competitively- priced energy.

e. Spatial Plans

These are national and county governments spatial frameworks within which development projects and programmes are implemented. The plans also feature assessments of natural resources within the respective county territory.

f. Sustainable Development Goals (SDGs)

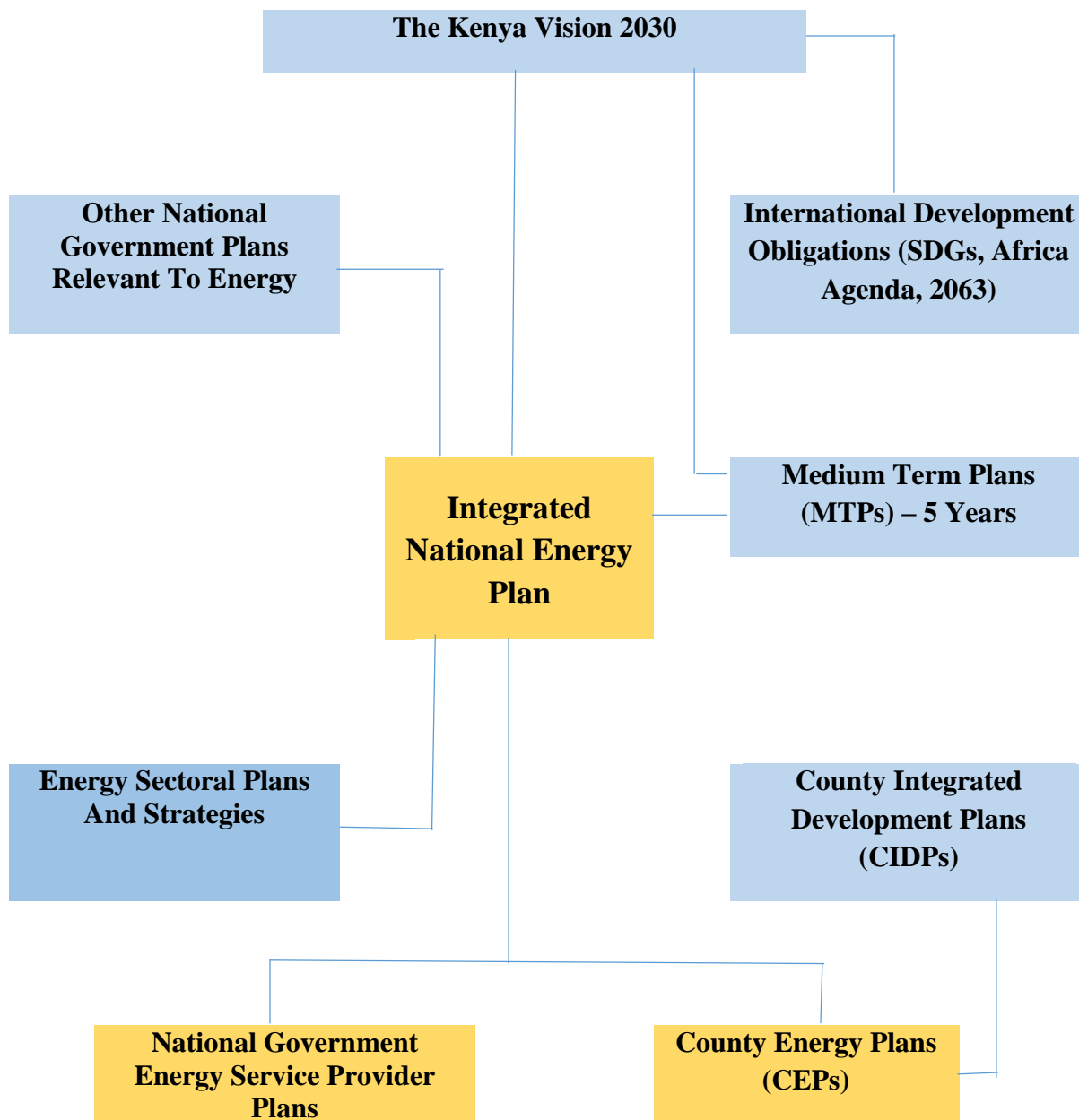
Goal 7 on affordable and clean energy is aimed at ensuring access to affordable, reliable, sustainable and modern energy for all by the year 2030.

g. Africa Union Agenda 2063

With respect to energy, this agenda aims at accelerating Africa’s transition from traditional to modern sources of energy and ensuring access to clean, affordable and sustainable energy. The African strategic vision in this regard will involve the utilization of the continent’s energy resources, especially renewable energy, in fostering economic growth and eradicating energy poverty. Individual countries are expected to develop and implement policies, strategies and regulations to promote the sustainable growth of the energy sector.

Figure 1.8 below shows the linkage between the County Integrated Development Plan with policies and other blueprints, including the Kenya Vision 2030, the SDGs, Africa Union Agenda 2063 and the Medium Term Plan.

Figure 1.8: Linkages of INEP with other National and International Plans



1.8.3. Scope and Data Sources

The preparation of the INEP shall involve identification of a long-term period for plan analysis for 20 years. Within this timeframe, periodic reviews and updates shall be made every third year as per Section 5(4) of the Energy Act, 2019.

The reference documents in the development of the INEP shall include, but will not be limited to the following:

| DOCUMENT/EXISTING COMMITTEE | INEP SUB-COMMITTEE |
|--|---|
| <ol style="list-style-type: none"> 1. Least Cost Power Development Plans 2. Feed-in-Tariff Plan 3. Generation and Transmission Masterplan 4. Distribution Masterplan | Electricity Plans |
| <ol style="list-style-type: none"> 5. National Electrification Strategy 6. Power Supply and Demand Creation Monitoring Committee reports 7. Rural Electrification Master Plan 8. Geospatial Mapping for Mini Grids Potential in Kenya | Energy Access Plans |
| <ol style="list-style-type: none"> 9. Bio-energy Strategy | Bio-Energy Plans |
| <ol style="list-style-type: none"> 10. National Energy Efficiency and Conservation Strategy | Energy Efficiency And Conservation Plans |
| <ol style="list-style-type: none"> 11. Solar and Wind Resources Plan 12. Solar and Wind Energy Resource Assessment (SWERA) Report for Kenya 13. National Wind Atlas 14. Hydropower Development Plan 15. Small Hydro Atlas 16. National Geothermal Strategy 17. Coal Master Plan 18. Nuclear Master Plan & Nuclear Energy Policy 19. National Oil and Gas Masterplan (as relates to thermal power plants) 20. Renewable Energy Technologies Assessment for All Counties | Energy Resource And Development Plans |

The following additional documents will also inform INEP;

1. Kenya Vision 2030 – Medium Term Plans, Strategic Plans
2. National Energy Policy, 2018
3. National Industrialisation Policy (as relates to industrial parks, SEZ, EPZ etc.)
4. Gender Policy
5. SDGs
6. Agenda 2063
7. County Integrated Development Plan
8. County Capacity Needs Assessment Report.
9. Economic survey
10. Budget review and outlook paper

PART TWO: LEGAL, REGULATORY & INSTITUTIONAL FRAMEWORK

2.0. Introduction

The energy sector in Kenya is governed by the Constitution of Kenya, 2010 (CoK), the Energy Act, 2019 and other relevant regulatory instruments that may be in place from time to time. These legal, regulatory and institutional frameworks will guide in the preparation of INEP.

2.1. Constitution of Kenya

The CoK provides for a two-tier structure of government, i.e. the national government and county governments. It distributes functions and powers between the two levels of Government as detailed in Chapter Eleven and the Fourth Schedule. Specifically, in relation to the energy sector, Part 1 of the Fourth Schedule provides that the national government shall be responsible for:

- a. Protection of the environment and natural resources with a view to establishing a durable and sustainable system of development, including water protection, securing sufficient residual water, hydraulic engineering, and the safety of dams.
- b. Energy Policy 2018, including electricity and gas reticulation and energy regulation; and
- c. Public investment.

In relation to the County Governments, Part 2 of the Fourth Schedule provides that they shall be responsible for county planning and development, including electricity and gas reticulation and energy regulation.

2.2. The Energy Act, 2019

The Act consolidates the laws relating to energy, to provide for National and County Government functions in relation to energy, to provide for the establishment, powers and functions of the energy sector entities; promotion of renewable energy; exploration, recovery and commercial utilization of geothermal energy; regulation of midstream and downstream petroleum and coal activities; regulation, production, supply and use of electricity and other energy forms; and for connected purposes

2.2.1. The Integrated National Energy Plan

The Act provides for the development of an Integrated national energy plan and the need to monitor the implementation of national energy plan. Specifically, Sections 5 and 6 of the Act provide that:

5. (1) *The Cabinet Secretary shall in consultation with the relevant stakeholders develop, publish and review energy plans in respect of coal, renewable energy and electricity so as to ensure delivery of reliable energy services at least cost.*
- (2) *Each national energy service provider shall develop and submit to the Cabinet Secretary plans for provision of energy services in accordance with its mandate.*
- (3) *Each County Government shall develop and submit a county energy plan to the Cabinet Secretary in respect of its energy requirements.*
- (4) *The Cabinet Secretary shall consolidate the plans contemplated in subsections (2) and (3) into an integrated national energy plan which shall be reviewed after every three years.*
- (5) *The energy plans shall—*
 - (a) *take into account the national energy policy;*
 - (b) *serve as a guide for energy infrastructure investments;*

- (c) *take into account all viable energy supply options; and*
 - (d) *guide the selection of the appropriate technology to meet energy demand.*
 - (6) *The Cabinet Secretary shall prescribe regulations on the content and timelines for the preparation of the energy plans.*
6. *Within three months after the end of each financial year, the Cabinet Secretary shall prepare and publish a report on the implementation of the national integrated energy plan.*

2.2.2. Functions of the National and County Governments

The Fifth Schedule of the Act provides for the distribution of functions between the national government and county governments. This is meant to promote harmony and cooperation between the two levels of government. The roles are as follows:

A. Functions of the National Government

1. Policy formulation and integrated national energy planning

- a. *Formulation of the national energy policy.*
- b. *Preparation of the Integrated National Energy Plan, incorporating coal, renewable energy, and electricity master plans.*
- c. *Provision of land and rights of way for energy infrastructure*

2. Energy regulation

- a. *Regulation and licensing of importation, refining, exportation, transportation, storage and bulk sales of petroleum and their derivatives.*
- b. *Regulation and licensing of production, conversion, distribution, supply, marketing and use of renewable energy.*
- c. *Regulation and licensing of generation, importation, exportation, transmission, distribution, retail and use of electrical energy.*
- d. *Approval of energy purchase agreements, network service contracts as well contracts for common user facilities.*
- e. *Protection of consumer, investor and other stakeholder interests.*
- f. *Preparation and enforcement of regulations and standards.*
- g. *Formulation of national codes for energy efficiency and conservation in buildings.*
- h. *Issuance of energy saving certificates to enhance energy efficiency and conservation.*
- i. *Setting, reviewing and adjustment of energy tariffs and tariff structures.*
- j. *Resolution of complaints and disputes between parties over any matter in the energy and petroleum sector.*
- k. *Prosecution of offences as guided by The Energy Act.*
- l. *Certification of petroleum tanker drivers, electrical workers and contractors, solar system installation technicians and contractors.*

3. Energy operations and development

- a. *Exploration and production of geothermal and other energy based natural resources.*
- b. *Importation, exportation, and refining or processing of petroleum and its derivatives.*

- c. *Transportation, storage and bulk sales of petroleum, coal and their derivatives.*
- d. *Generation, transmission, distribution (including reticulation) and retail supply of electricity.*
- e. *Collection and maintenance of energy data.*
- f. *Implementation of the Rural Electrification Programme and management of the Rural Electrification Programme Fund.*
- g. *Undertaking of feasibility studies and maintaining data with a view to availing the same to developers of energy resources and infrastructure.*
- h. *Provision of technical and other capacity building support to county governments.*
- i. *Administration and management of the Consolidated Energy Fund and the National Energy Conservation Fund.*
- j. *Protection of energy infrastructure, including pipelines and storage depots, refineries, power plants, control centres, electric supply lines and substations.*

B. Functions of County Governments

1. County energy planning

- a. *Preparation of county energy plans, incorporating petroleum, renewable energy and electricity master plans.*
- b. *Physical planning relating to energy resource areas such as dams, solar and wind farms, municipal waste dumpsites, agricultural and animal waste, ocean energy, woodlots and plantations for production of bio-energy feedstock.*
- c. *Provision of land and rights of way for energy infrastructure.*
- d. *Facilitation of energy demand by planning for industrial parks and other energy consuming activities.*
- e. *Preparation and implementation of disaster management plans.*

2. County energy regulation

- a. *Regulation and licensing of retail petroleum service stations.*
- b. *Regulation and licensing of county gas reticulation systems.*
- c. *Regulation and licensing and supply of retail coal products for domestic use.*
- d. *Regulation and licensing of designated parking for petroleum tankers.*
- e. *Regulation and licensing of biomass production, transport and distribution.*
- f. *Regulation and licensing of biogas systems.*
- g. *Regulation and licensing of charcoal production, transportation and distribution.*
- h. *Customization of national codes for energy efficiency and conservation in buildings to local conditions.*

3. County energy operations and development

- a. *Electricity and gas reticulation.*
- b. *Provision of adequate street lighting.*
- c. *Provision of designated parking for petroleum tankers.*
- d. *Collection and maintenance of energy data.*
- e. *Implementation of county electrification projects.*

- f. *Undertaking of feasibility studies and maintaining data with a view to availing the same to developers of energy resources and infrastructure.*
- g. *Establishment of energy centres for promotion of renewable energy technologies, energy efficiency and conservation.*
- h. *Protection of energy infrastructure, including oil and gas fields and pipelines, refineries, power plants, control centres, electric supply lines, substations and depot.*
- i. *Promotion of energy efficiency and conservation within the county.*

2.3. Regulations, Rules and Orders under the Act

Regulations, Rules and Orders are developed to operationalise specific sections the Act for better management and coordination. Currently, the following Regulations, Rules and Orders are in place and are currently under review to align them to the Energy Act, 2019;

- i) The Geothermal Resources Regulations, 1990
- ii) Electrical Power (Electrical Installation Works) Rules, 2006
- iii) The Energy (Rural Electrification Programme Fund) Order, 2008
- iv) Electricity Licensing Regulations, 2012
- v) Solar Photovoltaic Systems Regulations, 2012
- vi) Energy Management Regulations, 2012
- vii) The Energy (Complaints and Disputes Resolutions) Regulations, 2012
- viii) The Energy (Appliances Energy Performance and Labelling) Regulations, 2016

In line with the Act, the following Regulations have also been developed;

- i) Energy (Electricity licensing) Regulations
- ii) Energy (Electricity Supply including Grid code) Regulations
- iii) Energy (Reliability and Quality of Supply and Quality of Service) Regulations
- iv) Energy (Electricity Tariffs) Regulations
- v) Energy (Feed in Tariffs) Regulations
- vi) Energy (Mini Grids) Regulations
- vii) Energy (Complaints and Disputes Resolution) Regulations
- viii) Energy (Solar Water Heating) Regulations
- ix) Energy (Solar Photovoltaic Systems) Regulations
- x) Energy (Regulatory Accounts) Regulations
- xi) Energy (Energy Management) Regulations
- xii) Energy (Appliances Energy Performance) Regulations
- xiii) Energy (Geothermal Resources) Regulations
- xiv) Energy (Energy and Petroleum Tribunal Rules of Procedure) Regulations
- xv) Energy (Net Metering) Regulations
- xvi) Energy (Consolidated Energy Fund) Regulations
- xvii) Energy (System Operations) Regulations
- xviii) Energy (Rural Electrification Programme Fund) Regulations
- xix) Energy (Integrated National Energy Plan) Regulations
- xx) Energy (Geothermal Resources Royalties) Regulations
- xxi) Energy (Electricity Market, Bulk Supply and Open Access) Regulations
- xxii) Energy (Incidents and Accidents) Regulations
- xxiii) Energy (Abandonment and Decommissioning) Regulations
- xxiv) Energy (Renewable Energy Resources) Regulations
- xxv) Energy (Public Rights of Way) Regulations
- xxvi) Energy (Decisions of the Authority) Regulations
- xxvii) Energy (Coal & Coal bed methane gas for electricity and energy production and common user facilities) Regulations

xxviii) Energy (Local content) Regulations

xxix) Energy (Electricity Undertaking, Inspections & Investigations) Regulations

2.4. Other relevant Acts and Regulations

Alongside the foregoing principal legal frameworks, there are several other laws that impact the energy sector. They include and are not limited to;

- a. The Petroleum Act, 2019 which provides for the framework for the contracting, exploration, development and production of petroleum; cessation of upstream petroleum operations; to give effect to relevant articles of the COK in so far as they apply to upstream petroleum operation, regulation of mid-stream and downstream petroleum operations; and for connected purposes.
- b. The Nuclear Regulatory Act, 2019 which provides for a comprehensive framework for the regulation of safe, secure and peaceful utilisation of atomic energy and nuclear technology; the production and use of radiation sources and the management of radioactive waste; and for connected purposes.
- c. Public Private Partnership Act (2013) which details the laws governing partnership projects between state and private entities. It specifies the procedures for preparation, tender, approval, and implementation. The Act also stipulates the conditions for accepting a privately initiated investment proposal.
- d. The Water Act, 2016 which provides for the regulation, management and development of water resources, water and sewerage services; and for other connected purposes.
- e. The wildlife conservation and management act, 2013 which provides for the protection, conservation, sustainable use and management of wildlife in Kenya and for connected purposes.
- f. The Standards Act, Chapter 496 of the Laws of Kenya that provides for establishment of minimum quality specifications, mode, materials, and apparatus used in the country.
- g. The Environmental Management and Co-ordination Act, 1999, which regulates the environmental issues, including those relating to the energy sector.
- h. The Physical and Land Use Planning Act, 2019 that makes provision for planning, use, regulation and development of land and related purposes.
- i. The Weights and Measures Act, Chapter 513 of the Laws of Kenya under which storage tanks and dispensing equipment for sale of petroleum products are calibrated and regulated for accuracy.
- j. The Public Procurement and Asset Disposal Act No. 33 of 2015 that establishes procedures for efficient public procurement and for the disposal of unserviceable, obsolete, or surplus, stores, assets and equipment by public entities.
- k. The Anti-Corruption and Economic Crimes Act No. 3 of 2003, which provides for prevention, investigation and punishment of corruption, economic crime, and related offences.
- l. The Public Officer Ethics Act No. 4 of 2003, which provides for code of conduct and ethics for public officers.
- m. The Ethics and Anti-Corruption Commission Act No. 22 of 2011, which establishes the Ethics and Anti-Corruption Commission.
- n. The Land Act 2012 No. 6 of 2012, which provides for matters relating to public, private and community land.
- o. The Land Registration Act, No. 3 of 2012, which guides registration of titles to land and the roles of county governments.
- p. The National Land Commission Act 5 of 2012 that provides for the establishment of the National Land Commission.
- q. The Environment and Land Court Act No. 19 of 2011 that provides for the establishment of the Environment and Land Court.

- r. The Urban Areas and Cities Act No. 13 of 2011 that provides for the, classification, governance and management of urban areas and cities.
- s. The National Government Loans Guarantee Act No. 18 of 2011 that provides for the transparent, prudent and equitable management of the authority to guarantee loans conferred on the National Government.
- t. The Consumer Protection Act No. 46 of 2012 that provides for consumer protection and prevention of unfair trade practices in consumer transactions
- u. The County Government Act, 2012 that provides for the regulation required to implement the provisions relating to county governments and to give effect to Chapter 11 of the Constitution, to provide for the powers, functions and responsibilities of county governments to deliver services, and for connected purposes.
- v. The Forest Act, which provides for the development and sustainable management, including conservation and rational utilisation of forest resources for the socio-economic development of the country and for connected purposes.
- w. The Mining Act, 2016 which provides for prospecting, mining processing, refining, treatment, transport and any dealings in minerals and related purposes.
- x. Employment Act, 2007, which provides for fundamental rights of employees, provide basic conditions of employment of employees and to regulate employment of children.
- y. State Corporations Act provides for the establishment of state corporations, for control and regulations of state corporations and for connected purposes.
- z. Public Finance Management Act, 2012 provides that public finances are managed at both the national and county levels of government in accordance to the constitution and for the public officers charged with that responsibility to be accountable to the public for the management of those finances through Parliament and County Assemblies
- aa. Civil Aviation Act provides for the control, regulation, and orderly development of civil aviation in Kenya and for matters incidental thereto and connected therewith.
- bb. Occupational Safety and Health Act (OSHA) 2007 provides for the safety, health and welfare of workers and all persons lawfully present at workplaces, to provide for establishment for the establishment of the National Council for Occupational Safety and Health and for connected purposes.
- cc. National Construction Authority Act provides for the establishment, powers and functions of the National Construction Authority and for connected purposes.

2.5. Energy Policy, 2018

The Energy Policy, 2018 is the primary policy document which guides all subsequent policies, strategies, and legislation within the energy sector. The Energy Policy 2018 aims to:

- a. Utilize energy as a tool to accelerate economic empowerment for the National Government and county governments, as well as urban and rural development;
- b. Improve access to affordable, competitive, and reliable energy services;
- c. Provide an environment conducive to the development and provision of energy services;
- d. Prioritize and promote development of indigenous primary and secondary energy resources;
- e. Prioritize and promote the development of local technologies in energy development and delivery;
- f. Promote energy efficiency and conservation;
- g. Ensure that prudent environmental, social, health and safety considerations, as well as issues of climate change are factored in energy and petroleum sector developments;
- h. Ensure that a comprehensive, integrated and well informed energy sector plan is put in place for effective development;
- i. Foster international co-operation in energy trade, investments and development;
- j. Promote capacity building in the sector through research, development and training;

- k. Promote local manufacture of plant, equipment, appliances and materials;
- l. Promote appropriate standards, codes of practice and specifications for equipment, systems and processes in the sector;
- m. Promote diversification of energy supply sources to ensure security of supply;
- n. Promote cost-effective and equitable pricing of energy products;
- o. Protect investor, producer, supplier, consumer and other stakeholder interests;
- p. Provide incentives for local and international investments in the energy sector;
- q. Ensure that investors and operators in the energy sector comply with local content requirements;
- r. Promote and develop government-owned agencies in the development of energy resources;
- s. Promote an elaborate response strategy in the management of energy related disasters;
- t. Encourage generation of electricity from renewable resources, and build and maintain the necessary distribution and transmission infrastructure; and
- u. Provide for the efficient and optimal distribution of functions between the National Government and county governments in the sector while fostering cooperation with relevant public institutions.

2.6. The Feed-in Tariff Policy 2012

A Feed-in Tariff (FiT) is both a market and policy instrument declaring an intention to purchase electric power at a predetermined rate for a given period. FiT provide not only price points, but also guidance on purchase obligations, modalities of dealing with escalating costs, currency fluctuation, eligible project sizes, and transmission/interconnection arrangements, among others. This allows the investor to make decisions with minimal engagement with potential buyers (off-takers). This policy was formulated to promote investment in electricity generation from renewable energy sources.

The Policy covers wind, small hydro, and biomass power plants not exceeding 50MW, 10MW and 40MW respectively as well as solar PV, geothermal and biogas. The FiT Policy is under review. The Ministry is working on introducing Renewable Energy Auctions to partly replace the FiT system. The auctions aim to procure renewable energy capacity at competitive prices and is applicable to solar, wind, biomass, biogas, and small hydro projects above 10MW. The FiT system and energy auctions will be linked to the sector long-term planning.

2.7. Energy sector institutional structure

Kenya's energy sector has advanced in electricity generation, transmission, distribution and retailing. This arises from implementation of various reforms, notably the Electric Power Act 1997, Sessional Paper no. 4 of 2004, the Energy Policy, 2018 and the Energy Act, 2019. The Energy Act, 2019 repealed the Energy Act, 2006, the Kenya Nuclear Electricity Board Order No. 131 of 2012 and the Geothermal Resources Act, 1982. The reforms in the energy sector have seen a complete reorganization of functions, driven by the need to place responsibilities to specific institutions that would specialise in the mandates vested on them to enhance efficiency. The institutional structure in the electricity sub-sector in Kenya comprises the following:

2.7.1. The Ministry of Energy (MoE)

MoE is responsible for formulation and monitoring of implementation of policies to enable an environment for efficient operation and growth of the sector. It sets the strategic direction for the sector and provides a long-term vision for all sector players. It is also responsible for the national energy planning, mobilisation of financial resources for the sector and licensing of coal resources as relates to downstream activities and geothermal.

2.7.2. Energy and Petroleum Tribunal (EPT)

EPT is a quasi-judicial body whose mandate is to hear and determine disputes on all matters referred to it in relation to the energy and petroleum sectors. It also has original appellate jurisdiction to hear and determine decisions of EPRA.

2.7.3. The Energy and Petroleum Regulatory Authority (EPRA)

EPRA is responsible for economic and technical regulation of the energy and petroleum sectors. Its functions include licensing, energy audit, tariff review and setting, oversight, enforcement of regulations, dispute resolutions and approval of power purchase agreements and network service contracts.

2.7.4. Rural Electrification and Renewable Energy Corporation (REREC)

REREC is mandated develop renewable energy resources, other than geothermal and large hydropower, in addition to extending electricity supply to the rural areas, managing the rural electrification fund and mobilising resources for rural electrification.

2.7.5. The Kenya Electricity Generating Company PLC (KenGen)

KenGen is mandated to generate electric power from various sources, including hydro, geothermal, thermal, solar and wind.

2.7.6. Kenya Electricity Transmission Company (KETRACO)

KETRACO is mandated to develop, own, maintain and operate the transmission grid network and regional power interconnectors. It is also responsible for facilitating regional power trade through its transmission network.

2.7.7. Nuclear Power and Energy Agency (NuPEA)

NuPEA is responsible for promoting the development of nuclear energy and awareness creation of the nuclear programme. It is also responsible for the coordination of research and development as well as capacity building in the energy sector.

2.7.8. The Kenya Power and Lighting Company PLC (KPLC)

KPLC is the main off-taker in the power market, buying bulk power from power generators for onward supply to consumers. It also undertakes transmission of electrical energy, electricity distribution as well as supply and retail of electric power. It is also currently the power system operator.

2.7.9. Geothermal Development Company (GDC)

GDC is a fully owned Government Special Purpose Vehicle (SPV) mandated to undertake surface exploration of geothermal fields; exploratory, appraisal and production drilling; managing proven steam fields, early generation and sell steam to investors.

2.7.10. Independent Power Producers (IPPs) are private investors involved in power generation.

PART THREE: PREPARATION OF THE ENERGY PLANS AND INEP

3.0. Introduction

The section provides a step-by-step process for creating robust Energy plans and INEP which meet the identified objectives.

3.1. Development of National Energy Service Provider Plans

This section provides an eleven (11) step-by-step process for developing and/or review of the National Energy Service Provider Energy Plans as listed herein below;

- a. Stage 1: Preliminaries
- b. Stage 2: Establish an Internal Energy Planning Committee
- c. Stage 3: Identify and engage stakeholders;
- d. Stage 4: Formulate a vision and re-assess objectives;
- e. Stage 5: Conduct situational analysis of the Entity's energy profile;
- f. Stage 6: Develop energy goals and strategies;
- g. Stage 7: Identify and prioritize actions;
- h. Stage 8: Develop funding and financing strategy;
- i. Stage 9: Develop a blueprint for implementation of the Energy Plan;
- j. Stage 10: Plan to monitor and evaluate; and
- k. Stage 11: Refine, adopt and publicize the Energy Plan and INEP.

3.1.1. Stage 1: Preliminaries

3.1.2. Stage 2: Establish an Internal Energy Planning Committee

- a. *Appoint an Internal Energy Planning Committee.*

3.1.3. Stage 3: Identify and engage stakeholders

- a. *Identify Stakeholders*
- b. *Engage stakeholders.*
- c. *Plan to maximise stakeholder value throughout the planning process.*

3.1.4. Stage 4: Formulate a vision and re-assess objectives

- a. *Identify guiding principles and priorities to use as a basis for the vision.*
- b. *Create a focused vision statement.*

3.1.5. Stage 5: Conduct situational analysis of Entity's Energy Profile

- a. *Analyze the existing energy activities, projects, plans, programmes and policies of the national government, county government, development partners, private sector stakeholders and non-governmental organizations.*
- b. *Identify available human and organizational resources to help implement the Energy Plan.*

3.1.6. Stage 6: Develop Energy Goals and Strategies

- a. *Choose effective language to communicate the goals.*
- b. *Develop clear and measurable goals.*
- c. *Identify strategies for achieving goals.*
- d. *Integrate input from stakeholders.*
- e. *Publicize goals and strategies.*

3.1.7. Stage 7: Identify and Prioritize Actions

- a. *Identify policies, programmes, and projects to consider.*
- b. *Rank and evaluate options against goals and strategies.*

3.1.8. Stage 8: Develop Funding and Financing Strategy

- a. *Identify potential financing and funding sources.*

3.1.9. Stage 9: Develop a Blueprint for Implementation of the Energy Plan

- a. *Develop a blueprint.*
- b. *Establish operational responsibilities.*
- c. *Incorporate the Energy Plan into other planning and budgeting activities.*

3.1.10. Stage 10: Plan to Monitor and Evaluate

- a. *Establish a plan for performance measurement and reporting.*

3.1.11. Stage 11: Develop, Adopt, and Publicize the Energy Plan and INEP

- a. *Prepare a final Energy Plan.*
- b. *Submit a final Energy Plan to the CS.*
- c. *Publicize and commence implementation of the INEP and Energy Plan.*
- d. *Develop communication and public relations strategies for the Energy Plan.*
- e. *Evaluate and report on the effectiveness of the Energy Plan and its components within the set timelines.*
- f. *Update the Energy Plan when necessary to ensure the best results.*

3.2. Development of County Energy Plans

This section provides an eleven (11) step-by-step process for developing and/or review of the CEP as listed herein below;

- a. Stage 1: Preliminaries
- b. Stage 2: Establish a County Energy Planning Committee (CEPC)
- c. Stage 3: Identify and engage stakeholders;
- d. Stage 4: Formulate a vision and re-assess objectives;
- e. Stage 5: Conduct situational analysis of the County energy profile;
- f. Stage 6: Develop energy goals and strategies;
- g. Stage 7: Identify and prioritize actions;
- h. Stage 8: Develop funding and financing strategy;
- i. Stage 9: Develop a blueprint for implementation of CEP;
- j. Stage 10: Plan to monitor and evaluate; and
- k. Stage 11: Refine, adopt and publicize the CEP and INEP.

3.2.1. Stage 1: Preliminaries

3.2.2. Stage 2: Establish a County Energy Planning Committee (CEPC)

- a. *Appoint a CEPC.*
- b. *Identify CEPC Programme Coordinator.*

3.2.3. Stage 3: Identify and engage stakeholders

- a. *Identify Stakeholders*
- b. *Engage stakeholders.*
- c. *Plan to maximise stakeholder value throughout the planning process.*

3.2.4. Stage 4: Formulate a vision and re-assess objectives

- a. *Identify guiding principles and priorities to use as a basis for the vision.*
- b. *Create a focused vision statement.*

3.2.5. Stage 5: Conduct situational analysis of County Energy Profile

- a. *Develop the scope and constitute a team of experts to undertake the energy profile work. This may be outsourced where necessary.*
- b. *Assess current energy use and supply.*

- c. *Identify potential future energy supply.*
- d. *Analyze the existing energy activities, projects, plans, programmes and policies of the national government, county government, development partners, private sector stakeholders and non-governmental organizations.*
- e. *Identify available human and organizational resources to help implement CEP.*

3.2.6. Stage 6: Develop Energy Goals and Strategies

- a. *Choose effective language to communicate the goals.*
- b. *Develop clear and measurable goals.*
- c. *Identify strategies for achieving goals.*
- d. *Integrate input from stakeholders.*
- e. *Publicize goals and strategies.*

3.2.7. Stage 7: Identify and Prioritize Actions

- a. *Establish a system to rank ideas.*
- b. *Identify policies, programmes, and projects to consider.*
- c. *Rank and evaluate options against goals and strategies.*

3.2.8. Stage 8: Develop Funding and Financing Strategy

- a. *Understand financial requirements for different types of energy actions.*
- b. *Identify potential financing and funding sources.*
- c. *Design a suite of financial mechanisms for proposed CEP activities.*

3.2.9. Stage 9: Develop a Blueprint for Implementation of the CEP

- a. *Develop a blueprint.*
- b. *Establish operational responsibilities.*
- c. *Incorporate the CEP into other planning and budgeting activities.*

3.2.10. Stage 10: Plan to Monitor and Evaluate

- a. *Establish a plan for performance measurement and reporting.*

3.2.11. Stage 11: Develop, Adopt, and Publicize the CEP and INEP

- a. *Prepare a final CEP.*
 - b. *Have the CEP officially adopted.*
 - c. *Publicize and commence implementation of the CEP.*
 - d. *Develop communication and public relations strategies for the CEP.*
 - e. *Evaluate and report on the effectiveness of the full CEP and its components on a regular basis.*
- Update the CEP when necessary to ensure the best results.*

3.3. Development of INEP

This section provides an eleven (11) step-by-step process for developing and/or review of the INEP as listed herein below;

- a. Stage 1: Preliminaries
- b. Stage 2: Establish the Integrated National Energy Planning Committee;
- c. Stage 3: Identify and engage stakeholders;
- d. Stage 4: Formulate a vision and re-assess objectives;
- e. Stage 5: Conduct situational analysis of the energy sector;
- f. Stage 6: Develop energy goals and strategies;
- g. Stage 7: Identify and prioritize actions;
- h. Stage 8: Develop funding and financing strategy;
- i. Stage 9: Develop a blueprint for implementation of INEP;

- j. Stage 10: Plan to monitor and evaluate; and
- k. Stage 11: Refine, adopt and publicize the INEP.

3.3.1. Stage 1: Preliminaries

In the preliminary phase, the following steps are spearheaded by the MoE:

- a. Issue of circular on guidelines for preparation of INEP and circulation of the same to county governments, energy providers and national government representatives at the counties.
- b. Sensitisation/ familiarisation of all stakeholders on the INEP framework. The stakeholders include the national and county governments, and relevant non-state actors such as private sector players, NGOs, CBOs and development partners.
- c. Developing a budget and identifying funding for supporting the Integrated National Energy Planning process.
- d. Guiding on division of roles and responsibilities for INEP preparation activities, including time, labour and participation in meetings and workshops. Measurable performance objectives shall be set and the person(s) responsible for specific activities identified.
- e. Defining preliminary objectives and developing schedule for preparation of INEP as detailed in work plan attached as Annex 2. A time schedule for the process provides stakeholders with clear expectations about their involvement.

3.3.2. Stage 2: Establish the Integrated National Energy Planning Committee

This stage involves putting in place the Integrated National Energy Planning Committee (INEPC) whose terms of reference are detailed in Annex 3. The Cabinet Secretary in appointing the INEPC, shall request for nominations from the various organisations as listed in Annex 3. In nominating members for appointment to the INEPC, the nominating authorities will be required to identify officers who are able to:

- a. Dedicate themselves to the INEP process
- b. Coordinate various government offices
- c. Motivate key stakeholders to contribute to the INEP
- d. Meet the set timelines for INEP preparation process
- e. Monitor and evaluate the implementation of INEP

The Ministry shall:

- a. *Establish INEPC by appointing members of the Committee.*

The INEPC will:

- i. Coordinate the planning process.
- ii. Provide information and updates to the stakeholders and energy leadership on planning activities.
- iii. Mobilise resources to undertake energy planning.
- iv. Work closely with stakeholders to develop INEP.
- v. Follow-up on data gaps and ensuring adequacy of information and data.
- vi. Circulate a standardised brief of the policy, regulatory and institutional frameworks to county governments for purposes of developing County Energy Plans(CEP).
- vii. Consolidation of the energy plans from national energy service providers and county governments, into a draft INEP.
- viii. Subject the draft INEP to stakeholders prior to submission to the Cabinet Secretary for approval.

The INEPC may form smaller working groups to lead different aspects of the planning process.

b. Develop a detailed work plan for the INEP process.

The detailed work plan shall indicate important milestones such as dates for meetings, expected deliverables from stakeholders, deadlines for feedback on the deliverables and any stakeholder workshops that are envisaged during the process. Sufficient time shall be reserved for discussions, assessment of draft outcomes and stakeholder consultations. To sustain motivation during the process, planning shall be as realistic as possible, bearing in mind the specific characteristics of the county governments, energy service providers and other stakeholders.

For each planning phase, the work plan shall set out:

- i. Activities to be done
- ii. Roles and responsibilities
- iii. The timelines
- iv. The budget for the activities

The scope, planning, responsibilities, and milestones will effectively form Terms of Reference for all stakeholders in this process.

c. Appoint INEP Programme Co-ordinator from MoE

The INEP Programme Co-ordinator shall have the primary responsibility of championing the INEP process. Specifically, the focal person will be responsible for:

- i. Coordinating and delegating work among the INEPC, technical working groups and others who may be involved in the process.
- ii. Facilitate day to day running of the INEPC.
- iii. Communicating with key stakeholders in the energy sector.
- iv. Providing support to INEPC and technical working teams as they complete their work.
- v. Managing risks to the integrated energy planning process so that it is completed on time and budget.

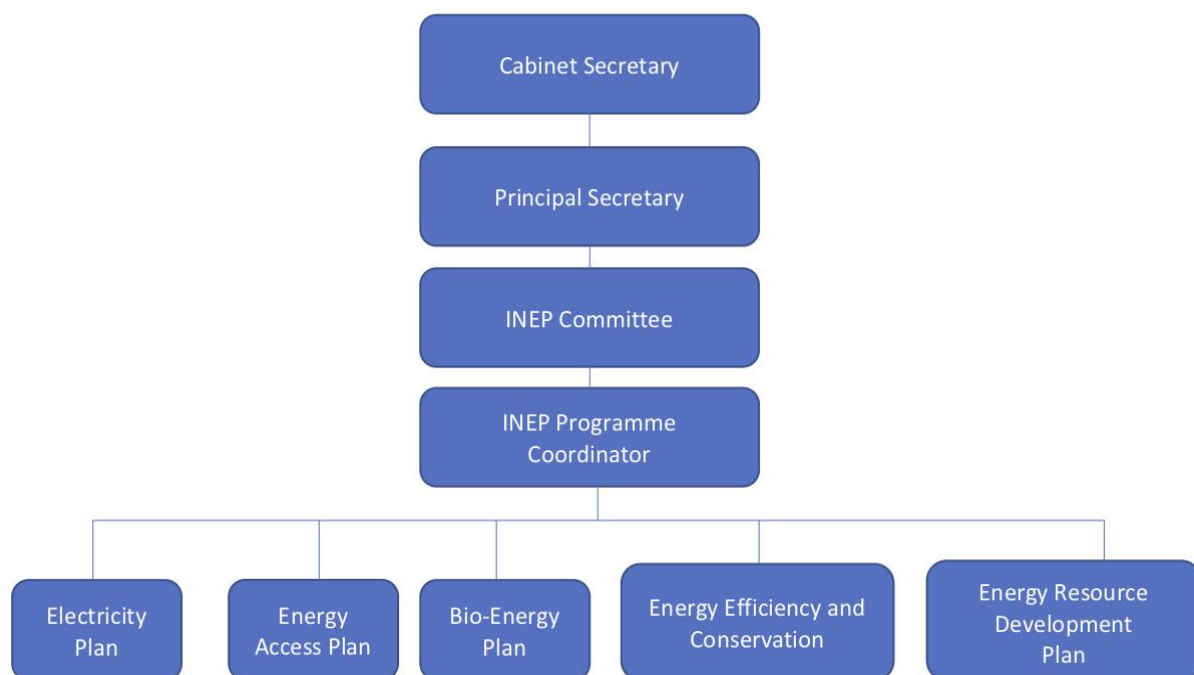
d. Set-up a coordinating structure

A well-defined coordinating structure with clear and mutually agreed responsibilities and lines of reporting and communication provides a strong structure for cooperation. The objective of having a coordinating structure will be to:

- i. Facilitate and organise the INEP process;
- ii. Integrate the interests of different stakeholders;
- iii. Enhance collaboration among the stakeholders.

The INEP coordinating structure is as indicated in Figure 3.1 below;

Figure 3.1 INEP Coordination Structure



3.3.3. Stage 3: Identify and engage stakeholders

Creating a viable and transformative energy future rests in the hands of all the actors in the energy value chain. They include government, consumer groups, private sector actors, non-governmental organizations, and development partners. It is important to map the mandates, responsibilities and interests of the different stakeholders and determine their roles in energy planning process. Involving a wide range of stakeholders across the government and the entire energy value chain is important because:

- i. Broad-based stakeholder engagement helps to lay the foundation for necessary support.
- ii. The plan needs the support of departmental heads and officials who are interested in their constituents' and stakeholders' points of view.
- iii. Stakeholders have valuable insights to offer and provide real local context for ideas.
- iv. Input from stakeholders helps prioritize recommendations based on their aspirations and priorities.

For each stakeholder, the following characteristics are important:

- a. Mandates, roles, activities and interests in relation to energy, and whether these support or impede the development of a sustainable sector.
- b. Resources, expertise and capacities.
- c. Experiences and main lessons learned from implementation of their projects.

3.3.4. Stage 4: Formulate a vision and re-assess objectives

The objective of vision formulation is to reach an agreement on a desired state of the sector in the future. An effective energy vision statement offers a representation of what the sector should look like in a specified future. This desired future provides a focus for the rest of the work that will go into the INEP preparation. A clearly articulated, transparent, and shared vision of the energy future sets the direction for subsequent decisions about goals, strategies, and actions.

The vision shall be clear, realistic, and measurable, and shall address four basic principles:

- a. Security of supply.
- b. Environmental and climate friendliness.
- c. Economic efficiency.
- d. Health and safety.

The following are the guiding questions to define a vision:

- a. How shall energy be produced and supplied?
- b. Which improvements in the value chain are desirable and feasible?
- c. How and by whom shall energy be used?
- d. What are the desired and feasible sources for electricity production?
- e. In the long run, is it preferable to improve sustainability of the current situation, or are alternative fuels available, affordable and/or preferred?

The vision shall be in line with existing frameworks, such as the national poverty reduction strategy and national energy policy. The vision will become the guiding concept throughout the INEP preparation process.

3.3.5. Stage 5: Carry out a situation analysis of the energy sector

A situation analysis maps out the present energy landscape, including: current and projected future energy use and supply data; an inventory of existing energy-related activities, projects, programmes, and policies; and information on available human and organizational resources to help implement the INEP.

A summary of findings and conclusions from this assessment, along with sections on the outcomes from previous stages, will be published as an Energy Profile. The goals, strategies, and actions to be identified in later stages will be most effective if they are informed by and built on current energy use data and the existing organizational and policy framework. This will ensure that the plan is focused on true gaps and/or needs, and that the actions identified are attainable. The current situation will also serve as the baseline for measuring future progress.

The following are the key steps involved in situational analysis:

a. Assess the political and policy environment

The objective of a political and policy assessment is to establish where energy governance fits in the existing policy environment, whether current governance structures support further development of the sector, and ensuring compatibility of energy interventions with existing structures. In the institutional and regulatory assessment, the following aspects shall be analysed:

- i. *Policy framework:* Which policies regulate energy? Are they consistent, implemented and enforced?
- ii. *Institutional responsibilities:* Which ministries and departments are responsible for which aspects of energy? What are their mandates, resources and capacities? What is their interest in energy?
- iii. *Regulatory structures:* What laws and regulations relate to the production and use of energy and land tenure? What licences are required to operate in energy? How effective is their enforcement? Do provisions exist to monitor the regulations?
- iv. *Financial aspects:* What revenues are collected from energy? Are there any subsidies influencing the production and usage of energy? Are there any national or international financial programmes influencing the sector? Are there subsidies or other financial incentives for particular energy sources and technologies?
- v. *International aspects:* What bilateral or regional agreements or regulations relate to the management of energy?

Relevant documents to consult may include policies, strategies and regulations on energy, forestry, land and land use, rural development, environment, and poverty reduction.

b. Establish the baseline supply and demand situation.

The objective of establishing the baseline is to gain an overview of the prevailing situation in the sector, including demographic and economic statistics, market structures, and supply and demand characteristics.

- i. *General statistics.* General demographic and economic parameters are the starting point for baseline analysis. Demographic information shall include population size and distribution, projected population growth rates by region and urbanisation rates. Economic data shall include household income and expenditures, income growth, and the main sources of income for the rural and urban populations. This data helps establish the number of people who will have to be supplied with energy, their demands and their ability to pay.
- ii. *Understanding the energy value chains.* Value chain analysis identifies the activities performed to deliver energy from source to consumer. The value chain will vary by energy, by region and between rural and urban areas. The energy sector comprises many different value chains, e.g. electricity, coal, geothermal, oil, commercially traded fuel wood for industrial use, charcoal for household use and collected fuel wood for private consumption. The following parameters should be assessed for each value chain:
 1. Who are the stakeholders in the value chain?
 2. How is the value chain organised? Who cooperates with whom?
 3. Who holds the power in the value chain and who receives profits at different points?
 4. What is the size of the sector (in both absolute and monetary terms)?
- iii. *Supply side.* The supply side comprises all stages before the energy reaches the final users. It includes the production, transportation/transmission, distribution, retail supply, marketing and sales of energy and of related appliances.
- iv. *Demand side.* The demand side is defined as the final use of energy, consisting of lighting, heating and cooking in households, institutions, industrial and commercial enterprises, agro-processing, transport and other productive activities as well as energy exports. It is also important to identify competing (non-energy) uses of other energy sources as biomass (e.g. construction, furniture production) to assess the effect of competition.

The following parameters need to be assessed to characterise the demand:

- I. *User categories:* Household, institutional, industrial and commercial users of energy, including the informal sector.
- II. *Consumption purposes:* The demands for domestic, institutional and commercial cooking, heating, industrial use (e.g. brick burning, lime burning), agro processing (e.g. tea drying, tobacco curing, sugar production) and electricity production.
- III. *Major consumption centres:* Mostly urban areas and industrial complexes.
- IV. *Energy types:* The different energy types used, e.g. in cooking and heating (biomass fossil fuels and fossil alternatives), quantities consumed and trends in fuel use.
- V. *Energy costs:* The prices paid by households and industries, as well as end-user costs, considering the energy efficiency, share of income spent on energy and trends in prices.
- VI. *Technologies used:* The conversion appliances, efficiencies, availability, adoption rate and affordability of technologies.

VII. *Consumer preferences:* The energy type preferences, energy use patterns and limiting factors for fuel switching.

The results from analysis shall differentiate between urban and rural areas, income groups and company size. Information on demand may already be available from socio-economic or household surveys, or may require additional empirical survey in different energy consumption sectors.

c. Analyse baseline sector data.

The objective is to examine existing connections between supply and demand in the energy sector. This will identify important energy supply areas and consumption centres. Energy consumption and production maps may be useful to visualise the main parameters and highlight areas with a surplus, deficit or balance, showing the main producer sites, user centres and transport routes. This should also entail the component of energy loss levels and appropriate mitigation measures including loss reduction. Analysis of the baseline data answers the following key questions:

- i. What are the main challenges faced by the energy sector?
- ii. Who are the most affected stakeholders?
- iii. Which are the most affected regions?
- iv. What are the main obstacles to a sustainable energy sector?
- v. What are the emerging issues in the energy sector?

The outcomes of the data collection and analysis shall be verified by MoE and stakeholders. A joint understanding of the baseline situation prepares the ground for joint decisions.

d. Confirm the scope

The scope determines which key sectors will be covered and the level of geographical detail. Based on the data analysis, it may be decided that focus will be on certain sectors or regions. In addition, the exact time horizon shall be decided on. This will be the period which the resulting interventions are expected to cover. General recommendations for the scope of the process are:

- i. Focus on the genuine, specific problems in the country or in certain regions, based on the findings of the baseline sector analysis.
- ii. Take the needs of energy users (domestic or commercial) and long-term sustainability of supply as a starting point.
- iii. Concentrate on current uses of energy, but consider also possible future application.
- iv. Consider all energy types.

3.3.6. Stage 6: Develop energy goals and strategies

The development of tangible long-term goals and short-term strategies will be informed by the results of the situation analysis carried out in Stage 4. The objective is to provide a pathway for translating the conceptual energy vision into concrete cost-effective actions. Clearly defined goals and strategies will form the framework for the rest of the plan's design and guide decisions about what actions (including policies, programmes, and projects) to propose. Goals and strategies also help to communicate the specific value of efforts to key audiences and provide a basis for tracking and measuring progress.

During this phase of the planning process, the team leaders will need to:

- a. Choose effective language to communicate the goals
- b. Develop clear and measurable goals

- c. Identify strategies for achieving goals
- d. Integrate input from stakeholders
- e. Publicize the goals and strategies

The following are key steps in developing goals and strategies.

a. *Develop a prognosis for future supply and demand.*

Based on the data collected and analyzed, energy demand and supply is projected over the defined period. Scenario setting may show the geographical and temporal demand and supply patterns, and provide a first indication of where complications could appear (e.g. rising prices, shortages). The scenario shall be assessed for robustness by running tests with small changes in the input variables. The robustness, accuracy and limitations of the scenario shall be clearly explained to the stakeholders it is shared with. Computer simulation programmes, tools and software may be used for scenario development.

b. *Develop alternative scenarios.*

Alternative scenarios illustrate how the sector can develop under certain assumptions, including potential interventions. Alternative scenarios are developed based on assumed changes in internal and external drivers that may vary among scenarios, and could include:

- i. Energy prices.
- ii. Adoption of improved technologies by users.
- iii. Supply and demand of energy services.
- iv. Availability and affordability of energy sources.
- v. Technologies for improved conversion efficiencies.

The interrelation between variables is complex and is probably perceived differently from different positions, and shall therefore be agreed upon by the MoE and other stakeholders. Scenario analysis should cover both supply and demand changes.

c. *Define specific objectives.*

The aim of this is to further specify the way forward. The formulation of objectives for the sector allows the definition of appropriate interventions. Comparison of the alternative scenarios with the baseline provides insights into the impact of the different internal drivers, and therefore shows the areas where interventions in the sector would be most effective. Based on this information and the vision, the INEPC can decide upon the objective(s) of the interventions. At this stage, the focus shall solely be on these objectives. The specific actions that need to be taken to reach these objectives will be defined in Stage 7. The objectives may include any of the following:

- i. Ensure energy supply and demand balance
- ii. Promote energy efficiency and conservation.
- iii. Promote use of renewable energy.
- iv. Promote the access to energy.
- v. Provision of energy to underserved regions.
- vi. Improve energy quality to satisfy high productive demands.
- vii. Increase the efficiency of energy production to achieve competitive supply prices and tariffs.
- viii. Increase energy interconnection and integration across the continent.
- ix. Promote sustainable biomass supply.
- x. Encourage efficient biomass use.
- xi. Determine availability of viable fossil fuels.
- xii. Build sufficient institutional capacity for programme implementation, among others.

- xiii. Enhance security of supply

d. *Re-assess stakeholder capacity and mandate.*

The objective of this is to collect the necessary information to permit an efficient division of tasks among stakeholders. This re-assessment shall cover the government, private sector and other stakeholders and shall specifically address capacities that are relevant to the objectives selected in the previous stage. If capacity gaps are identified, external support may be needed to build the required knowledge and skills.

Stakeholder assessment shall go beyond the human capacity of individual employees because an individual's power to act depends also on management structures and processes in their organization. Therefore, a systematic assessment of stakeholder capacities must analyze all levels of capacity: individual, organizational and institutional. Such a capacity assessment can form the basis for targeted capacity development interventions.

3.3.7. Stage 7: Identify and prioritize actions

After finalizing energy goals and strategies, a list of potential actions to achieve them must be developed and ranked. Goals and strategies will only be accomplished with concrete actions. There are a wide range of policy, programme, and project options one can choose from. Therefore, they must be broadly considered and then prioritized. Deliberately identifying and articulating the criteria and rationale for ranking these choices will:

- a. Assure a focus on relevant activities that will be effective in contributing towards the goals,
- b. Provide guidance to those implementing the plan if future resources are constrained, and
- c. Help garner support from others.

To identify and prioritize effective actions for the INEP, the team leaders will need to:

- i. Establish a system to rank ideas.
- ii. Identify policies, programmes, and projects to consider.
- iii. Rank and evaluate options against goals and strategies.

The following steps may be considered in identification and prioritization of interventions:

a. *List and prioritize potential intervention options with the objectives defined above.*

With this, suitable interventions can be developed. To obtain a complete overview from which a strategic selection can be made, a "long list" of potential interventions shall be generated, summarising all possible actions that could contribute to achieving the objectives. For each potential intervention, the following preliminary information shall be provided:

- i. Intervention: Concrete actions to be taken.
- ii. Specific objective: How the intervention helps achieve specified objective(s).
- iii. Time needed to become effective (short, medium, or long-term). Although the general objective is based on the horizon of the vision, individual interventions can be undertaken over shorter periods, such as two or four years.
- iv. Budget: Low, medium or high costs.
- v. Required framework conditions, assumptions, and prerequisites for success, including the necessary capacities.
- vi. Interdependencies between interventions (one intervention may have to be preceded by another).

- vii. Potential externalities, positive or negative, particularly effects on vulnerable groups such as the poor and women.

Based on time, budget, framework conditions, interdependencies and potential externalities, a “shortlist” of potential interventions shall be extracted by selecting the most feasible and effective interventions from the “long list”. These are best chosen strategically; picking actions that complement each other to increase impact, balancing a mix of short-term and long-term actions, and ensuring a combination of supply and demand side interventions. The options selected shall be consistent with the vision formulated in Stage 4, and baseline sector analysis and scenarios developed in Stage 6.

Interventions may also be proposed (initially) for certain regions of the country. It is likely that the sector analysis will have revealed regional differences. For instance, uptake of technologies may be more likely in one region than the other because of socio-economic and environmental factors. Therefore, some interventions may be targeted or piloted in certain areas.

b. Specify the selected interventions.

The objective is to turn the selected interventions into clearly defined, concrete activities. The following additional information on each selected intervention shall be elaborated:

- i. Specific objectives of each intervention, quantified and time bound, as sub-objectives of the objectives above.
- ii. Concrete actions to be taken on the ground.
- iii. Target group to be addressed.
- iv. Responsible implementer: This can be deduced from the assessment of the political and policy environment and the stakeholder analysis.
- v. Mitigation actions for the externalities.
- vi. Detailed budget estimation.
- vii. Potential funding sources, such as government budgets, credit mechanisms, donors or private sector.

It is important that the objectives and the actions are described clearly to ensure a common understanding of the proposed interventions. Also, sufficient resources for energy shall be allocated in national and county budget planning. With clear funding commitments from government, additional funds can often be mobilised from donors, NGOs or the private sector.

3.3.8. Stage 8: Develop funding and financing strategy

The implementation of a majority of actions recommended in INEP will require funding. The cost will likely vary widely, from no-cost policy changes to capital-intensive infrastructure projects. Taking the time to identify opportunities to pay for these actions within the plan will increase the likelihood that they will actually be implemented. There are a variety of funding sources, some of which take advantage of financing opportunities to provide capital in the short term, but ultimately need to be paid back by tax payers.

While financing opportunities are not “free money”, the ability to access needed funds at strategic times can be a particularly valuable option for energy projects with often attractive returns in the form of reduced energy costs. Financing options vary in terms of risk profile and time horizon, and there are ways to structure these transactions and projects to minimise risk and align savings with repayment schedules. There is need to research the options and get information from a wide range of sources so as to make an informed decision. Funding sources

vary over time among energy service providers, communities and counties, so each energy service provider and county will need to develop a strategy that is specific to their local circumstances.

Developing an overarching funding and financing strategy as part of the INEP allows for:

- a. Identification of appropriate financing for different activities;
- b. Staging of short- and long-term financing;
- c. Effective use of portfolios of financing; and
- d. Greater support and likelihood of INEP adoption.

The Team Leaders will work with energy service providers and county governments financial officials on this task. Stakeholders with financial interests shall also be involved, such as:

- a. National Treasury and planning officials, utilities, or other energy finance programme administrators; and
- b. Representatives from local financial institutions, including banks, credit unions, foundations, and bonding authorities.

To find appropriate financial support for the INEP, the Leadership Team will need to:

- a. Understand financial requirements for different types of energy actions;
- b. Identify potential financing and funding sources; and
- c. Design a suite of mechanisms for proposed INEP actions.

3.3.9. Stage 9: Develop a blueprint for implementation of INEP

An implementation blueprint sets out detailed information to put the final INEP actions in place, including who will be responsible for each action, what the specific deliverables will be, and when they will be accomplished. It also incorporates conclusions from the finance strategy (Stage 8 and the plan to do ongoing monitoring and evaluation (Step 10). The implementation blueprint will be integrated in the Final INEP Report and can also be used as a standalone document in the implementation phase.

Establishing a formal implementation blueprint is the key to realizing the vision, goals, and strategies, and turning the overall INEP into reality, as it:

- a. Articulates the resources, staff, and budget needed to sustain the INEP activities;
- b. Communicates expectations to staff and to the energy sector; and
- c. Provides a reference point for all parties to use in the implementation phase to ensure that activities are moving in the right direction and achieving targets identified.

To assure effective implementation of the INEP, the team leaders will need to:

- a. Develop a blueprint;
- b. Establish operational responsibilities; and
- c. Incorporate the INEP into other planning and budgeting efforts.

3.3.10. Stage 10: Plan to monitor and evaluate

Measurable indicators and means of verification must be defined for determining progress and impacts of each intervention towards the overall objectives of INEP. Setting out a clear process for periodic assessment and evaluation upfront means that responsibility for these important steps is clear and intentional. In concert with developing an implementation blueprint, identify the process and resources now for monitoring and evaluating progress, as well as providing that information to the public and making necessary adjustments.

Monitoring and evaluation is vital for the ultimate success of the INEP, as it allows:

- i. Informed management of activities;
- ii. Adjustment of strategies to correct or make up for deviations or shortfalls;
- iii. Validation of progress towards goals;
- iv. Publishing of progress reports to the public and authorities to sustain interest; and
- v. Celebration of successes.

To maximise the chance of success for the plan, the team leaders will need to:

- a. Establish a performance measurement and reporting system;
- b. Evaluate and report on the effectiveness of INEP and its components on a regular basis; and
- c. Update the INEP when necessary, to ensure the best results.
- d. document lessons learnt and how problems were solved, in order to inform the successive planning cycles.

3.3.11. Stage 11: Develop, adopt, and publicize INEP

The last phase of the planning process is to prepare a Final INEP, present it for formal adoption, and then publicize it to the broader energy sector. The final plan is a roadmap for energy future, laying out where things stand today, the long-term vision, and the goals, strategies, and actions for achieving that vision. It also incorporates the implementation blueprint, including responsible parties, timelines, financing strategy and the process for tracking progress.

The Final INEP captures the results of the process in one comprehensive document to effectively communicate to decision-makers and the public, the outcomes of the planning phase and the importance of providing support to see the implementation of the plan through. Once completed, it is critical for the INEP to be formally adopted so that there is official commitment to its implementation and it has weight of authority in future budgeting and other planning efforts. After adoption and throughout implementation, the INEP shall be publicized to ensure engagement and build support in the energy sector.

To finalize and successfully launch the INEP, the INEPC will need to:

- a. Prepare a Final INEP;
- b. Have the INEP officially adopted;
- c. Develop communication and public relations strategies for INEP.

PART FOUR: MAINSTREAMING OF CROSS-CUTTING ISSUES IN ENERGY PLANS AND INEP

4.0. Introduction

In selecting policies and objectives, identifying key stakeholders, carrying out analysis and review of data, scenario development and identification of interventions, and determining monitoring and evaluation indicators, the following cross-cutting issues, and any additional cross-cutting issue that may be directed in the Circular from time to time, shall be taken into consideration:

4.1. Gender

Energy interventions impact men and women differently, as they have distinct roles, responsibilities and voice within their households, markets, and communities. This leads to differences in their access, control, use of energy and the impact of energy services on their lives. Policies and plans provide the framework for distribution of access to and control over public resources to address an identified problem as per government values and principles. Policies determine choice and priorities, whether to improve fossil fuel distribution through public and/or private sector investment, or to promote the use of small-scale renewable energy systems through financial instruments, such as subsidies.

Policies can also set out organizational practices that may either promote or undermine gender empowerment. The policy framework gives guidance to planners on how to implement policy. Most of energy policies and plans are not gender responsive and tend to affect women's ability to access critical resources and technologies for their own well-being and empowerment. This requires that policy makers and implementers enhance their knowledge and capacities on gender issues so that they can understand the need for gender mainstreaming and how to put it into practice to respond to gender needs in energy policy and planning.

A gender-aware policy maker and implementer has the capacity to understand the implications of a programme, project or policy from a gender perspective. Furthermore, a gender-aware planner is able to implement policy, programmes and projects, taking gender into account. Therefore, the role of energy planners is to translate men's and women's needs into specific energy services. Gender awareness in policies means that the different gender needs of men and women are incorporated into all aspects (contents and processes) of programmes, projects and policies. This can be considered to entail three essential elements:

- a. The recognition that women and men have different and special needs.
- b. Women are a disadvantaged group, relative to men, in terms of their socio-economic status and access to and control over assets. These differences are known as gender gaps.
- c. Women's development entails working towards increased equality and empowerment, for women, thus closing the gender gaps.

The Ministry has already developed a gender policy in energy. This will be a guiding and reference document for mainstreaming of gender in the energy sector, and more specifically in the respective energy plans and the Integrated National Energy Plan. There are several gender analytical tools that are available to energy planners. The gender policy will help energy planners to achieve the following:

- a. Identify gender issues in their energy projects.
- b. Agree on gender goals that the project wants to achieve.
- c. Develop a strategy and action plan on how these gender goals can be met.
- d. Successfully implement gender focused activities in their projects.
- e. Institutionalise gender mainstreaming capacity within the projects.
- f. Track performance of the project implementation, impacts and institutionalisation of gender issues.

- g. Have a full recognition of the different energy needs for women and men, based on consultations that consciously seek advice from both genders.
- h. Recognize the potential of women and men to participate in energy supply.
- i. Recognize the need to tackle institutional barriers that limit women's participation in energy planning and production, and in their access to energy for variety of end-uses.

In formulating programme and projects, energy planners shall ask themselves these questions:

- a. Which gender is likely to participate in and benefit from the energy intervention?
- b. Which gender is going to be involved in the management and maintenance of the system?
- c. Is women's knowledge, e.g. on ecosystems and biodiversity, considered?
- d. How far have individuals and non-governmental organizations with experience in gender mainstreaming participated in project identification, formulation and appraisal?
- e. Are project personnel able to mainstream gender issues?
- f. Are there appropriate opportunities for women to participate in project management positions? Among others.

During monitoring, evaluation and feedback, the following questions may be considered.

- a. What is the impact of the energy interventions on women's workload and time use, access and control of income and resources, decision making, reproductive roles and expressed aspiration of men and women?
- b. Does the project's monitoring and evaluation system explicitly measure the impacts on men and women?
- c. What are the types and courses of data needed?
- d. Are monitoring and evaluation results used for decision making?
- e. Are women involved in the collection and interpretation of this data?

4.2. Innovation, research and development

NuPEA is responsible for coordinating research and development in the entire energy sector. NuPEA will liaise with all stakeholders in the sector, which include the ministry of energy, national energy service providers, county governments, research institutions, institutions of higher learning, among others, to spearhead R&D activities in the sector.

The energy sector is undergoing a fundamental transition and transformation that is expected to accelerate. Through this change come new challenges and opportunities, as the pace of the energy transition varies by industry, technology, and timelines. Research and development (R&D) is a critical tool in assessing the challenges and opportunities brought about by the transition, and thus aid in evidence-based decision making.

Energy research and development shall not only consider energy technologies, but also the energy policy. Ultimately, energy R&D policies and priorities must support goals of national socioeconomic development. Research is essential in identifying which type of interventions will work in what contexts. It plays an important role in discovering technologies and making sure that existing ones are used in the best possible ways. Research can find answers to things that are unknown, filling gaps in knowledge and changing the way that energy professionals work. The purpose of research is to inform action.

The areas of energy research and development include;

- a. Energy supply and storage technologies.
- b. Energy demand management and conservation.
- c. Impact of various policy instruments, such as price, physical and legal controls, technical improvements, energy demand, education and energy promotion.

- d. Policy, legal, regulatory and institutional framework guiding energy sector in the Country.
- e. The role of private sector, development partners, non-governmental organizations, and consumers in the evolving environment.
- f. Energy supply constraints and sustainability

4.3. Communication

Low awareness and knowledge among key stakeholders with regard to energy issues has been identified as one of the key challenges affecting the uptake of some energy interventions. For instance, consumers cannot make informed decisions if they are not aware of the available energy solutions and options. A communication strategy therefore needs to be developed to reach out to all stakeholders in the energy sector for effective and efficient implementation of the energy plans and INEP.

The key stakeholders include policy and decision makers, organisations trading in energy products, non-governmental organizations, citizens, civil society organizations, research institutions and academic institutions. Others include private actors in the industrial and mining, commercial, tourism, public buildings, transport and educational sectors, all of whose decisions impact the energy sector.

4.4. Disaster and risks management

The energy infrastructure is a critical asset in the country. As such, every effort must be employed in the protection of energy infrastructure to ensure energy services are not disrupted.

The Energy plan and INEPC should:

- a. Develop an integrated risk management strategy for the entire energy sector; and
- b. Raise awareness on integrated risk management practices.

Some of the activities to be considered include:

- a. Risk identification.
- b. Risk reduction strategies.
- c. Preparedness to deal with emerging risks and disasters.
- d. Financial protection of the sector.
- e. Recovery strategy in case of disaster.

4.5. Environment, Health and Safety (EHS)

Environment, health and safety are key considerations that all stakeholders in the energy sector should take into consideration when developing policies, regulations, projects and programmes. Section 11(g) of the Act mandates EPRA to formulate, set, enforce, and review environmental, health, safety (EHS) and quality standards for the energy sector in coordination with other statutory authorities. To achieve this, EPRA works in collaboration/consultation with statutory authorities such as the National Environmental Management Authority (NEMA), Directorate of Occupational Safety and Health Services (DOSHS) and the Kenya Maritime Authority (KMA).

Role of EPRA in EHS

The Role of EPRA in EHS is to:

- a. Formulate, enforce and review environmental, health, safety and quality standards for the energy sector.
- b. Monitor energy sector EHS compliance.
- c. Enforce environmental, health, safety and quality standards for the energy sector.

- d. Investigate accidents and incidents.
- e. Check EHS compliance for license or permit application.
- f. Request and analyze EHS performance records of the licensee.

EHS Audit and Environmental Impact Assessment review

EPRAs execute EHS assessments of proposed projects and carry out audits of existing energy facilities.

Objectives of the EHS assessments

The objectives of the EHS assessments are to;

- a. Prevent accidents such as rupture of pipelines, truck accidents, LPG cylinder explosion, electrocution, and LPG fires.
- b. Protect human health and ensure safety: Check pollution levels at power plants (e.g. thermal/geothermal etc), petroleum depots, petrol stations, LPG plants and compare against recommended standards and guidelines.
- c. Protect the environment: Protect water resources from pollution by hydrocarbons and other contaminants. Protect the air from harmful emissions.
- d. Conserve resources for existing and future generations.

EHS audits are carried out at utilities within the energy sector using a comprehensive audit protocol designed on the basis of national EHS requirements and international best practices to check the following:

- a. Compliance with regulatory requirements and licensing conditions.
- b. Leadership, commitment and accountability: Determines success of an EHS management system and check establishment of EHS policies and procedures.
- c. Crisis Management: Ability and preparedness to deal with emergencies and accidents, and assessment of the hazards and risks of such unplanned events.

Accidents and incident investigation

Accident and incident investigation is one of the core functions of EPRAs. Under Section 214(1) of the Act, *“a person engaged in any undertaking or activity pursuant to a licence under this Act shall notify the respective licensing authority and the Authority within forty-eight hours in writing, in the form and manner prescribed by the Authority, of any accident or incident causing loss of life, personal injury, explosion, oil spill, fire or any other accident or incident causing harm or damage to the environment or property which has arisen in Kenya or within Kenya’s Exclusive Economic Zone or Outer Continental Shelf.”* As a licensing Authority, EPRAs are mandated under Section 214(2) of the Act to direct an investigation to be carried out into any accident or incident and take such action as it deems necessary.

PART FIVE: OUTLINE OF ENERGY PLANS FOR NATIONAL ENERGY SERVICE PROVIDERS

5.0. Introduction

This section provides an outline of energy plans for the energy service providers. They include the MoE, EPRA, KPLC, KenGen, KETRACO, GDC, REREC and NuPEA. The contents will be unique to each entity's mandate. Although the plans will differ in the specific vision, goals and recommended actions, the following general content considerations shall be applied:

5.1. Content of the National Energy Service Providers Plans

Although each National Energy Service Providers' plans will differ in the specific vision, goals and recommended actions, the following general content considerations shall be applied;

- 1. Cover Page**
- 2. Preliminaries (Foreword, Preface, Acknowledgements and table of contents).**
- 3. Executive Summary.**

Presents two to three pages that capture the essence or vision of the energy plan. The executive summary shall highlight explicit recommendations or action items, review topical areas discussed within the plan, provide a brief description of the stakeholder engagement and plan development process.
- 4. Scope and Purpose.**

Provides an introduction that outlines the scope, overarching goals of the energy plan and sets expectations for the reader.
- 5. Vision.**

Describes the desired future in detail so that it clearly depicts the intended outcomes once all elements of the energy plan are adopted and implemented. This section illustrates how the energy plan recommendations harmonise with all current, applicable energy plans, policies, programmes, laws, executive orders, and trends.
- 6. Past performance.**

Captures the performance of the energy service provider as per their mandate. This section shall include visual aids i.e. graphs, charts, etc.
- 7. Current Energy Profile, Policies, and Programmes.**

Presents the current energy profile of the energy service provider as per their mandate (e.g., characteristics of energy production, consumption data, prices and expenditures, import/export overview, etc.). This section shall include visual aids (graphs, charts, etc.), as well as projected production and consumption trends. It covers an assessment of existing policies and programmes, including a review of their costs and benefits.
- 8. Future Projections and Needs.**

Addresses the energy forecast models used to inform the recommended actions, documents assumptions and key variables that may affect the projections.
- 9. Goals and Recommended Actions.**

Includes a complete listing of the goals and recommended actions being offered in the plan, organised by goal, energy type, or end-use sector. The recommended actions shall be SMART (Specific, Measurable, Attainable, Realistic and Time bound).
- 10. Implementation and Timeline.**

Establishes an implementing agency or strategy for the goals and recommended actions, and includes milestones and duration to set an end date by which each shall be accomplished.
- 11. Financing Mechanisms.**

Indicate the financing strategies for the goals and recommended actions to ensure that the plan is financially sustainable.

- 12. Monitoring, Evaluation and Reporting**
Explains the strategies used to measure results of the energy plan, including specific metrics that will be used to gauge success in implementation of each goal and recommended actions. This section shall also clearly define responsibilities and assign leaders to implement the specific recommendations of each of the energy plans.
- 13. Challenges and Solutions.**
Identifies specific barriers to completing the goals outlined in the energy plan (such as technological changes, evolving consumer behaviours, possible environmental hazards, regional transmission challenges, and unpredictable supply, demand, and pricing issues), and offers potential solutions.
- 14. Summary.**
Provide a summary section to review important elements of the energy plan. This section shall include commitments to report on plan implementation, procedures for modifying the plan, and a projected cycle for updating the plan.
- 15. Glossary.**
Includes a glossary of terms and abbreviations used in the plan.
- 16. Appendices.**
Includes additional information that may be necessary to support the plan.
- 17. References and Resources.**
Provides a list of references used in the development of the plan. Also includes any resources that support the plan.

5.2. National Energy Service Providers Plan Outline

This section presents an outline of the various chapters and annexes

- 5.2.1. Table of Contents**
- 5.2.2. Preliminaries (Foreword, Acknowledgements, Executive Summary)**
- 5.2.3. Chapter One: The Overview of The Plan**
 - 1.1. Introduction of the chapter
 - 1.2. Background
 - 1.3. Scope , purpose and objectives of the Plan
 - 1.4. Policy Legal and Regulatory framework for energy sector.
 - 1.5. Institutional framework for energy sector
 - 1.6. National Energy Service Provider’s mandate towards realization of government development agenda .This include the Vision 2030, The Big 4 Agenda among others
 - 1.7. Global, Regional and National Energy Challenges and emerging issues
- 5.2.4. Chapter Two: Situational Analysis**
 - 2.1. Introduction
 - 2.2. Review of past performance. Include visual aids (graphs, charts etc)
 - 2.3. Key Milestones
 - 2.4. Challenges
 - 2.5. Lessons learnt
 - 2.6. Strength Weakness Opportunities and Threats Analysis
 - 2.7. Political, Economic, Social, Technological, Environmental and Legal Analysis
 - 2.8. Stakeholder Analysis
 - 2.9. List of potential intervention options. The interventions identified should integrate the crosscutting issues such as Gender, Environment, Health and Safety, Risk and Disaster Management, Innovation, Research and Development as well as Communication.

2.10. Energy efficiency and conservation

5.2.5. Chapter Three: Programmes/Projects

3.1. Introduction of the chapter

3.2. Programme/Projects. These should include energy efficiency and conservation programmes being implemented.

| S/No. | Programme/Projects | Timelines | Key Activities | Implementing Agency | Project Cost | Status (New/Ongoing) |
|-------|--------------------|-----------|----------------|---------------------|--------------|----------------------|
| | | | | | | |
| | | | | | | |

The detailed programmes/ projects information is provided in Annex 5.

5.2.6. Chapter Four: Implementation And Coordination Framework

4.1. Introduction

4.2. Institutional Framework

This section shall identify the institutional framework and provide the roles of key stakeholders in the implementation of the plan.

4.3. Resource requirements, Mobilization and Management

4.3.1. Financial resources requirements

4.3.2. Resource Gaps

4.3.3. Resource mobilization strategies.

4.3.4. Resource management

4.4. Risk analysis and mitigation measures

5.2.7. Chapter Five: Monitoring, Evaluation And Reporting

5.1. Introduction

This section shall provide a brief description of the structure for M& E of the plan. It shall state the goal and outline the design and indicators for the goals, outcomes and outputs. It shall also outline mechanisms on data collection, analysis, reporting, and dissemination and stakeholder engagements.

5.2. Monitoring and Evaluation Results matrix

| S/No. | Programme/Project | Output | Baseline | | Mid-term target | End-term target | Source Of Data | Frequency | Responsibility | Reporting |
|-------|-------------------|--------|----------|------|-----------------|-----------------|----------------|-----------|----------------|-----------|
| | | | Value | Year | | | | | | |
| | | | | | | | | | | |
| | | | | | | | | | | |

5.2.8. Chapter Six: Conclusions And Recommendations.

This chapter will highlight the key issues and recommendations of the plan.

PART SIX: OUTLINE FOR ENERGY PLANS FOR COUNTIES

6.0. Introduction

This section an outline of the CEP, indicating the various chapters and annexes. Except for the scope and time taken, the preparation of the county energy plans is similar to that of the Integrated National Energy Plan. The tool for collection of data for county energy profile is as indicated in [Annex 7](#).

To ensure uniformity across the counties and facilitate effective and efficient integration of CEP into INEP, county governments shall use the following template in the preparation of their respective CEPs.

6.1.1. Cover Page

When preparing its energy plan, each county shall contain the following:

- a. National and County Emblems
- b. County Energy Plan (Insert period e.g. 2021-2030)
- c. County name
- d. Variety of appropriate pictures depicting energy resources or energy infrastructure within the County's boundaries.

A sample cover page is attached as [Annex 8](#).

6.1.2. First Page (Title Page)

The First Page shall contain the following:

- a. Title: County Energy Plan for (*Insert County*)
- b. County's official map
- c. County Vision and Mission

6.1.3. Foreword

The Foreword should contain the rationale for preparing the CEP and the highlights of the development priorities of the county during the plan period. The statement will outline the linkages to the energy sector policy, legal and regulatory frameworks. It will also state how stakeholders have been consulted and engaged, and the process used in identifying the needs and prioritising actions. The Foreword will further stress the county's commitment to the implementation of the plan, together with the key steps to be taken to ensure successful implementation. The foreword shall be signed by the Governor.

6.1.4. Preface

The preface shall highlight the purpose for preparing the CEP and the linkage to CIDP and the requirement for the development of INEP by the Energy Act, 2019. State how the process of CEP development involved consultation, participation and inclusivity of all the stakeholders.

Discuss briefly the objectives and how they will be achieved in terms of strategies. Also highlight the main focus of CEP in terms of key areas (energy sources, energy access, bio-energy, electricity and energy efficiency and conservation), programmes, projects, implementation matrix and its contents, financing, M&E framework and its use in tracking and reporting on its implementation.

Highlight how CEP will be implemented and the key stakeholders and what is expected from them. Highlight the establishment of CEP Committee and its role in development of the plan. State need for support from stakeholders and assure the commitment of the County towards the

implementation of CEP. The preface shall be signed by County Executive Committee Member (CEC) in charge of energy.

6.1.5. Acknowledgement

This section will acknowledge any financial or technical support the county may have received in preparation of the CEP. It will also express appreciation of people who helped in development of the plan.

6.1.6. Executive summary

This section will present a summary of the major qualitative and quantitative features of the plan, recommended projects, priority projects and other actions. It will also briefly explain the main financing plans for the execution of the CEP. The linkage between the actions and expected results will be highlighted, with specific targets, outputs and outcomes mentioned.

6.1.7. Chapter One: Introduction

1.1. Background:

1.2. This section should provide background of the energy planning, which may include the rationale for the CEP, history of energy planning, plus challenges and opportunities.

1.3. Process of development of County Energy Plan.

1.4. Integration of county energy planning into the CIDP process.

1.5. County Overview:

1.5.1. Location and size

1.5.2. Demographic features

1.5.3. County economy.

1.6. Development partners, Private actors and non-governmental organizations in the county's energy sector.

1.7. Policy and regulatory framework for the energy sector:

The INEPC will provide a standardised brief on policies and strategies, to be adopted by counties for purposes of this section.

1.8. Applicable legislations on energy in the County

Counties should strive to align their county specific legislations on energy to the national legal and regulatory framework.

6.1.8. Chapter Two: County Energy Resources Assessment

This section details all resources and provides statistical data in terms of technical viability and level of current exploitation. Moreover, it specifies functions of the county government in relation to the exploitation of the resource. It also relates the county energy resources to national statistics. Further, it describes energy resources and potential in the county, including projections based on the available data. The required data for the county energy resources assessment include:

- a. Availability of fuel wood in the area.
- b. Source of fuel wood supply.
- c. Amount of agricultural residues (paddy straw, rice husk, maize, millet, sorghum, legumes) produced by a household.
- d. Number of cattle owned and their potential for the provision of feedstock for biogas.
- e. Location and capacity of potential hydropower generation.
- f. Potential of solar power.
- g. Location and capacity of potential geothermal power generation.

- h. Wind power generation potential and location.
- i. Inter-county energy resources potential.
- j. Other energy resources potential.

The resource assessment activity framework focuses on five key dimensions: availability and economic potential, adequacy, sustainability, ease of access and cost of use.

2.1. Assessment of biomass energy resources

The biomass resource assessment should inform on local availability, proximity of biomass resource sites and accessibility to local users. It is essential to highlight specific concerns about biomass in the planning framework due to its local availability from forested areas:

- a. Differentiate forest areas under the National Government and county government.
- b. Establish the supply and demand of forest cover in the county.
- c. Identify biomass deficit in the county.
- d. Indicate county biomass imports and exports.

The above information could be obtained through the county statistics office, users' survey or stakeholders in the area. The section below discusses the information required to estimate production and potential of fuel wood, agricultural residues, and animal waste, using a general approach.

- a. Fuel wood: A map outlining the spatial extent of the various types of ground cover and biomass is required to estimate the production potential of fuel wood.
- b. Agriculture residues: The resource assessment requires information on monthly or annual production of agricultural residues locally. The necessary information includes grain production and residue-to-product ratio. The residue-to-product ratio can be estimated through direct measurement in the field during harvesting.
- c. Animal waste: Estimates of production potential of animal waste can be based on the population of a particular type of animal and the corresponding animal waste productivity factor per head.

2.2. Assessment of waste resources

The county government to carry out feasibility studies on waste-to-energy potential in the county. This service can be outsourced.

2.3. Assessment of geothermal resources

The MoE will provide a standardized brief on the status of geothermal resource potential and ongoing resource assessments to be adopted by counties. The county government may propose plans and actions to complement and enhance national plans and actions for this assessment.

2.4. Assessment of hydropower resources.

The MoE will provide a standardized brief on the status of hydropower potential and ongoing assessments to be adopted by counties. The county government may propose plans and actions to complement and enhance the national plans and actions for this assessment.

2.5. Assessment of solar resources

The MoE will provide a standardized brief on the status of solar potential and on-going assessments to be adopted by counties. The county government may propose plans and actions to complement and enhance the national plans and actions for this assessment.

2.6. Assessment of wind resources

The MoE will provide a standardized brief on the status of wind resource potential and ongoing resource assessments to be adopted by counties. The county government may propose plans and actions to complement and enhance national plans and actions for this assessment.

2.7. Assessment of fossil fuels

The MoE will provide a standardized brief on the status of fossil fuel potential and ongoing resource assessments to be adopted by counties. The county government may propose plans and actions to complement and enhance national plans and actions for this assessment.

2.8. Assessment of Nuclear programmes.

The MoE will provide a standardized brief on the status of Nuclear programmes. The county government may propose plans and actions to complement and enhance national plans and actions for this assessment.

2.9. Assessment of other energy resources

The MoE will provide a standardized brief on the status of any other energy resources not listed above. The county government may propose plans and actions to complement and enhance national plans and actions for this assessment. The update on the county’s energy resource potential and current level of exploitation will be documented as per the table below:

| PROSPECTIVE SOURCES | | | | |
|---|----------------------------|---------------------|----------------------------------|-----------------|
| Sector | General description | Volume/ area | Potential energy capacity | Location |
| Waste | | | | |
| Cattle manure | | | | |
| Corn residues | | | | |
| Rice husks | | | | |
| Bagasse | | | | |
| Agricultural waste | | | | |
| Municipal waste | | | | |
| Solar | | | | |
| Solar radiation by area | | | | |
| Wind | | | | |
| Wind potential by area | | | | |
| Hydro power | | | | |
| Potential for different sites, A, B, C etc. | | | | |
| Geothermal | | | | |
| Potential for different sites, A, B, C etc. | | | | |
| Other Biomass sources | | | | |
| Nuclear | | | | |
| Other energy sources | | | | |

6.1.9. Chapter Three: Energy Access

Energy access encompasses;

- a. All spheres of energy access: households, productive uses, and community facilities, noting the different needs of men and women.
- b. All forms of energy access: electricity, cooking, heating and mechanical power.
- c. All feasible and appropriate means of energy provision: grid connected, mini-grid and stand-alone systems.

This chapter provides an overview of energy access in the County, this will cover the energy access trends over time, key stakeholders, strategies, goals and barriers to energy access. The chapter shall cover the following:

- a. Policies and regulations that relate to energy access.
- b. Key stakeholders involved in energy access. This shall include their roles and capacities.
- c. Past and current initiatives on energy access.
- d. Trends on energy access (electricity, cooking, heating and mechanical).
 - i. Energy Access for Households.
 - Lighting
 - Cooking and water heating
 - Space heating
 - Cooling
 - Information and communications
 - ii. Energy Access for community services
 - Health care: hospitals, clinics, mortuaries, and health posts;
 - Education: schools, universities, and training centres;
 - Institutions that offer services to the public: government offices, police stations, prisons, community centers, public libraries, orphanages, sports facilities, religious buildings, etc.;
 - Infrastructure services: water and street lighting.
 - iii. Productive use of energy
 - Energy and micro and small-scale enterprises (MSEs)
 - Industrial
 - Transport
 - Geothermal direct use

Table 3.1 will provide a summary of the trend of levels and electricity sold commercially, on-grid, off-grid and stand alone.

Table 3.1: Summary of electricity sales

| Year | 2008 | 2010 | 2013 | 2015 | 2019 | 2020 |
|--------------------------------------|-------------|-------------|-------------|-------------|-------------|-------------|
| Households (kWh) | | | | | | |
| Public Institutions/Facilities (kWh) | | | | | | |
| Industrial Customers (kWh) | | | | | | |
| Water and street lighting (kWh) | | | | | | |
| Total units sold (kWh) | | | | | | |

Household fuels serve the essential energy needs for people’s life, particularly cooking and water heating. The quality of supply of household fuels is characterized by different factors, including the type of fuel (firewood, charcoal, LPG, kerosene, biogas, briquettes,

etc.), the appliance used (traditional stove, improved stove, gas stove, ethanol stove, etc.), and delivery system (gathering, purchasing, self-production, etc).

Table 3.2 shows clean cooking fuels progression up-to 2028.

Table 3.2: Energy fuel consumption

| Year | 2008 | 2013 | 2018 | 2023 | 2025 | 2028 |
|--|-------------|-------------|-------------|-------------|-------------|-------------|
| LPG (%) | | | | | | |
| Biogas (%) | | | | | | |
| Bio-ethanol (%) | | | | | | |
| Electricity (%) | | | | | | |
| Briquettes (%) | | | | | | |
| HHs access to clean fuels: non-solids (%) | | | | | | |
| Institutions access to clean fuels: non-solids (%) | | | | | | |
| SMEs access to clean fuels: non-solids (%) | | | | | | |
| Improved cook stoves: Solid fuels (%) | | | | | | |
| Total access to modern cooking services (%) | | | | | | |
| Access to unclean cooking services (%) | | | | | | |
| Geothermal Direct Use (%) | | | | | | |

- e. Past and current initiatives on clean cooking solutions.
- f. Barriers to increasing access to clean cooking solutions in rural and urban settings.
- g. Cross-cutting issues in energy access:
 - Gender issues in energy access,
 - Environment and climate change,
 - Risk and disaster management,
 - Communication,
 - Research and development.
- h. Progression to universal access to energy

The planned on-grid connectivity rate together with the off-grid alternatives will enable achievement of 100% access to electricity by the year 2022.

The on-grid and off-grid connectivity progression are shown in Table 3.3:

Table 3.3: Electricity connectivity progression

| Year | 2020 | 2021 | 2022 | 2023 |
|---|-------------|-------------|-------------|-------------|
| Total connectivity of the HHs in % | | | | |
| Total connectivity of the SMEs in % | | | | |
| Total connectivity of the industries in % | | | | |
| Total connectivity of the institutions in % | | | | |

In regard to electricity access levels, the country will target to have minimum levels of access – a platform to promote affordable, reliable, and sustainable off-grid renewable energy systems in rural areas – to allow for “empowerment” for people in underserved communities with minimum energy targets necessary to improve education, accelerate the transfer of knowledge, facilitate communication, and promote entrepreneurship. The multi-tier framework (MTF) for energy access is as indicated in [Annex 4](#).

a. Access to modern cooking solutions

The efforts to provide universal access to modern cooking solutions will include improved cook stoves (ICS) and clean fuels, which refer to the use of non-solid fuels for cooking (electricity, liquid and gaseous fuels). Modern energy inputs for thermal applications include electricity, LPG, biogas, and solar thermal.

Table 3.4. shows clean cooking fuels progression for households up-to 2028.

Table 3.4: Clean cooking fuels sources progression

| Year | 2020 | 2021 | 2022 | 2023 | 2024 | 2025 | 2026 | 2027 | 2028 |
|--|------|------|------|------|------|------|------|------|------|
| LPG (%) | | | | | | | | | |
| Biogas (%) | | | | | | | | | |
| Bio-ethanol (%) | | | | | | | | | |
| Electricity (%) | | | | | | | | | |
| Briquettes (%) | | | | | | | | | |
| HHs access to clean fuels: non-solids (%) | | | | | | | | | |
| Institutions access to clean fuels: non-solids (%) | | | | | | | | | |
| SMEs access to clean fuels: non-solids (%) | | | | | | | | | |
| Improved cook stoves: solid fuels (%) | | | | | | | | | |
| Total access to modern cooking services (%) | | | | | | | | | |
| Access to unclean cooking services (%) | | | | | | | | | |

b. Development of goals and strategies to promote energy access:

- i. Future energy access outlook
- ii. Alternative scenarios
- iii. Specific objectives of access to energy
- iv. Stakeholder capacity and mandate.

c. Selection of interventions:

- i. List and prioritize potential intervention options
- ii. Specify the selected interventions
- iii. Develop a governance structure for implementation.

6.1.10. Chapter Four: County Energy Efficiency and Conservation Measures Assessment

This section should focus on energy efficiency and conservation measures in the county.

a. Elements of energy efficiency assessment

- i. Development of benchmarking standards for government buildings and transport.
- ii. Identification of energy efficiency gaps and potential solutions.
- iii. Evaluation of costs and benefits of potential solutions.
- iv. Analysis of implementation barriers and constraints.
- v. Recommendations on priority sectors or areas of interventions, investment needs and sequence of actions.

- b. Additional important information
 - i. Improved cook stoves adoption across the county/sub-county/ ward level.
 - ii. Review of awareness levels on energy efficiency at different categories within the county/ sub-county/ward level.
 - iii. Energy consumption at household, public and private sectors in the county.
 - iv. List of companies compliant with the solar water heating regulations, 2012.
 - v. Energy efficient modes of transport.

- c. Energy efficiency in households
 Counties should look at the following in terms of usability and efficiency:
 - i. Improved cook stoves,
 - ii. LPG,
 - iii. Biogas,
 - iv. Lighting bulbs, and
 - v. Energy accounting in terms of sales and non-revenue meters by KPLC.

- d. Energy efficiency in commercial and institutional buildings
 The following statistical data should be provided:
 - i. Electricity consumption,
 - ii. Appliances and equipment used, and
 - iii. Building designs.

- e. Energy efficiency in industries
 The following statistical data should be provided:
 - i. Energy use by type of industry, and
 - ii. Number of audited industries.

- f. Energy efficiency in transport sector
 The following data should be indicated:
 - i. Estimated number of vehicles transiting the county,
 - ii. Estimated number of vehicles owned by residents and used within the county,
 - iii. Proportion of the people using non-motorised transport (NMT),
 - iv. Proportion of vehicles inspected per annum (obtained from the motor vehicle inspection agencies).
 - v. Number of motorbikes registered in the county (obtained from the licensing office).

Note: Secondary data may be obtained from official statistical publications, including Statistical Abstracts and Economic Surveys, while primary data shall be obtained through surveys, research, focus group discussions etc.

6.1.11. Chapter Five: Bio-Energy

The chapter provides an overview of bio-energy initiatives, the challenges, key stakeholders, future bio-energy outlook, and proposed interventions. The following shall be put into consideration:

- a. The ministries or agencies responsible for specific aspects of biomass energy, their mandates, resources, and capacities.
- b. Laws and regulations that relate to the production and use of biomass and land tenure. Issues to consider would include: What licenses are required to produce, trade or transport biomass? How effective is their enforcement? Are there provisions to monitor if wood fuel is harvested sustainably and legally?
- c. Baseline supply of bio-energy:

- i. Bio-energy crops,
 - ii. Agricultural residues,
 - iii. Waste,
 - iv. Forest products.
- d. Bio-energy supply costs.
- e. Bio-energy trade.
- f. Current bio-energy market and demand situation:
 - i. Power generation,
 - ii. Building sector,
 - iii. Manufacturing sector,
 - iv. Transport sector.
 - v. Households and institutions
- g. Analysis of the baseline data.
- h. Challenges affecting the bio-energy sector.
- i. Cross-cutting issues in bio-energy:
 - i. Gender issues
 - ii. Environment and climate change,
 - iii. Risk and disaster management,
 - iv. Communication,
 - v. Innovation, Research and development.
- j. Development of bio-energy goals and strategies:
 - i. Future bio-energy supply and demand situation by sector and counties,
 - ii. Challenges in realising the estimated growth in bio-energy demand,
 - iii. Challenges in realising the estimated growth in bio-energy supply,
 - iv. Alternative scenarios,
 - v. Specific objectives of the bio-energy sub-sector,
 - vi. Stakeholder capacity and mandate.
- k. Future bio-energy costs.
- l. Selection of interventions:
 - i. List and prioritize potential intervention options,
 - ii. Specify the selected interventions,
 - iii. Develop a governance structure for implementation.

6.1.12. Chapter Six: Electricity

This chapter includes all the issues in the electricity sub-sector, including current and future demand and supply, key stakeholders, key challenges, and proposed interventions.

- a. Key stakeholders involved in electricity. The details shall include their mandates and capacities.
- b. Baseline supply and demand situation, preferably by sectors of the economy and trend analysis for the past 10 years.
- c. Analysis of the baseline data:
 - i. Existing systems/infrastructure,
 - ii. Committed expansion programmes/projects.
- d. Cross-cutting issues in the electricity sub-sector.
 - i. Gender issues,
 - ii. Environment and climate change,
 - iii. Risk and disaster management,
 - iv. Communication,
 - v. Innovation, Research and development.
- e. Development of electricity goals and strategies:
 - i. Electricity

- ii. Future supply and demand situation
 - iii. Alternative scenarios
 - iv. Specific objectives of the electricity sub-sector
 - v. Stakeholder capacity and mandate
 - vi. Stakeholder feedback analysis
 - vii. Governance structure for implementation.
- f. Selection of interventions.
- i. List and prioritize potential intervention options,
 - ii. Specify the selected interventions (integrated electricity plan comprising generation expansion plan, transmission expansion plan, distribution plan and retail plan).

6.1.13. Chapter Seven: Programmes and Projects

This chapter will include all the agreed interventions selected to achieve the agreed objectives. Intervention shall be presented in the format attached.

7.1. National Government Projects.

This will include; Power generation; national and regional transmission lines; distribution lines and associated infrastructure; electrification of public institutions and installation of transformers in all constituencies; off-grid electrification of underserved counties; national public street lighting project; alternative energy technologies; and coal, geothermal and nuclear exploration and development.

7.2. County Government Projects.

The county government will identify their projects and programmes

7.3. Non-governmental and Private Sector projects.

The non-governmental organizations and private sector stakeholders will provide information about their projects, to be included in the CEP.

7.4. Development partners.

Development partners will provide information about their projects, to be included in CEP.

7.5. Any other organisations/person(s).

Table 7.1: Summary of Programme/Project Interventions

| S/No. | Objective | Project/Programme | Timelines | Specific Activities | Implementing Agency | Project Cost | (Ne |
|-------|---|-------------------|-----------|---------------------|---------------------|--------------|-----|
| a) | National Government Projects/Programmes | | | | | | |
| 1. | | | | | | | |
| 2. | | | | | | | |
| b) | County Government Projects/Programmes | | | | | | |
| 3. | | | | | | | |
| 4. | | | | | | | |
| c) | Non-governmental and Private Sector Projects/Programmes, etc | | | | | | |
| 5. | | | | | | | |

| | | | | | | | |
|----|--|--|--|--|--|--|--|
| 6. | | | | | | | |
|----|--|--|--|--|--|--|--|

6.1.14. Chapter Eight: Implementation, Coordination, Monitoring and Evaluation

The County Energy Plan should mirror the INEP. Additionally, reference to the Distribution Master Plan is vital. Further, a provision for private sector engagement in energy development should be considered, as well as the roles of project implementers. In documenting selected projects and requirements, training is essential for any new technologies to reduce the risk of ending up with non-viable projects.

8.1. Implementation

Implementation of the energy plan will require legal and institutional frameworks. The county government shall establish a legislative and regulatory framework for the energy sector. Implementation of the plan necessitates a centralised department with an overarching supervisory role to ensure coordination and enactment. The county department responsible for energy shall have the overall supervisory and coordinating role. This section should also define and describe a monitoring mechanism, identified deviations from the plan and achievable systematic deliverables according to the financial budget, quality and time schedule.

8.2. Coordination

Include two levels of coordination: Vertical coordination with the MoE and the national energy service providers; and horizontal coordination at the county level with county departments.

8.3. Monitoring and evaluation

A time schedule showing major activities and those responsible for delivery of the recommended energy projects should be included:

| S/n | Programme | Outcome indicators | Baseline | | Mid-term Target | End-term Target | Source of Data | Frequency | Responsibility |
|-----|-----------|--------------------|----------|------|-----------------|-----------------|----------------|-----------|----------------|
| | | | Value | Year | | | | | |
| | | | | | | | | | |
| | | | | | | | | | |
| | | | | | | | | | |
| | | | | | | | | | |

The detailed M&E framework is as indicated in Annex 6 (a) and (b).

6.1.15. Chapter Nine: Conclusions

This section will provide a summary of key issues and recommendations in the CEP

PART SEVEN: OUTLINE OF THE INTEGRATED NATIONAL ENERGY PLAN

7.0. Introduction

This section presents the structure of the Integrated National Energy Plan (INEP) and an outline of the various chapters and annexes.

7.1. INEP Structure

The following is the proposed structure of the Integrated National Energy Plan:

7.1.1. Preliminaries

- 1. Cover page**
 - a. Ministry of Energy and government logo
 - b. Integrated National Energy Plan (Insert period e.g. 2021-2030)
 - c. Theme of the Plan
- 2. First page**
 - a. Title: Integrated National Energy Plan
 - b. INEP vision and mission.
- 3. Subsequent pages of the plan**
 - a. Table of contents
 - b. Lists of tables
 - c. Lists of maps/figures
 - d. Lists of plates (captioned photos)
 - e. Acronyms
 - f. Glossary of commonly used Terms.

7.1.2. Foreword

The Foreword shall contain the rationale for preparing the Integrated National Energy Plan, a summary of the achievements realized in the sector and the highlights of the development priorities for the country during the plan period. It shall also discuss the linkage of the INEP with other development plans, which include, among others: Kenya Vision 2030 and its Medium Term Plans, the National Spatial Plan, County Sectoral Plans, Africa's Agenda 2063, the Sustainable Development Goals (SDGs), and other national policies and international commitments, e.g., Green Economy Strategy and Implementation Plan (GESIP). The foreword shall also highlight the CS commitment towards implementation of the plan. The foreword shall be signed by the CS.

7.1.3. Preface

The preface shall highlight the importance of energy for socio-economic development towards achievement of Vision 2030 goals. It shall also highlight the requirement by the Energy Act, 2019 for the development of INEP and state the purpose for preparing the INEP and how the process of its development involved consultation, participation and inclusivity of all the stakeholders. Discuss briefly the objectives of INEP and how they will be achieved in terms of strategies.

Also highlight the main focus of INEP in terms of key areas (energy sources, energy access, bio- energy, electricity and energy efficiency and conservation), programmes, projects, implementation matrix and its contents, financing, M&E framework and its use in tracking and reporting on its implementation. Highlight how INEP will be implemented and the key stakeholders and what is expected from them. Highlight the establishment of INEP Committee

and its role in the development of the plan. State the need for support from stakeholders and affirm the commitment of the Ministry towards the implementation of INEP. The Preface shall be signed by the Principal Secretary.

7.1.4. Acknowledgement

This shall acknowledge all those involved in the INEP preparation process. The role played by the various stakeholders, including key national and county government actors and development partners who supported the development of the INEP. The role of the public in general shall also be acknowledged.

7.1.5. Executive Summary

The executive summary shall provide the reader with a quick preview of the plan's contents. It shall highlight the content of each chapter.

7.1.6. Chapter One: Introduction

1.1. Background

This section shall provide a background of the energy planning, and may include the rationale of INEP, history of energy planning, as well as the challenges and opportunities related to the process.

1.2. Scope of the INEP

Integrated Energy Planning is used differently in different regions of the world. It is important at the outset of an INEP process to clearly delineate the types of energy resources that will be covered by the plan.

1.3. The vision and mission of INEP

This section will set out the vision and mission of INEP

1.4. The goals and objectives of the INEP

This section will set out the goals of INEP and identify the policy considerations that the INEP will address during the planning period. At the outset of the INEP planning process, it is critical to identify and reach agreement on the objectives that the plan is intended to meet. Some of the objectives are promoting economic growth, meeting changing energy needs and ensuring access to affordable, diverse, and reliable energy.

1.5. Policy, Legal, Regulatory and Institutional framework guiding energy sector

This section will identify all the policies and legal frameworks guiding the energy sector. This section will also provide the institutional framework and roles of key stakeholders.

7.1.7. Chapter Two: Energy Resources

This chapter will outline the energy resources listed below, their location, potential, on-going and concluded resource assessment, and level of exploitation.

2.1. Bio-energy resources.

2.2. Geothermal energy resources.

2.3. Hydro resources.

2.4. Solar resources.

- 2.5. *Waste resources.*
- 2.6. *Fossil resources.*
- 2.7. *Wind resources.*
- 2.8. *Nuclear resources.*
- 2.9. *Other energy resources*

7.1.8. Chapter Three: Energy Access

Energy access encompasses;

- a. All spheres of energy access: households, productive uses, and community facilities, noting the different needs of men and women.
- b. All forms of energy access: electricity, cooking, heating and mechanical power.
- c. All feasible and appropriate means of energy provision: grid connected, mini-grid and stand-alone systems.

This chapter provides an overview of energy access in the country, this will cover the energy access trends over time, key stakeholders, strategies, goals and barriers to energy access. The chapter shall cover the following:

- 3.1. *Policies and regulations that relate to energy access.*
- 3.2. *Key stakeholders involved in energy access. This shall include their roles and capacities.*
- 3.3. *Past and current initiatives on energy access.*
- 3.4. *Trends on energy access (electricity, cooking, heating and mechanical).*
 - i. Energy Access for Households.
 - a.) Lighting
 - b.) Cooking and water heating
 - c.) Space heating
 - d.) Cooling
 - e.) Information and communications
 - ii. Energy Access for community services
 - i. Health care: hospitals, clinics mortuaries, and health posts;
 - ii. Education: schools, universities, and training centres;
 - iii. Institutions that offer services to the public: government offices, police stations, prisons, community centers, public libraries, orphanages, sports facilities, religious buildings, etc.;
 - iv. Infrastructure services: water and street lighting.
 - iii. Productive use of energy
 - i. Energy and micro and small-scale enterprises (MSEs)
 - ii. Industrial
 - iii. Transport
 - iv. Geothermal direct use

Table 3.1 will provide a summary of the trend of levels and electricity sold commercially, on-grid, off-grid and stand alone.

Table 3.1: Summary of electricity sales

| Year | 2008 | 2009 | 2010 | 2011 | 2012... | ...2040 |
|--------------------------------------|------|------|------|------|---------|---------|
| Households (kWh) | | | | | | |
| Public Institutions/Facilities (kWh) | | | | | | |

| | | | | | | |
|---------------------------------|--|--|--|--|--|--|
| Industrial Customers (kWh) | | | | | | |
| Water and street lighting (kWh) | | | | | | |
| Total units sold (kWh) | | | | | | |

Household fuels serve the essential energy needs for people's life, particularly cooking and water heating. The quality of supply of household fuels is characterized by different factors, including the type of fuel (firewood, charcoal, LPG, kerosene, biogas, briquettes, etc.), the appliance used (traditional stove, improved stove, gas stove, ethanol stove, etc.), and delivery system (gathering, purchasing, self-production, etc).

Table 3.2 shows clean cooking fuels progression up-to 2040.

Table 3.2: Energy fuel consumption

| Year | 2008 | 2009 | 2010 | 2011... | ...2040 |
|--|-------------|-------------|-------------|----------------|----------------|
| LPG (%) | | | | | |
| Biogas (%) | | | | | |
| Bio-ethanol (%) | | | | | |
| Electricity (%) | | | | | |
| Briquettes (%) | | | | | |
| HHs access to clean fuels: non-solids (%) | | | | | |
| Institutions access to clean fuels: non-solids (%) | | | | | |
| SMEs access to clean fuels: non-solids (%) | | | | | |
| Improved cook stoves: Solid fuels (%) | | | | | |
| Total access to modern cooking services (%) | | | | | |
| Access to unclean cooking services (%) | | | | | |
| Geothermal Direct Use (%) | | | | | |

3.5. Past and current initiatives on clean cooking solutions.

3.6. Barriers to increasing access to clean cooking solutions in rural and urban settings.

3.7. Cross-cutting issues in energy access:

- a. Gender issues in energy access
- b. Environment and climate change
- c. Risk and disaster management,
- d. Communication
- e. Research and development.

3.8. Progression to universal access to energy

The planned on-grid connectivity rate together with the off-grid alternatives will enable achievement of 100% access to electricity by the year 2022.

The on-grid and off-grid connectivity progression are shown in Table 3.3:

Table 3.3: Electricity connectivity progression

| Year | 2020 | 2021 | 2022... | ...2040 |
|---|-------------|-------------|----------------|----------------|
| Total connectivity of the HHs in % | | | | |
| Total connectivity of the SMEs in % | | | | |
| Total connectivity of the industries in % | | | | |
| Total connectivity of the institutions in % | | | | |

In regard to electricity access levels, the country will target to have minimum levels of access – a platform to promote affordable, reliable, and sustainable off-grid renewable energy systems in rural areas – to allow for “empowerment” for people in underserved communities with minimum energy targets necessary to improve education, accelerate the transfer of knowledge, facilitate communication, and promote entrepreneurship. The multi-tier framework (MTF) for energy access is as indicated in [Annex 4](#).

3.9. Access to modern cooking solutions

The efforts to provide universal access to modern cooking solutions will include improved cook stoves (ICS) and clean fuels, which refer to the use of non-solid fuels for cooking (electricity, liquid and gaseous fuels). Modern energy inputs for thermal applications include electricity, LPG, biogas, and solar thermal.

Table 3.4. shows clean cooking fuels progression for households up-to 2040.

Table 3.4: Clean cooking fuels sources progression

| Year | 2020 | 2021 | 2022 | 2023 | 2024 | 2025 | 2026 | 2027... | ...2040 |
|--|-------------|-------------|-------------|-------------|-------------|-------------|-------------|----------------|----------------|
| LPG (%) | | | | | | | | | |
| Biogas (%) | | | | | | | | | |
| Bio-ethanol (%) | | | | | | | | | |
| Electricity (%) | | | | | | | | | |
| Briquettes (%) | | | | | | | | | |
| HHs access to clean fuels: non-solids (%)) | | | | | | | | | |
| Institutions access to clean fuels: non-solids (%) | | | | | | | | | |
| SMEs access to clean fuels: non-solids (%) | | | | | | | | | |
| Improved cook stoves: solid fuels (%) | | | | | | | | | |
| Total access to modern cooking services (%)) | | | | | | | | | |
| Access to unclean | | | | | | | | | |

| | | | | | | | | | |
|----------------------|--|--|--|--|--|--|--|--|--|
| cooking services (%) | | | | | | | | | |
|----------------------|--|--|--|--|--|--|--|--|--|

3.10. Development of goals and strategies to promote energy access:

- a. Future energy access outlook
- b. Alternative scenarios
- c. Specific objectives of access to energy
- d. Stakeholder capacity and mandate.

3.11. Selection of interventions:

- a. List and prioritize potential intervention options
- b. Specify the selected interventions
- c. Develop a governance structure for implementation.

7.1.9. Chapter Four: Energy Efficiency and Conservation

The chapter provides an overview of energy efficiency and conservation initiatives, the challenges, key stakeholders, barriers to energy efficiency and conservation, future energy efficiency and conservation outlook, proposed interventions, among others. The following are key areas to be checked:

- a. Policies that relate to energy efficiency and conservation.
- b. Laws and regulations that relate to energy efficiency and conservation. Issues to consider would include: How effective is their enforcement? Are there provisions to monitor energy efficiency and conservation?
- c. Key stakeholders involved in energy efficiency and conservation. This shall include their roles and capacities.
- d. Past and current initiatives on energy efficiency and conservation.
- e. Sectoral assessments of energy efficiency and conservation (past performance):
 - i. Households
 - ii. Buildings
 - iii. Industry and agriculture
 - iv. Transport
 - v. Power sector utilities
- f. Analysis of the data, including identification of barriers to energy efficiency and conservation.
- g. Cross-cutting issues in energy efficiency and conservation:
 - i. Gender issues
 - ii. Environment and climate change
 - iii. Risk and disaster management
 - iv. Communication
 - v. Innovation, research and development
- h. Development of energy efficiency and conservation goals and strategies:
 - i. Future energy efficiency and conservation outlook
 - ii. Alternative scenarios
 - iii. Specific objectives of energy efficiency and conservation
 - iv. Stakeholder capacity and mandate
- i. Selection of interventions:
 - i. List and prioritize potential intervention options
 - ii. Specify the selected interventions
 - iii. Develop a governance structure for implementation

7.1.10. Chapter Five: Bio-Energy

The chapter provides an overview of bio-energy initiatives, the challenges, key stakeholders, future outlook, and proposed interventions. The following shall be put into consideration:

- m. Policies that guide biomass, forest management, land use and their implementation.
- n. The ministries or agencies responsible for the various aspects of biomass energy, their mandates, resources, and capacities.
- o. Laws and regulations that relate to the production and use of biomass and land tenure. Issues to consider would include: What licenses are required to produce trade or transport biomass? How effective is their enforcement? Are there provisions to monitor if wood fuel is harvested sustainably and legally?
- p. Baseline supply of bio-energy:
 - i. Bio-energy crops
 - ii. Agricultural residues
 - iii. Waste
 - iv. Forest products.
- q. The costs relating to bio-energy supply.
- r. Bio-energy trade.
- s. Current bio-energy market and demand situation:
 - i. Power generation,
 - ii. Building sector,
 - iii. Manufacturing sector,
 - iv. Transport sector
 - v. Households and institutions
- t. Analysis of the baseline data.
- u. Challenges affecting bio-energy sector.
- v. Cross cutting issues in bio-energy:
 - i. Gender issues
 - ii. Environment and climate change,
 - iii. Risk and disaster management,
 - iv. Communication,
 - v. Innovation, Research and development.
- w. Development of bio-energy goals and strategies:
 - i. Future bio-energy supply and demand situation by sector and counties,
 - ii. Challenges in realising the estimated growth in bio-energy demand,
 - iii. Challenges in realising the estimated growth in bio-energy supply,
 - iv. Alternative scenarios,
 - v. Specific objectives of the bio-energy sub-sector,
 - vi. Stakeholder capacity and mandate.
- x. Future bio-energy costs.
- y. Selection of interventions:
 - i. List and prioritize potential intervention options,
 - ii. Specify the selected interventions,
 - iii. Develop a governance structure for implementation.

7.1.11. Chapter Six: Electricity

This chapter covers all the issues in the electricity sub-sector, including policies, laws, regulations, current and future demand and supply, key stakeholders, major challenges, and proposed interventions. The details are as follows:

- g. Policies on electricity.
- h. Key stakeholders involved in electricity, including their mandates and capacities.

- i. Laws and regulations that relate to the generation and use of electricity. Issues to consider would include: What licenses are required to generate, transmit, distribute and retail electricity? What licenses are needed in construction of electricity infrastructure? How effective is their enforcement? Are there provisions to monitor how electricity is generated, transmitted, distributed and retailed?
- j. Baseline supply and demand situation, preferably by sectors of the economy and trend analysis for the past 10 years.
- k. Electricity market.
- l. Regional power market and grid interconnections.
- m. Analysis of the baseline data:
 - i. Existing systems/infrastructure,
 - ii. Committed expansion programmes/projects,
 - iii. Electricity tariff evolution.
- n. Cross-cutting issues in the electricity sub-sector:
 - i. Gender issues,
 - ii. Environment and climate change,
 - iii. Risk and disaster management,
 - iv. Communication,
 - v. Innovation, research and development.
- o. Development of electricity goals and strategies:
 - viii. Electricity
 - Future supply and demand situation,
 - Alternative scenarios,
 - Specific objectives of the electricity sub-sector,
 - Stakeholder capacity and mandate,
 - Stakeholder feedback analysis,
 - Governance structure for implementation.
 - ix. Electricity demand forecasting for generation planning, transmission planning, distribution planning and retail supply planning taking into account;
 - planning criteria
 - modelling and assumptions
 - scenario results
- p. Selection of interventions:
 - List and prioritize potential intervention options,
 - Specify the selected interventions (integrated electricity plan comprising generation expansion plan, transmission expansion plan, distribution plan and retail plan).
- q. Electricity Tariffs Evolution.

7.1.12. Chapter Seven: Programmes and Projects

This chapter will include all the selected interventions selected to achieve the agreed objectives. Interventions shall be presented in the format attached. It will also categorise the interventions being implemented by national and county governments, development partners, non-governmental organizations, private sector and institutions of higher learning.

7.1. *National government projects.*

Power generation; national and regional transmission lines; distribution lines and associated infrastructure; electrification of public institutions and installation of transformers in all constituencies; off-grid electrification of underserved counties; national public street lighting projects; alternative energy technologies; and coal, geothermal and nuclear exploration and development.

- 7.2. **County government projects.**
The INEP will consolidate all projects proposed and being implemented by county governments as detailed in their respective county energy plans.
- 7.3. **Non-governmental and private sector projects.**
The INEP will incorporate projects by non-governmental organizations and private sector institutions.
- 7.4. **Development partners.**
The INEP will include interventions by development partners.
- 7.5. **Any Other organisation.**

Table 7.1: Summary of Projects/Programme

| S/No. | Objective | Project/Programme | Timelines | Specific Activities | Implementing agency | Project cost | Status (New/Ongoing) |
|-------|---|-------------------|-----------|---------------------|---------------------|--------------|----------------------|
| a) | National Government Projects/Programmes | | | | | | |
| 1. | | | | | | | |
| 2. | | | | | | | |
| b) | County Governments Projects/Programmes | | | | | | |
| 3. | | | | | | | |
| 4. | | | | | | | |
| c) | Non-governmental and Private Sector Projects/Programmes, etc | | | | | | |
| 5. | | | | | | | |
| 6. | | | | | | | |

In addition to the above information, all the implementing agencies will provide detailed project information in the templates provided in [Annex 5](#).

7.1.13. Chapter Eight: Implementation Framework

8.1. Introduction

This section shall provide an overview of the implementation framework of the INEP. It will also outline the relevant resource requirements, mobilization, and management.

8.2. Institutional Framework

This section shall identify the institutional framework and provide the roles of key stakeholders in the implementation of INEP. The plan should:

- a. Indicate the national and county organizational structures; and
- b. Show the linkages with other government agencies, development partners, private sector players, non-governmental organizations, among others.

INEP shall be implemented by:

- a. Ministry of Energy,
- b. National Energy Service Providers

- c. Other relevant national government ministries and entities,
- d. County governments,
- e. Development partners,
- f. Private sector institutions,
- g. Non-governmental organizations.

8.3. Resource Requirements, Mobilization and Management

This section shall explain the resource requirements and mobilisation strategies that shall include revenue raising, asset management, financial management, operational financing, capital financing and accountability. The successful implementation of INEP requires substantial financial resources. Therefore, the key stakeholders are required to mobilize adequate resources to finance their relevant programmes/projects.

Funding for INEP projects will be through the national government, energy service providers, county governments, other devolved funds, development partners, public-private partnerships, and non-governmental organizations, among others. Only projects whose viability, funding and approval by the relevant authorities confirmed shall be included in INEP.

8.3.1. National Government

The relevant national government MoE and energy entities such as EPRA, KPLC, KETRACO, REREC, KenGen, GDC and NuPEA will utilize their budgets to implement projects/programmes under their respective mandates. The sources of funds shall be derived from the exchequer, internally generated revenues, the Consolidated Energy Fund, grants, loans and/or in-kind support

8.3.2. County Government

County governments also have a role to play in energy development as per the Fourth Schedule of the Constitution and the Fourth Schedule of the Act. The sources of funds can be from County Energy Fund, local revenues (taxes and charges for services rendered) as well as through accessing the equitable share of revenue raised by the National Government. In addition, Section 194 of the Act states that the “*county government shall establish a fund for the purpose of promotion of efficient use of energy and its conservation within the county*”.

8.3.3. Other Devolved Funds

There are other devolved funds that the national and county governments can tap to fund energy programmes/projects. They include the following:

- a. National Government Constituency Development Fund(NG-CDF): The Fund is drawn from the National Government’s Share of revenue in accordance with the Division of Revenue Act enacted pursuant to Article 218 of the CoK. The eligible projects under the NG-CDF Act are only those entailing works or services falling under the functions of the National Government as provided for in the constitution. Energy is among those functions.
- b. Equalization Fund: Article 204 of the COK provides for the establishment of an Equalization Fund into which 0.5% of all

the revenues collected by the National Government each year, calculated on the basis of the most recent audited accounts of revenue received, shall go to provide basic services, including water, roads, health facilities and electricity in marginalised areas.

8.3.4. *Development Partners*

The National Government and county governments shall identify and propose energy projects and initiatives to development partners for consideration. The energy sector has benefited greatly from this partnership. It is expected that the support will continue towards implementation of this strategy.

8.3.5. *Non-Governmental Organizations*

There are several non-governmental organizations involved in the provision of energy services. Their role is crucial as they supplement government efforts in the provision of energy services. There are those involved in undertaking national programmes, while others operate at a regional or county level.

8.3.6. *Public-Private Partnerships (PPPs)*

The Government of Kenya has made infrastructure development through PPPs a priority, as a mechanism to achieve Vision 2030. The Ministry of Energy, county governments and energy service providers can tap into PPPs where deemed necessary. The national government or a county government can provide concession to private investors to undertake projects on its behalf. The PPP parties will benefit from the framework through revenue sharing agreements.

8.3.7. *Private Sector*

The national government and county governments may develop policy interventions and incentives to attract private actors to invest in energy projects/programmes. These may include tax incentives, letter of support to reduce cost of credit, creating revolving funds to support investors, among others. The interventions are aimed to:

- a. Support capacity building, institutional collaboration, awareness creation and enforcement of regulations;
- b. Reduce the high upfront cost that makes energy projects non-affordable or difficult to finance due to short repayment conditions;
- c. Support preparatory activities (pre-feasibility and feasibility studies, and energy audits) where transaction costs are proportionally high compared to the size of the investment; and
- d. Reduce operating costs, where revenue streams are insufficient to cover for capital repayments.

8.3.8. *Financial Resource Requirements*

When preparing INEP, there is need to indicate the proposed financial resource requirement for each programme/project as derived from MoE, the energy service providers, county governments and others. This shall be captured in Table 8.3(a) below.

Table 8.3 (a): Summary of Financial Resource Requirements

| Programme /Project | MoE/Energy Service Provider/ County Government/Others. | Resource Requirement (Ksh. M) |
|---|--|-------------------------------|
| Power generation | | |
| Transmission lines and associated substations | | |
| Distribution lines and associated substations | | |
| Electricity access | | |
| Street lighting | | |
| Coal development | | |
| Geothermal development | | |
| Solar and wind development | | |
| Capacity building | | |
| Regulation | | |
| Resource assessment | | |
| Innovation, research and development | | |
| Nuclear power development | | |
| Clean cooking | | |
| Gender mainstreaming in energy | | |
| Energy centres development | | |
| Others | | |
| Total | | |

8.3.9. *Financial Resource Projection*

The section shall detail the resources expected from various sources, which include energy sector revenues, the equitable share of national revenues, conditional grants from the national government, and/or development partners. The details shall be captured in Table 7.3(b) as shown below:

Table 8.3(b): Revenue Projections

| Type of Revenue | Year 1 (Start of the Plan Period) | Year 2 | Year 3 | Year 4 | Year 5 | Total |
|---|-----------------------------------|--------|--------|--------|--------|-------|
| A) Revenue from the National Government | | | | | | |
| B) Revenue from the County governments | | | | | | |
| C) Loans and grants from | | | | | | |

| | | | | | | |
|------------------------------|--|--|--|--|--|--|
| development partners | | | | | | |
| D)Private sector commitments | | | | | | |
| E)NGO commitments | | | | | | |
| F) Other sources (Specify) | | | | | | |
| Total | | | | | | |

8.3.10. *Estimated Resource Gap and Mobilization Strategies*

The section shall capture the resource gaps and measures on how to address the shortcomings.

8.3.11. *Resource Management*

This section provides a discussion on asset management, financial management, operational financing and accountability.

7.1.14. Chapter Nine: Monitoring and Evaluation Framework

9.1. Introduction

The section shall provide a brief description of the structure for monitoring and evaluation (M&E) of the INEP. It shall state the goals and outline the design and indicators for the goals, outcomes and outputs.

9.2. Data collection, Analysis and Reporting

This section shall outline mechanisms and stakeholder engagement for data collection, analysis, reporting, and dissemination.

9.3. M&E Output and Outcome Indicators

This section shall give the monitoring and evaluation output and outcome indicators by programmes/projects. The energy service providers and the county governments shall refer to the National Integrated Monitoring and Evaluation System (NIMES) and County Integrated Monitoring and Evaluation System (CIMES) guidelines respectively. They elaborate on indicator formulation. The programmes' output and outcome indicators and targets shall be summarised in the M&E Results Matrix as indicated in Table 9.4. A detailed M&E matrix is represented in Annex 6 (a) and (b).

Table 9.4a: M&E Results Matrix(Output)

| S/N | Programme | Output Indicators | Baseline | | Mid-Term Target | End-Term Target | Source Of Data | Frequency | Responsibility | Reporting Entity |
|-----|-----------|-------------------|----------|------|-----------------|-----------------|----------------|-----------|----------------|------------------|
| | | | Value | Year | | | | | | |
| | | | | | | | | | | |
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Table 9.4b:M&E Results Matrix (Outcome)

| S/N | Programme | Outcome Indicators | Baseline | | Mid-Term Target | End-Term Target | Source Of Data | Frequency | Responsibility | Reporting Entity |
|-----|-----------|--------------------|----------|------|-----------------|-----------------|----------------|-----------|----------------|------------------|
| | | | Value | Year | | | | | | |
| | | | | | | | | | | |
| | | | | | | | | | | |
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7.1.15. Chapter Ten: Conclusion

This chapter will highlight the key issues and recommendations of the INEP.

REFERENCES

INEP FRAMEWORK REFERENCES

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ANNEXURES

Annex 1: Planning Template for NGO’s and Private Sector Energy Projects and Programmes

Name of the Organization

Address

Telephone Number

Email Address

Name of Accounting Officer/ CEO/ Director.....

Name and contact details of technical person (for any clarifications)

| S/NO. | PROJECT NAME | PROJECT DESCRIPTION | PROJECT COST | PROJECT LOCATION | | PROJECT OBJECTIVES | PROJECT ACTIVITIES | PROJECT TIMELINES | | IMPLEMENTING ENTITIES/ PARTNERS |
|-------|--------------|---------------------|--------------|------------------|--------------|--------------------|--------------------|-------------------|----------|---------------------------------|
| | | | | COUNTY | CONSTITUENCY | | | START DATE | END DATE | |
| 1. | | | | | | | | | | |
| 2. | | | | | | | | | | |

Annex 2: INEP Work plan

| Month number | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
|--|---|---|---|---|---|---|---|---|---|----|
| <i>Stage 1: Preliminaries</i> | X | | | | | | | | | |
| <i>Stage 2: Establish the INEPC</i> | X | | | | | | | | | |
| <i>Stage 3-1: Identify stakeholders</i> | | X | | | | | | | | |
| <i>Stage 3-1: Stakeholders analysis and engagements</i> | | | X | | | | | | | |
| <i>Stage 4: Formulate a Vision and re-assess objectives</i> | | | X | | | | | | | |
| <i>Stage 5: Situational analysis of the energy sector</i> | | | X | | | | | | | |
| <i>Stage 6: Develop energy goals and strategies</i> | | | | X | | | | | | |
| <i>Stage 7: Identify and Prioritize Actions</i> | | | | X | | | | | | |
| <i>Stage 8: Develop funding and financing strategy</i> | | | | | X | | | | | |
| <i>Stage 9: Develop a blueprint for implementation of INEP</i> | | | | X | | | | | | |
| <i>Stage 10: Plan to monitor and evaluate</i> | | | | | | X | | | | |
| <i>Stage 11: Define, adopt and publicize INEP</i> | | | | | | | | | | X |

Annex 3: Terms of Reference and Membership of the Integrated Energy Planning Committee

The TORs for this Committee shall be to:

- i. Develop INEP from the national energy service providers' plans and county energy plans, and from input of other stakeholders, and thereafter submit the same to the Cabinet Secretary for publishing.
- ii. Review and update the INEP every three (3) years while ensuring that each update takes into consideration changes in the economy, demography, technologies, and the global trends.
- iii. Develop a uniform framework for county energy plans and national energy providers' plans.
- iv. Collect, collate and analyze data and information relevant for energy planning.
- v. Undertake short-term and long-term forecasting, simulations and optimization of energy projects using appropriate tools.
- vi. Consolidate the list of committed projects and their implementation timeframes.
- vii. Develop screening mechanisms for project identification in the energy sector based on least cost principles.
- viii. Develop frameworks for regional energy integration as appropriate.
- ix. Undertake monitoring and evaluation of the implementation of the INEP, and prepare and submit the progress report to the Cabinet Secretary for publishing within three months after the end of each financial year.
- x. Develop a framework to guide the selection of the appropriate technology to meet energy demand.
- xi. Provide technical data, statistics, and information to policy makers in the energy sector as may be appropriate from time to time.
- xii. Initiate research in consultation with the relevant Agency to inform policy and decision making in the energy sector.
- xiii. Identify and propose capacity building areas relevant to energy planning in the sector.
- xiv. Undertake any other tasks that may be assigned by the Cabinet Secretary for Energy.
- xv. May where necessary, identify and recommend to the CS for co-option, up to a maximum of five (5) members with specific technical skills necessary for the discharge of the committee's mandate.

Membership

The membership of the Committee shall be drawn from the MoE, EPRA, KenGen, REREC, KPLC, KETRACO, GDC, NuPEA, The National Treasury and Planning, KNBS, Ministry (Ministries) responsible for Devolution and representatives from CoG, as detailed below. There shall be not more than 5 Co-opted members to cater to additional expertise.

| No. | Organization | Number of members |
|------------|--|--------------------------|
| 1. | Ministry of Energy | 5 |
| 2. | Energy & Petroleum Regulatory Authority | 2 |
| 3. | Kenya Electricity Generating Company PLC | 2 |
| 4. | Rural Electrification & Renewable Energy Corporation | 2 |
| 5. | Kenya Power & Lighting Company PLC | 2 |
| 6. | Kenya Electricity Transmission Company | 2 |
| 7. | Geothermal Development Company | 2 |
| 8. | Nuclear Power & Energy Agency | 2 |
| 9. | The National Treasury & Planning | 2 |

| No. | Organization | Number of members |
|--------------|-------------------------------------|-------------------|
| 10. | Kenya National Bureau of Statistics | 1 |
| 11. | Ministry of Petroleum and Mining | 1 |
| 12. | Ministry of Devolution | 1 |
| 13. | Council of Governors | 2 |
| 14. | Co-opted members | 5 |
| TOTAL | | 31 |

Annex 4: Multi-Tier Framework (MTF) for Energy Access Level

The Multi-Tier Framework (MTF) redefines energy access from the traditional binary count to a multi-dimensional definition as the ability to avail adequate, reliable, quality, convenient, affordable, legal, healthy and safe for all required energy services. The International Energy Agency defines energy access as “a household having reliable and affordable access to both clean cooking facilities and to electricity, which is enough to supply a basic bundle of energy services initially and then an increasing level of electricity over time to reach the regional average.” This implies, having electricity connection does not mean having access to electricity under the new definition, which also takes into account other aspects such as reliability and affordability. Energy access is measured in the tiered-spectrum, from Tier 0 (no access) to Tier 5 (the highest level of access).

1. Level of Energy Access

| Percentage of access | | | | | | |
|---|------|------|------|------|------|------|
| | 2017 | 2018 | 2019 | 2020 | 2021 | 2022 |
| Tier 0 (No access) | | | | | | |
| Tier 1 | | | | | | |
| Tier 2 | | | | | | |
| Tier 3 | | | | | | |
| Tier 4 | | | | | | |
| Tier 5 (the highest level of access) | | | | | | |

2. Multi-tier Framework for Electricity

| | Tier 0 | Tier 1 | Tier 2 | Tier 3 | Tier 4 | Tier 5 |
|--------------------------|--------|--|--------|--|--|--------|
| Capacity | | Capacity (3W to above 2kW) and ability to power appliance (Applicable for off-grid solutions) | | | | |
| Duration-Day | | From at-least 4 hours a day to over 23 hours a day | | | | |
| Duration-Evening | | From at least 1 hours in the evening to over 4 hours | | | | |
| Reliability | | | | | Number and duration of outages | |
| Quality | | | | | Voltage problems do not affect the use of desired appliances | |
| Affordability | | | | Basic service less than 5% of the household income | | |
| Legality | | | | | Service provided legally | |
| Health and Safety | | | | | Absence of accidents | |

3. Multi-tier Framework for Cooking

| | Tier 0 | Tier 1 | Tier 2 | Tier 3 | Tier 4 | Tier 5 |
|--------------------|--------|--|--------|--------|--------|--------|
| Indoor air quality | | Concentration of PM2.5 and CO; tiers aligned with WHO guidelines | | | | |

| | | | | |
|----------------------------------|--|---|--|--|
| Efficiency | | The benchmarks under development, awaiting results of ISO process | | |
| Convenience | | | Stove preparation time and fuel collection and preparation | |
| Safety | | | Absence of accidents and alignment with the ISO process | |
| Affordability | | | | Levelized cost of cooking solution <5% of household income |
| Quality and availability of fuel | | | | Cooking not affected by seasonal variations in the fuel quality and availability |

Annex 6: Monitoring And Evaluation Framework

Annex 6 (A) Output Monitoring And Reporting Template

| S/No | Programme/ Project | Project Objective(s) | Delivery Unit | Key Output | Key Performance Indicator | Unit of Measure | Baseline | | Target Year 1 | | | Target Year 2..... | | | Target Year..... | | | Agency Responsible for reporting | Data source |
|------|--------------------|----------------------|---------------|------------|---------------------------|-----------------|---------------|----------------|---------------|---------------------|----------|--------------------|---------------------|----------|------------------|---------------------|----------|----------------------------------|-------------|
| | | | | | | | Baseline Year | Baseline Value | Target | Actual Achievements | Variance | Target | Actual Achievements | Variance | Target | Actual Achievements | Variance | | |
| | | | | | | | | | | | | | | | | | | | |
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Annex 6 (B): Outcome and Impact Monitoring and Reporting Template

| S/No. | Programme/ Project | Project Objective(s) | Delivery Unit | Key Outcome | Key Performance Indicator | Unit of Measure | Baseline | | Target Year 1 | | | Target Year 2..... | | | Target Year..... | | | Agency Responsible for reporting | Data source |
|-------|--------------------|----------------------|---------------|-------------|---------------------------|-----------------|---------------|----------------|---------------|---------------------|----------|--------------------|---------------------|----------|------------------|---------------------|----------|----------------------------------|-------------|
| | | | | | | | Baseline Year | Baseline Value | Target | Actual Achievements | Variance | Target | Actual Achievements | Variance | Target | Actual Achievements | Variance | | |
| | | | | | | | | | | | | | | | | | | | |
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Annex 7: Data Collection Tool For County Energy Profile

| A. General information on energy associated technologies | |
|---|--|
| 1. | Pro-Solar General information on energy associated technologies |
| | What are the main sources of energy in this area? |
| 2. | Which are the energy types used by the community members in this area? Prompts: firewood, charcoal, farm residues, kerosene, LPG, other wood waste, biogas, solar PV, solar water heating, solar cookers, solar dryers, fireless cookers, wind power, small hydro power plants |
| 3. | What are the main types of energy used by households in this area? |
| 4. | Which energy technologies do they use? |
| 5. | What are the main types of energy used by institutions in this area? |
| 6. | What are the main types of energy used by small businesses in this area? Hotels and restaurants, cottage industries, shops, beauty salons etc. |
| 7. | How do households access energy technologies in this area? Prompt: Own sources, purchase in market |
| 8. | How do institutions access energy technologies in this area? Own sources, purchase in market |
| 9. | How do small businesses access energy technologies in this area? Own sources, purchase in market |
| 10. | What are the measures to be taken to enhance the development of supply and usage of energy in this area? |
| 11. | What are your suggestions for specific projects which can be undertaken in the area to meet the increasing demand for energy? |
| 12. | Is there any local support initiative for promoting access and use of energy in this area? Prompt: on farm tree planting, promotion of solar and biogas technology etc. |
| 13. | Are there any manufacturers, dealers or resellers of energy technology in the areas? Prompt: energy saving stoves, solar equipment |
| 14. | Have there been any training and awareness sensitization on adoption of energy technologies carried out in this area? |
| 15. | If yes, what kind of training and who sponsored the training? |
| 16. | What recommendations do you have for enhancing affordability of various energy technologies in this area? Prompt: Improved stoves, solar panels, solar water heating etc. |
| | |
| B. Fuel and energy technologies | |
| a) Firewood | |
| 1. | What are the main sources of firewood for households in this area? |
| 2. | Which firewood technologies are commonly used by households in this area? |
| 3. | What are the reasons for households preferring the above mentioned firewood technology? |
| 4. | Which firewood technologies are commonly used by institutions in this area? |
| 5. | What are the reasons for the institutions preferring the above mentioned firewood technology (ies)? |
| 6. | Which firewood technologies are commonly used by the businesses in this area? |
| 7. | What are the reasons for businesses preferring the above mentioned firewood technologies? |
| 8. | What units of measure does the community use for collecting/purchasing firewood? Stacks, etc. and what is the cost per unit (Ksh)? |
| 9. | Please, rate the availability of firewood in this area? <i>Rating: very plenty, plentifully available, easily available, not easily available, very difficult</i> |

| | |
|-----------|--|
| 10. | How would you rate existing technical support for supply, installation and maintenance of energy saving firewood stoves in this area? <i>Prompt: very plenty, plenty, moderately available, not easily available, not available</i> |
| 11. | Are there established commercial producers, distributors or resellers of firewood in this area? |
| 12. | Are there formal associations for producers, distributors or resellers of firewood in this area? |
| 13. | In your opinion, how would you rate the willingness for households to change from use of rudimental technologies like three-stone stove to improved technologies such as energy saving and smokeless firewood stoves? <i>Prompt: very willing, willing, moderately willing, not so much willing, not willing at all</i> |
| 14. | In your opinion, how much do you think a household using three-stone stove would afford to spend on purchase of an improved firewood stove (e.g. energy saving firewood stove, energy saving smokeless stoves)? |
| 15. | What are the challenges in accessing firewood in this area? |
| 16. | What challenges are associated with improved (energy saving) firewood stoves in this area? |
| 17. | What is the cost of improved cook stoves in your area? |
| | |
| b) | Charcoal |
| 1. | What are the main sources of charcoal for your households, SMEs and institutions in this area? |
| 2. | Which charcoal technologies are commonly used in households in this area? |
| 3. | What are the reasons for households preferring the above mentioned charcoal technology? |
| 4. | Which charcoal technologies are commonly used by institutions in this area? |
| 5. | What are the reasons for institutions preferring the above mentioned charcoal technology in this area? |
| 6. | Which charcoal technologies are commonly used by businesses (SME) in this area? |
| 7. | What are the reasons for businesses (SMEs) preferring the above mentioned charcoal technology? |
| 8. | What units of measure does the community use for collecting/purchasing charcoal? Bags, debes, tin can, etc. and what is the cost per unit (Ksh)? |
| 9. | Please, rate the availability of charcoal in this area? <i>Rating: very plenty, plentifully available, easily available, not easily available, very difficult</i> |
| 10. | How would you rate existing technical support for supply, installation and maintenance of energy-saving charcoal stoves in this area? <i>Prompt: very plenty, plenty, moderately available, not easily available, not available</i> |
| 11. | Are there established commercial producers, distributors or resellers of charcoal in this area? |
| 12. | Are there formal associations of producers, distributors or resellers of charcoal in this area? |
| 13. | In your opinion, how would you rate the willingness for households, SMEs and institutions to change from use of rudimental charcoal technologies (such as traditional charcoal stove) to improved technologies such as energy saving charcoal stoves (Kenya Ceramic Jiko)? <i>Prompt: very willing, willing, moderately willing, not so much willing, not willing at all</i> |
| 14. | In your opinion, how much do you think a household using traditional charcoal stove would afford to spend on purchase of an improved (energy saving) charcoal stove? |
| 15. | What are the challenges in accessing charcoal in this area? |
| 16. | What is the cost of the available cook stoves? |
| 17. | What challenges are associated with improved charcoal stoves in this area? |
| | |
| c) | Solar Energy |
| 1. | What solar energy technologies are being used within the local area? <i>Prompt: photovoltaic systems, solar water heaters, solar cookers, solar dryers</i> |
| 2. | Do you have solar photovoltaic systems technology suppliers, contractors and installers in this area? |

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| 3. | Are there technicians who offer support for installation, operation and maintenance of solar photovoltaic systems technology in the area? |
| 4. | Please, rate the accessibility of solar photovoltaic technologies in this area? Rating: very plenty, plentifully available, easily available, not easily available, very difficult |
| 5. | In your opinion, how would you rate the willingness for households, SMEs and institutions to change from use of conventional types of energy (grid electricity, kerosene, LPG) to solar photovoltaic systems technology for lighting and appliances power? Prompt: very willing, willing, moderately willing, not so much willing, not willing at all. |
| 6. | In your opinion, how much do you think a household, SME, Institution would afford to spend on purchase of a solar PV system for lighting and appliances power? |
| 7. | What are the challenges in accessing solar PV technology in this area? |
| 8. | What are the challenges associated with solar PV technology in this area? |
| 9. | Do you have solar water heating systems technology suppliers, contractors and installers in this area? |
| 10. | Are there technicians who offer support for installation, operation and maintenance of solar water heating systems technology in the area? |
| 11. | Please, rate the accessibility of solar water heating technologies in this area? Rating: very plenty, plentifully available, easily available, not easily available, very difficult |
| 12. | In your opinion, how would you rate the willingness for households, SMEs and institutions to change from use of conventional types of energy (such as grid electricity, biomass, kerosene, LPG) for heating water to solar water heating systems technology? Prompt: very willing, willing , moderately willing, not so much willing, not willing at all |
| 13. | In your opinion, how much do you think a household, SME, Institution would afford to spend on purchase of a solar water heating system for hot water needs? |
| 14. | What are the challenges in accessing solar water heating technology in this area? |
| 15. | What are the challenges associated with solar water heating technology in this area? |
| 16. | Do you have solar cookers installed at household, SME and institutions located in this area? |
| 17. | Do you have solar dryers installed at household, SME and institutions located in this area? |
| 18. | Do households and institution keep cows under zero-glazing in this area? |
| 19. | Do you have biogas technology suppliers, contractors and installers in this area? |
| 20. | Are there technicians who offer support for installation, operation and maintenance of biogas technology in this area? |
| 21. | Please, rate the accessibility of biogas technologies in this area? <i>Rating: very plenty, plentifully available, easily available, not easily available, very difficult</i> |
| 22. | In your opinion, how would you rate the willingness for households, SMEs and institutions to change from use of conventional types of energy (such as grid electricity, kerosene, LPG) to biogas technology for cooking? <i>Prompt: very willing, willing , moderately willing, not so much willing, not willing at all</i> |
| 23. | In your opinion, how much do you think a household, SME, Institution would afford to spend on acquiring of a biogas plant? |
| 24. | What are the challenges in accessing biogas technology in this area? |
| 25. | What are the challenges associated with biogas technology in this area? |
| 26. | What is the cost of biogas plant installation? |
| | |
| d) | Wind Power |
| 1. | Is wind power energy being used in this area? |
| 2. | Do you have wind power technology suppliers, contractors and installers in this area? |
| 3. | Are there technicians who offer support for installation, operation and maintenance of wind power technology in this area? |
| 4. | Please, rate the accessibility of wind power technologies in this area? <i>Rating: very plenty, plentifully available, easily available, not easily available, very difficult</i> |

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| 5. | In your opinion, how would you rate the willingness for households, SMEs and institutions to change from use of conventional types of energy (such as grid electricity, kerosene, LPG) to wind power technology for lighting and electric appliances power? <i>Prompt: very willing, willing, moderately willing, not so much willing, not willing at all</i> | | |
| 6. | In your opinion, how much do you think a household, SME, Institution would afford to spend on acquiring of a wind power installation? | | |
| 7. | What are the challenges in accessing wind power technology in this area? | | |
| e) Biofuels (Biodiesel and Bio-ethanol) | | | |
| 1. | Are bio fuels produced or used in this locality? | | |
| 2. | If yes, who are the producers of the biofuels? | | |
| 3. | Are there farmers who grow raw materials that can be used for production of biofuels? | | |
| 4. | What are the challenges in accessing biofuels in this area? | | |
| f) Small hydro power plant | | | |
| 1. | Is small hydro power energy being used in this area? | | |
| 2. | Are there rivers with potential for installation of small hydro power plants in this area? | | |
| 3. | Do you have small hydro power technology suppliers, contractors and installers in this area? | | |
| 4. | Are there technicians who offer support for installation, operation and maintenance of small hydro power technology in this area? | | |
| 5. | Can the local community organize itself to establish a small hydro power plant for generating off grid electricity for this area? | | |
| 6. | What are the challenges associated with small hydro power technology in this area? | | |
| 7. | | | |
| g) LPG | | | |
| 1. | Is LPG commonly used in this area? | | |
| 2. | If yes above, what are the reasons for preferring use of LPG energy? | | |
| 3. | What are the challenges associated with LPG in this area? | | |
| h) Kerosene | | | |
| 1. | Is kerosene commonly used in this area? | | |
| 2. | If yes above, what are the reasons for preferring use of kerosene energy? | | |
| 3. | What are the challenges associated with kerosene in this area? | | |
| 4. | | | |
| C. AWARENESS | | Yes | No |
| 1. | Is there any formal association for producers, transporters and resellers of firewood and charcoal in this area? | 1 | 2 |
| 2. | Are you aware of Regulations on Charcoal which requires commercial charcoal producers and distributors to be licensed to engage in charcoal business? | 1 | 2 |
| 3. | Are you aware of Regulations on Solar Water Heating which requires business to install solar water heating systems where the hot water minimum needs is 100 litres per day? | 1 | 2 |
| 4. | Are you aware of Regulations on Solar Photovoltaic (PV) that requires all solar PV systems manufactures, dealers, technicians and contractors to be licensed and that that all new buildings to be fitted with solar PV systems? | 1 | 2 |
| 5. | Are you aware of the draft Regulations on Improved Biomass Cook Stoves which requires that all business that use wood and charcoal to install improved biomass cook stoves? | 1 | 2 |

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| 6. | From your experiences, what changes in the legal and regulatory framework should be put in place to promote efficient supply and use of the different forms of renewable energy? |
| 7. | In your opinion, what are some of the strategies that the Government of Kenya, promoters and other relevant stakeholders should put in place to enhance uptake of renewable energy technologies? |
| 8. | Do you have any other information that you would like to share with us concerning access to renewable energy in this area? |
| | |

**Source: Draft County Energy Planning Framework, 2013*



MINISTRY OF ENERGY



COUNTY ENERGY PLAN (2022-2027)

NAKURU