MAASAI MARA UNIVERSITY

CENTRE FOR INNOVATION, NEW AND RENEWABLE ENERGY POLICY

Policy No.	MMU/CIE/P02
Version	01
Principal Responsibility	Director, CINRE
Effective Date	22nd March, 2021

Policy Approval

This policy shall be known as the Centre for Innovation, New and Renewable Energy Policy of Maasai Mara University (herein after referred to as "the Policy")andshall take effect on the date of approval by the University Council.

In exercise of the powers conferred by Statute 17 (2d) of Maasai Mara University section 35(1) (a) (iii) of the Universities Act No. 42 of 2012 and section 19 of the Charter for Maasai Mara University 2013, Maasai Mara University Council affirms that this Policy has been made in accordance with all relevant legislations.

Dated the 22 day of March 2021

Signed: .....

Dr. Kennedy Ole Kerei, PhD

Chairman of Council, Maasai Mara University

P.O. Box 861-20500 Narok, Kenya

Telephone: +254 - 205131400

Email: chairmarauni@mmarau.ac.ke

Website: www.mmarau.ac.ke

Foreword

The University recognizes and values the key role played by Science, Technology and Innovation (ST&I) in job, wealth creation and building human capital required to catapult the Country into a knowledge and skill driven economy. To do this, the University has to embrace the concept of having a culture of innovation, invention and technological developments. For this to thrive, then the University has to establish a platform to seed and grow these activities, hence the creation of the innovation hubs, or innovation Centers within the University to aid in crystallizing out these ideas.

The objective of this policy is to achieve the transformation of University research to inventions and innovations which will lead to national production processes and create technology platforms essential for the development of products, processes and services in a wide range of sectors.

I wish to appreciate and commend CINRE for this policy development. I further wish to reiterate the University's commitment to provide an enabling environment for the successful implementation of this policy.

Prof. Kitche Magak
Ag. Vice-Chancellor

Definition of Terms

Innovation- This is a technical term that refers to the application of improved solutions that satisfies new demand.

Invention – refers to a totally new idea or solution.

Innovation Centre - a niche that provides facilities to nurture new ideas and assist any developing perspectives form the society.

New energy technology – the application of practical aims that is science related to create electricity, heat and fuel energy from renewable sources.

Renewable energy – energy that is mustered from renewable sources which are naturally replenished on a human timescale; these include wind, sunlight, wind, rain, tides and geothermal heat.

Practical skills – the know-how that is done with human intervention using equipment, tools or technology.

Technology – application of scientific knowledge to the practical aims of life to manipulate the human environment.

Industrial hubs – a niche that provides facilities to nurture new ideas and assist any developing perspectives form the society.

Table of Contents

Executive Summary

This policy was developed in order to guide the Centre for Innovation, New and Renewable energy deliver its mandate effectively and efficiently. Essentially, it is a guiding tool in the day to day running of the Centre activities. The policy is divided into nine (9) major sections, with some section having subsections engrained in them. Broadly, the policy has the following sections systematically captured: Policy background information, reviews and global trends, policy statement, justification, significance, goal of the policy, objectives, scope of the Centre, functions/role of the Centre, action plan, the Centre structure, the Centre creation and its sections. Others are; the Centre administration and governance, the Centre establishment, the Centre requirements, policy monitoring and evaluation; and policy revision.

University Vision and Mission

Vision

To be a World Class University Committed to Academic Excellence for Development.

Mission

To provide quality University education through innovative teaching, research and consultancy services for development.

Motto

Eng'eno e puaan (Knowledge for Prosperity)

Core Values

Teamwork

Professionalism

Creativity and Innovativeness

Transparency and Accountability

Excellence

Equity and Social Justice

Centre for Innovation, New and Renewable energy Vision, Mission

Vision

Quality and Efficient Innovations development and Renewable Energy Supply for all University Facilities, Functions and society at large

Mission

To Facilitate Innovations developments and Provision of Clean, Sustainable, Affordable, Competitive, Reliable and Secure Energy Services at affordable Cost while Protecting the Environment.

1.0 Policy Background Information

1.1 Introduction Statement

Most of Africa's institutions of higher learning (Universities and Colleges) have not embraced real practical skills. Most if not all of their activities are centered on theory and examinations or on limited theoretical practical work. There is no focus on real final products to solve problems facing the society. In an African setting, training was mainly centered on apprenticeship; a practical and product based learning which was geared towards solving society's problems.

Setting up a center for energy, technology and innovations is one of the ways of achieving the lost glory of apprenticeship for training the youth. This was a strong tool of imparting knowledge where the trainees were exposed fully to the practical skills and practice in a particular knowledge area. It will converge a multidiscipline of scholars and their students. As a continuous attachment tool, it will equip the learners with real time situations and appreciations ready for the market.

It is believed that, the Universities being the Apex of learning and training should produce scholars and graduates ready to come up with solutions to problems facing the society and the country at large through research and innovations, thereby improving livelihoods.

It is under this background that Maasai Mara University is proposing to set up a Centre for Energy, Material, Technology and Innovation. This will provide an opportunity for both staff and students from all disciplines to explore their innovative practical ideas and skills with ultimate commercial ventures.

It will be an Arena where the multidiscipline will coalesce (converge), put their heads together, dialogue and build ideas, skills, prototypes and industrial products for the betterment of society. The staff and students alike will have space, humble time and environment to explore on their practical ideas, skills, and innovations to feel the commercial aspects of it.

1.2 Policy Reviews and Global trends

Science, technology and innovation feature increasingly in discourses on African development[1]. There appears to have emerged a consensus that innovation in whatever form can be an important driver of organization's transformation and the country at large. This view has in large part been driven by advances in science, technology and innovations. Universities should now be home to innovation hubs, innovation laboratories, and innovation incubation centers, driven

in large measure by the revolution in the development of applications for ICT and rising rates of youth unemployment. Indeed, many African governments, development partners and civil society organizations appear to hold the view that technology and innovation centers and laboratories should be set up in universities as they hold the key to the continent's transformation and improved competitiveness. Except for a few universities in South Africa, most of the continent's universities do not appear among the first 250 in the global rankings of universities. And the gap between Africa and the rest of the world in terms of science, technology and innovation continues to widen. This shows a clear correlation between the existence of such centers in the universities and the countries development.

African governments recognize that their ability to deal with high rates of youth unemployment and accelerate economic diversification and transformation in the long run critically depends on the degree to which they contribute to advances in science, harness new and old technologies, and innovate. Most appear to believe that the creation of innovation centers, hubs, parks and clusters in the universities is an important and critical first step towards development. Historical evidence lends support to this view. Innovation centers and technological parks have played a transformative role in the industrialization of countries such as China, Chile, Malaysia, Thailand and United States of America. In the medium to long run, these industrial parks, if successful, could become drivers of innovation in the country.

1.3 Policy Definition highlights

The International Association of Science Parks defines a science park as "an organization managed by specialized professionals whose aim is to increase the wealth of their community by promoting the culture of innovation and the competitiveness of its associated businesses and knowledge-based institutions"

In this context centers and parks are innovation and research driven. Most of the centers' policy and advocacy interest play the role of translating research outcomes (say university research or specialized institutions' research) into commercial products. Science parks, industrial parks, and centers may serve as innovation intermediaries and screening devices. Science parks and technology parks, are very formal and require very specialized professionals to manage them. In this regard the center can assume the picture of innovation clusters and parks thus frugal organizations, hovering at times hover between formality and informality that prosper through the exploitation of scale and network economies. These innovation centers and parks fill a gap. They, in some ways, constitute a first step towards developing and seeding the culture of

innovation especially at firm level that is lacking in many African countries. From this standpoint, innovation centers and parks in universities could be a tool for industrialization through the acceleration of learning to catch-up with the leading countries.

2.0 Rationale of the policy

Science, technology and innovation (ST&I) is a front-burner development issue for all African governments. Practically all the challenges to Africa's development are amenable to technological solutions. For this reason, a considerable amount of policy effort is increasingly devoted to promoting ST&I. These efforts focus in the main on "prestige" issues of university and industry research, ignoring the only innovation-focused organizations on the continent, innovation hubs and clusters.

2.1 Policy Statement

A university's primary role is to train and equip the trainees with knowledge-based education which will have value addition to the society: - develop and get rid the society off basic problems. To attain this goal, the university will have to repackage its systems in a manner to have an output based knowledge philosophy. That is, anything it is doing should result into a real tangible and applicable product for its own use first and then for others.

Experience has shown that, to create a culture of innovations amongst staff and students, exposure to frequent research, interactions and dialoguing is key.

Currently, the University like most other Universities has not embraced research and use of technologies into material processing, alternative renewable energy harnessing, modernized innovations geared towards environmental protection and lowering financial recurrent expenditures. Also, research and use of efficient technologies of the existing energy sources, manufacturing and waste recycling has been to a critically limited mode. This call for the University to set a base and be a leading light in the research into materials, energy, technologies and innovations that could use efficiently the existing energy sources, enhance training, supervising on Energy and hence the guide to research and innovation.

2.2 Justification

Maasai Mara University like any other public university is endowed with seasoned human resource capital: - researchers, young innovators, and consultants who are enthusiastic and ready to work and research together. The University is also rich with natural and artificial resources: - sunshine, wind, land, waste materials and infrastructure from which industrial

products, renewable energy, income and water can be harnessed. Amazingly, the university lacks or is in short supply of the basic needs- energy, water, and proper waste management techniques. These has put the university into a financial crisis as most funds could be allocated in acquiring basic items and payment of bills, which could have been otherwise sourced internally or reduced in view of lowering recurrent expenditures. In view of these, the university proposes to set up a Center for Innovation, New and Renewable Energy (CINRE), to be a Renewable energy, materials, technology and innovations hub where scholars and students could find a platform to coalesce and sharpen their trade to discover, invent, and innovate and to prototype.

2.3 Significance

The setting up of the center will create a culture innovation, green energy use and industrial productions, thereby new technologies and innovations will spring up. The university will be self-sufficient in most basic products; industrial products eg. Soaps, detergents, disinfectants, paints, resins, solar harvesting materials etc. All these will drastically lower the university's recurrent expenditure and environmental emissions and pollution.

3.0 Policy Objectives

3.1 Goal of the policy

To set up a hub for excellence in research into; materials, Renewable energy, technology and innovations at the university in view of producing tangible products, alternative Energies, guide, manage and improve on the use of the existing energy, train, Research in Frontier areas of Science and Technology, and producing consumable innovative energy products and ideas ready for implementation in view of reducing emissions and costs.

3.2 Policy Objectives

i. To create and activate innovative culture amongst the undergraduates and graduate students
ii. To promote research and use of green energy within the university
iii. To incubate technologies, materials and innovations in green energy (solar, wind and biomass energy), manufacturing and ICT
iv. To train and expose young entrepreneurs in the areas of energy trading, manufacturing, and ICT

v. To provide a multidiscipline platform where various groups can interact and share on emerging research technological and innovation trends / current emerging global issues.

vi. To develop and incubate indigenous cottage industries

4.0 Policy on Scope and Role of the center

4.1 Policy on Scope of the Centre

The Centre shall work within the framework of Innovations, New and Renewable energy and technology research; innovation creation and incubation; energy management efficiency, creating awareness to both staff, students, and the community on the benefits of efficient energy use and on Green energy sources. Within the same framework, the Centre shall endeavor to Capacity building for the University and the Country's manpower resources through: Short Courses on Energy (Auditor, Technician) through accreditation from the Ministry of Energy, Masters and PhD Programme on Green Chemistry, Green Energy, New and Renewable Energy through collaborative researches with departments and Schools within Maasai Mara University. Thematic areas shall but not limited to: Biofuel Chemistry, Biogas human waste, and biodegradable solid waste technology, Energy Crops, Photovoltaic cells, solar energy, New and Renewable Energy Technology, energy economics, energy sociology, wind energy etc. The Centre in collaborations with departments and Schools, shall also do researches in technologies geared towards; renewable energy sources, innovative equipment using new energies and related areas.

4.2 Policy on Functions/Roles of the Center

1. To Undertake Renewable Energy Production for the University's consumption by;
   i. identifying Innovative projects and harness possible Renewable Energy Sources within and a round the institution; biomass, solar and wind
   ii. Advising on possible ways of tapping the energy through proposal writing.
   iii. coming up with Economic implications of the various renewable energy productions (Budgetary implications)
   iv. identifying possible sources of Funding
   v. Coming up with Implementation Strategies; Technological build-up and consumption regimes.
2. To control the Supply, consumption and management of Energy within the institution. To ensure efficient utilization of the same.

3. To coordinate Innovative Research Activities across all Schools along Renewable Energy through;
    i. Identification of possible renewable energy research activities to be attached to the Centre
    ii. Mobilization of research funds for the projects
    iii. Identification and facilitation of possible renewable energy Sharing and Linkages with other Energy Organizations, Groups and Centers nationally and across the Globe.
4. To Coordinate Short Courses

    The Centre shall coordinate the following Short Courses:
    i. Renewable Energy production Technology
    ii. Energy Audit Technician
    iii. Energy Technician
5. To foster mitigation measures geared towards environmental protection against pollution by;
    i. Constantly assessing levels of combustion gas emissions within campus and its surroundings.
    ii. Identifying possible levels of emissions associated with the various types of energy, and combustion devices used within the Institution.
    iii. Identifying and advising on the possible Innovative technological remedies to curb further emissions
    iv. To come with relevant public awareness campaigns projecting towards Innovative use of renewable energy - a mitigation measure to environmental emissions.
6. To Link Maasai Mara University to relevant Ministries and departments of Government of Kenya and other world bodies on Global Energy and Innovation policies.
7. Offer Innovative Consultancy Services to: industrial production Companies, community groups, farmers etc on Renewable Energy harvesting and production, Energy efficient utilization and conservation, New energy trends which are efficient and cost friendly etc.
8. Establish Accreditation Linkages to offer UNEP based courses on Renewable Energy production and efficiency, Water harvesting and use, environmental protection etc.
9. To carry out Risk assessments on Energy production and come up with strategies to remedy it.

10. To provide a forum to unleash research, technological and innovative ideas on:-

i) solar photocells, solar thermal systems
ii) solar solvents electrical power productions
iii) biogas technologies and raw material studies
iv) wind turbines and windmills
v) Water purification and processing

11. To provide an Incubation Centre to practice and carry out the following activities;-

I) incubate, develop and commercialize the unleashed technologies and innovation up to commercial stage in;

II) Technology and knowledge transfer

The center shall organize and offer Annually: Conferences, seminars, workshops and training to farmers, society groups or organizations, community groups, and individual companies on the areas of; Renewable Energy generation and use without cutting trees, entrepreneurial skills from sales of fertilizer and increased revenues from agriculture, etc.

5.0 Policy Action Plan

The Centre shall:

i. Engage on mapping out on the types of energy and innovations the University is producing and using currently, their capacities, efficiency and inefficiencies, consumption distributions and need to various departments and the possible sources of energy losses.
ii. Embark on setting up a decentralized Innovation and Energy Park where a Biogas energy from human waste, cow dung, agricultural remains and kitchen remains; and thermal solar energy systems will be housed to generate super-hot waters for the kitchen and Hostels.
iii. Advice and guide the setting up of latest generations of solar lighting systems at strategic areas in campus, and thereafter supervising and servicing their operations.
iv. Collaborate on Researches into technologies and innovations in the setting up of;
    - A solar-solvent heating systems to generate electricity and thermal energy for heating water at the energy Park.
    - A solid waste into Water-gas fuel conversations plant.
    - Wind-turbine electrical energy and water pumping powering systems.
    - Biogas and electrical energy generation from Sewage effluents generations.
    - Biogas and electrical energy generation from wheat straw and other agricultural residues to cash in on the rich and abundant agricultural region.

- Waste water recycling for use in lavatories, laundry washing and general cleaning purposes across the campus.
- Organic fertilizer production, mixing and validations for use to offset some of energy costs.
- Synthesis of bioethanol from biogas solid remains to be used in the solar-solvent heating systems for electricity generations.

6.0 Policy on the Centre Structure

1. 6.1 Policy on the Centre Creation and its sections:

For the smooth running of the Centre in order to accomplish its mandates efficiently, the Centre shall be created within Maasai Mara University main Campus. The Centre shall have the following sections within it:

1. New and Renewable Energy
   - i. Biomass energy
     - Biogas: Gas fuel, and Electricity generation
     - Biofuels: Bioethanol and Biodiesel
     - Water gas: Gas fuel
   - ii. Solar energy
     - Electricity generation
     - Thermal energy generation
   - iii. Wind energy
     - Wind turbines: Electrical Energy
     - Wind pumps: water pumps
2. Innovations and Intellectual Property
   - i. Innovations hub
     - Incubation center
     - Workshops/labs
     - Data Centre
   - ii. Intellectual property office

2. 6.2 Policy on the Centre Administration and Governance:

It shall have a Director, researchers drawn from each School, Energy & Innovation development Technicians, Energy Auditors, an Administrator, Secretary and Energy Clerks.Also the Centre shall have the Centre development and Coordination Board.

3. 6.3 Policy on the Centre Establishment

The Centre shall be run by;

i. Director,

ii. Center Development and Coordination Board-referred as a Center Board (6)

iii. others;

- Administrator (1)
- Energy/Fabrication and Innovation Development Technicians (4)
- Energy Auditors/ Energy officer (1)
- Secretary (1)
- Energy clerk (2)

Centre for Innovation, New and Renewable Energy ORGANOGRAM

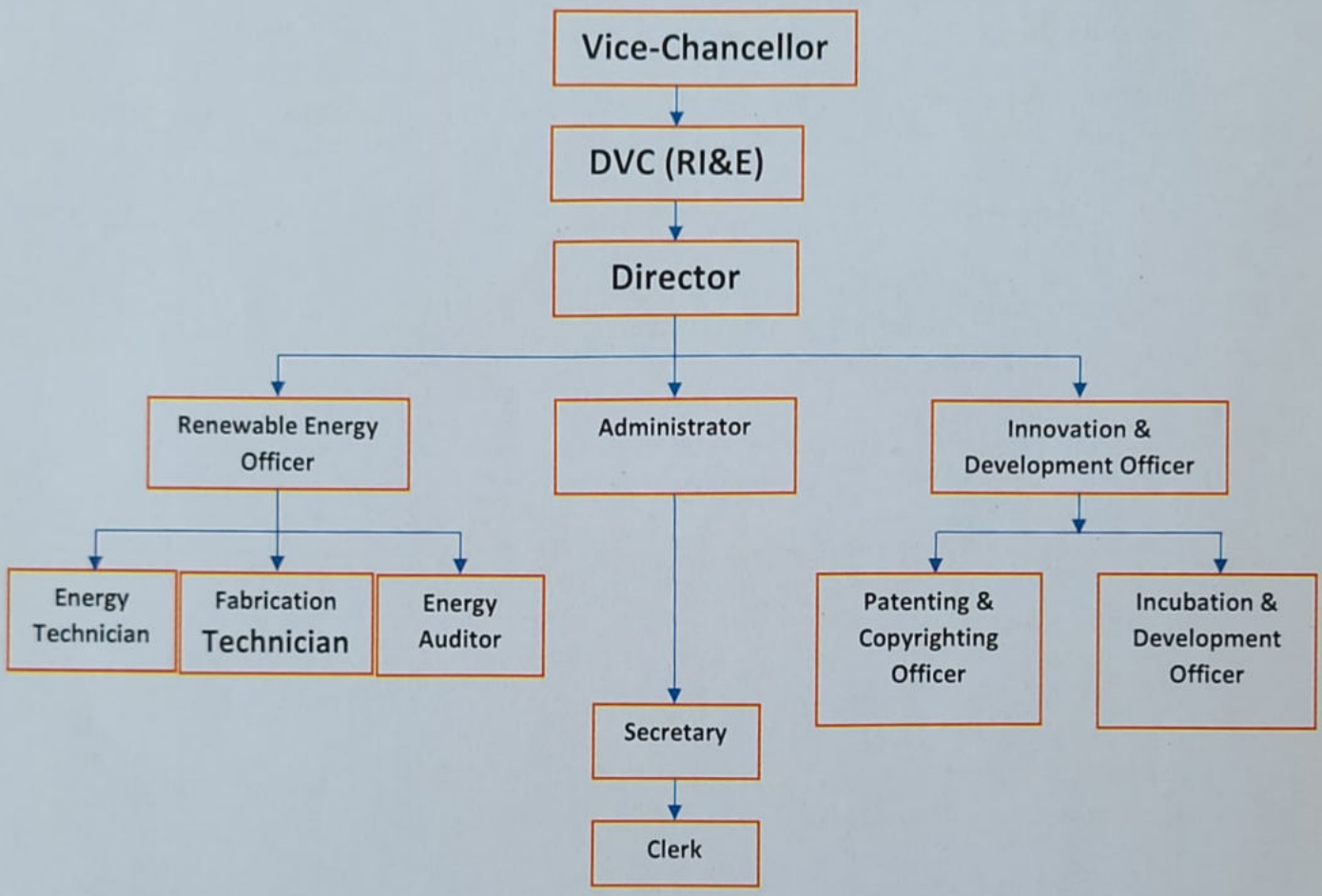

Figure 1: The Centre governance structure

7.0 Policy on the Centre Requirements;

i. Innovation Incubation center/ room (1)

ii. Innovation & Cluster Hub working space (1)

iii. Office space (3)

iv. Computers (2 desk tops and 1 lab top as a start)

v. Workshop/Laboratory

- Testing and Instrumentation lab (1)

- Prototyping Workshop/ fabrication laboratory (1)
- Data collection and documentation laboratory/ computer lab (1)

vi. Grinding and Shredding machines (1 each) for Biogas feedstock processing

8.0 Policy on Monitoring and Evaluation

To ensure actualization of this policy, the following key indicators shall be tracked from time to time:

i. Renewable Energy production pilot plant within the University

ii. Fabricated commercial products for sale;

- Portable domestic Biogas units,
- Combustion devices
- Briquette Machines
- Solid wastes-energy integrated gasifier units

iii. Green energy harnessing materials: - thermal materials, solar photocells, fuel gas equipment

iv. Industrial products: - cleaning materials, resins and paints

v. Increased number of innovations and inventions per year

vi. Publications

vii. Reduced university's recurrent expenditure

viii. Increased patents and copy Rights per year

9.0 Policy Revision

This policy shall be reviewed after a period of every two (2) years. This exercise shall be conducted by the CINRE Board of management and coordinated by the Director, CINRE.