

# **CLOSING THE ENERGY EFFICIENCY KNOWLEDGE GAP THE KENYAN SITUATION**

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# Energy efficiency sector in Kenya

- **Energy efficiency efforts started in the early 2000s**
- **The Energy Act, 2019**
- **Energy sector regulator - Energy and Petroleum Regulatory Authority (EPRA)**
- **Two regulatory instruments:**
  1. **The Energy (Energy Management) Regulations, 2012**
  2. **Energy (Appliances Energy Performance and Labelling) Regulations, 2016**
- **Kenya National Energy Efficiency and Conservation Strategy launched in 2020**
  - ❖ **Targets households, buildings, agriculture and industry, transport, and power utilities to be accomplished within a 5-year timeline up to 2025**
  - ❖ **Recognises training and capacity-building in EE and conservation central to meeting the targets**

# Energy efficiency sector in Kenya cont'd

## The Energy (Energy Management) Regulations, 2012

- ❖ **Targets industrial, commercial, and institutional facilities consuming more than 180,000 kWh annually**
- ❖ **Designated facilities are required to:**
  - i. Develop an energy management policy**
  - ii. Designate an energy officer**
  - iii. Conduct an energy audit once every 3 years**
  - iv. Develop an energy management implementation plan**
  - v. Implement ECMs to achieve at least 50% of the recommended energy savings**
  - vi. Monitor performance of EE projects, prepare implementation reports and submit them to EPRA**
  - vii. Keep a record of production and energy consumption data.**
- ❖ **Audits are conducted by licensed energy auditors - 87**

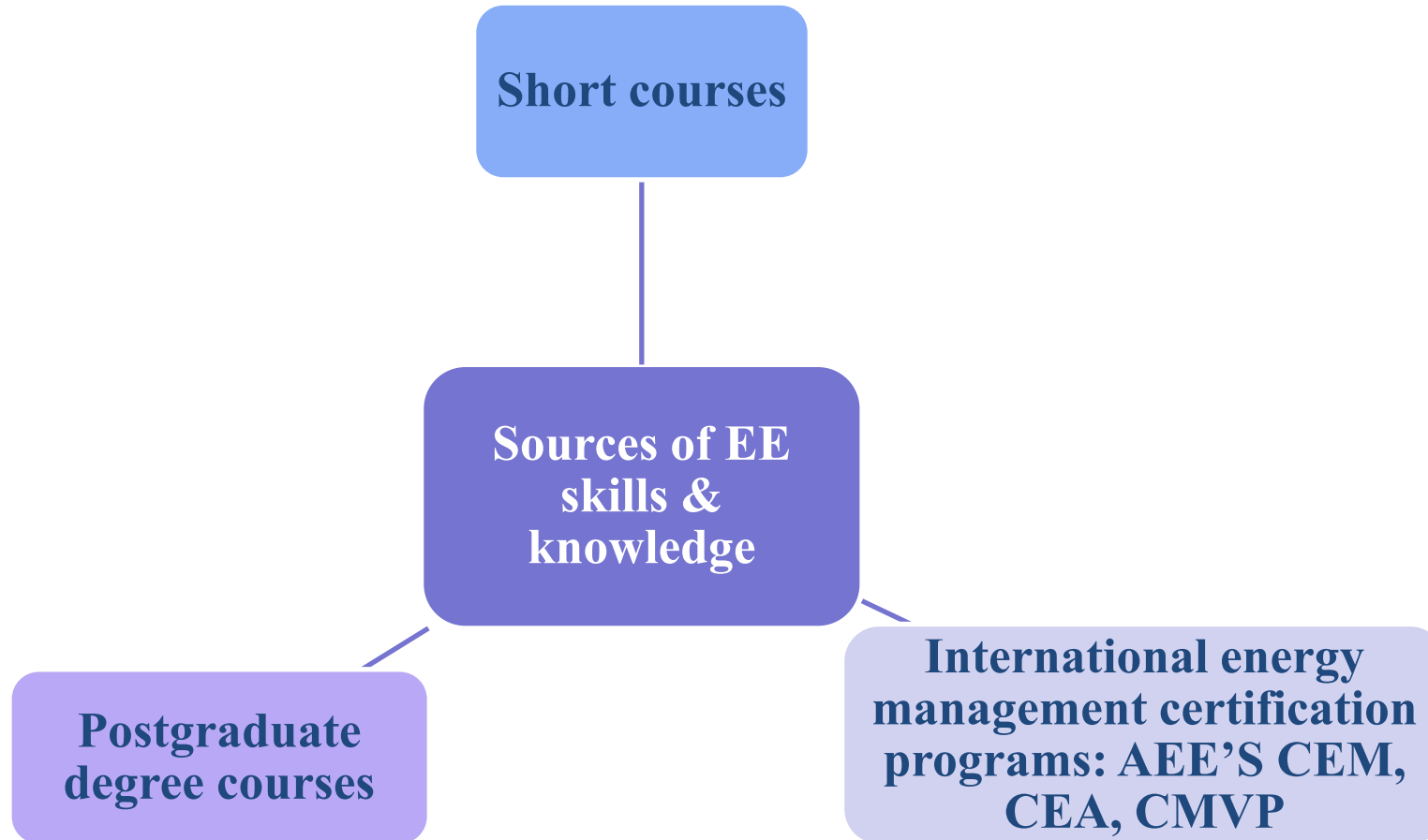
# Energy efficiency sector in Kenya cont'd

- ❖ **Energy auditors licensing requirements:**
  - ❑ **Minimum academic qualification; higher national diploma (HND), bachelors or postgraduate degree and;**
  - ❑ **Passed an energy management certification exam or postgraduate diploma or MSc in Energy Management and;**
  - ❑ **Have conducted at least five energy audits**

## **Energy (Appliances Energy Performance and Labelling) Regulations, 2016**

- **Test appliances for energy performance - MEP**
- **Register appliances with EPRA**
- **Affix appliance with appropriate energy star label**
- **Appliances - Refrigerators, 3-Phase induction motors, non-ducted air conditioners, lamps, ballasts for lamps**

# Sources of acquired skills and knowledge



# Methodology



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**Review of audit  
reports submitted to  
EPRA**

**Field visits to facilities**

**EE professionals'  
interviews**

**Interviewed local  
universities offering  
EE training programs**

**Interviewed  
government and non-  
government agencies  
involved in energy  
management**

# Requisite skills and knowledge for energy auditors

## Energy management

Fundamentals

Tariffs

Data collection & analysis

Establishing EnPI

## Technical knowledge

Electrical power systems analysis

Thermodynamics and heat transfer

Combined heat and power

Systems optimization

Commissioning principles

O&M practices

New & existing technologies

M&V techniques and protocols

## Analytical skills

Statistical analysis

Whole-system analysis

Problem-solving abilities



# Requisite skills and knowledge for energy auditors cont'd

## Financial & accounting skills

Economics of energy management

Life cycle cost analysis

Financial decision-making processes

Economic assessment indicators

Financing options

Cost control & budgeting

Risk management

## Regulations, standards, and best practices

National and county laws, rules, regulations, standards, policies

Global and sector best practices

## Other areas

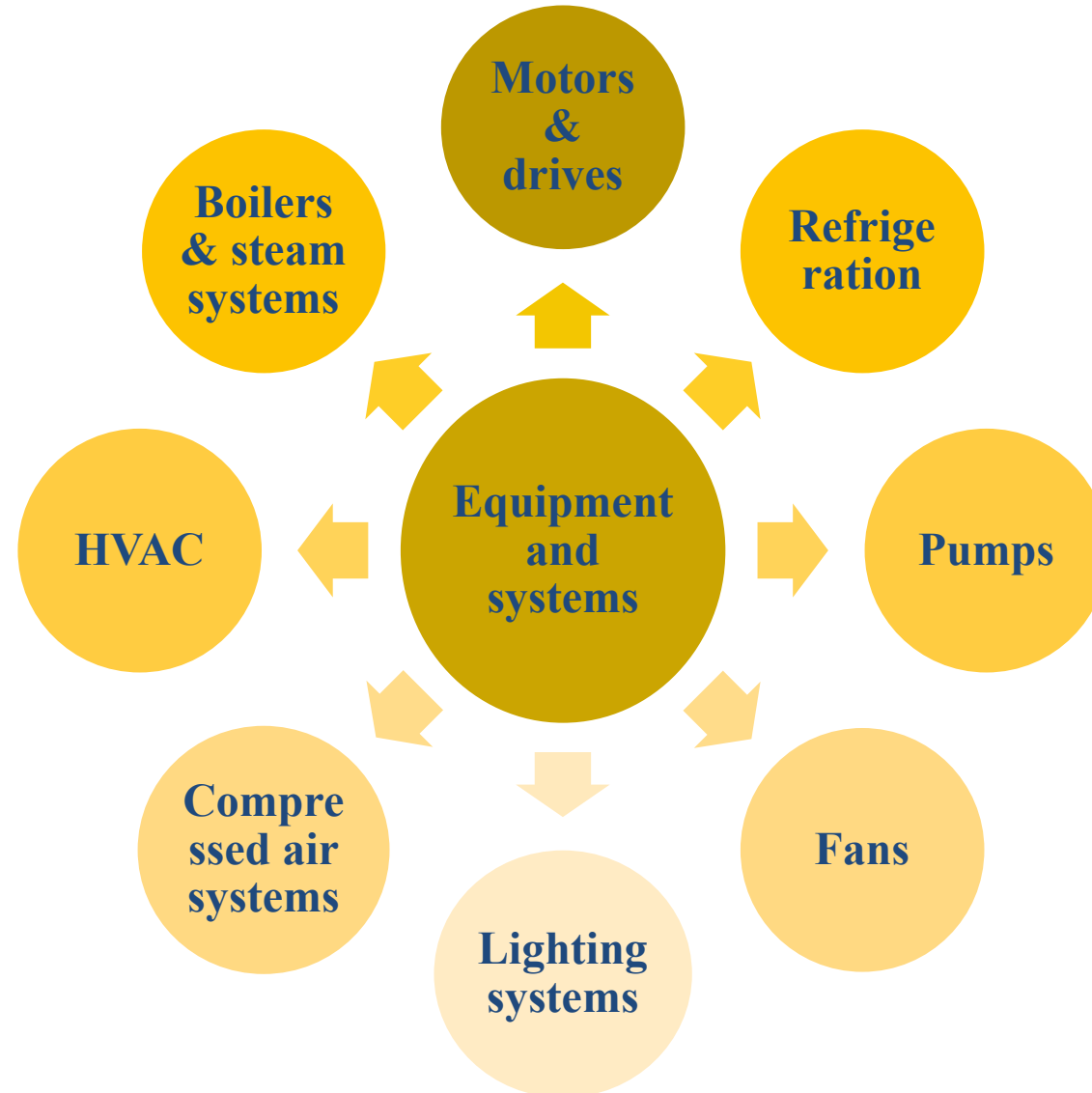
Communication and interpersonal skills

Performance contracting

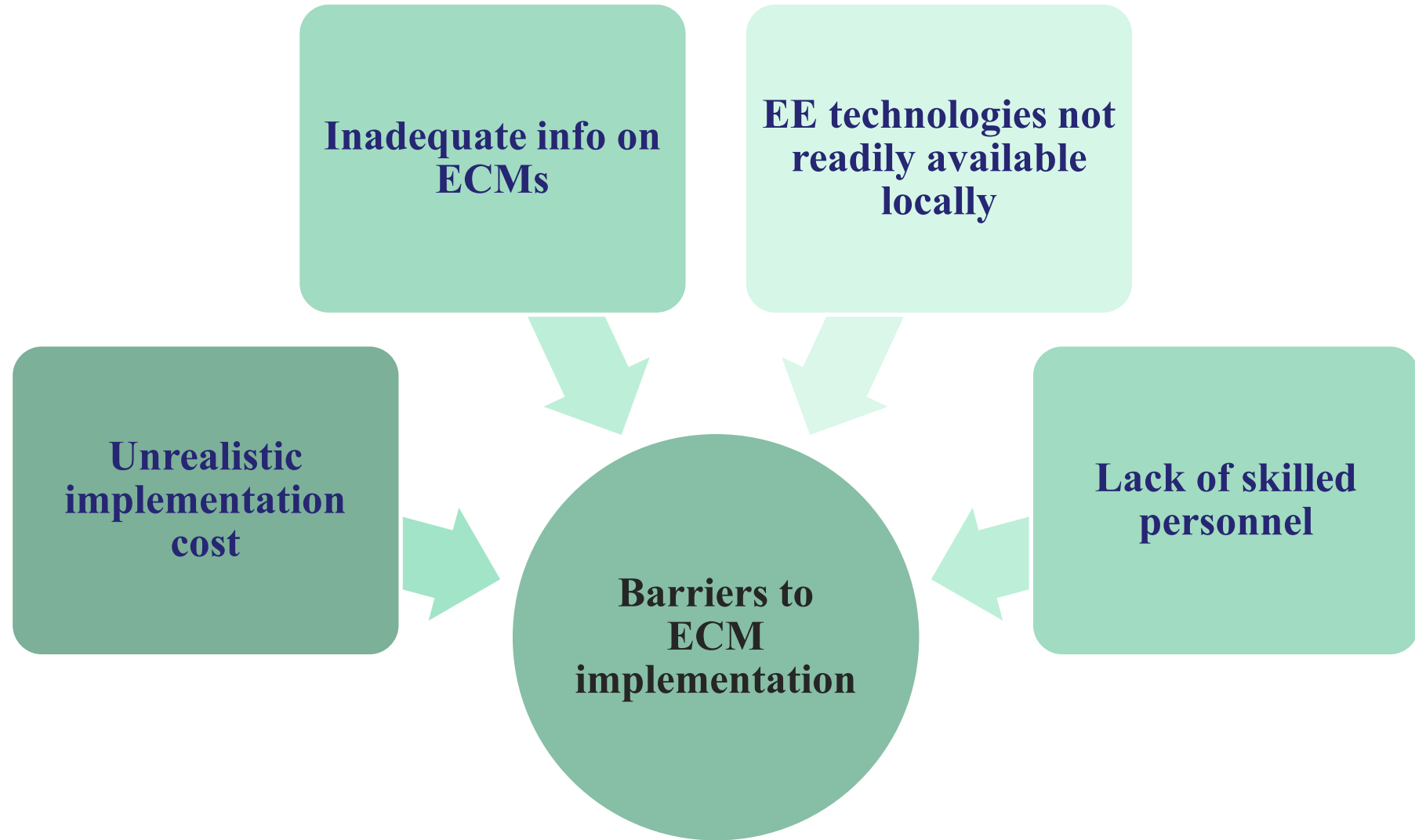
Judgment and decision making

Report writing

# Main applications and processes that require EE intervention



## Challenges encountered during implementation of ECMs





# EE skills among energy auditors

Understanding energy use

Establishing energy baseline

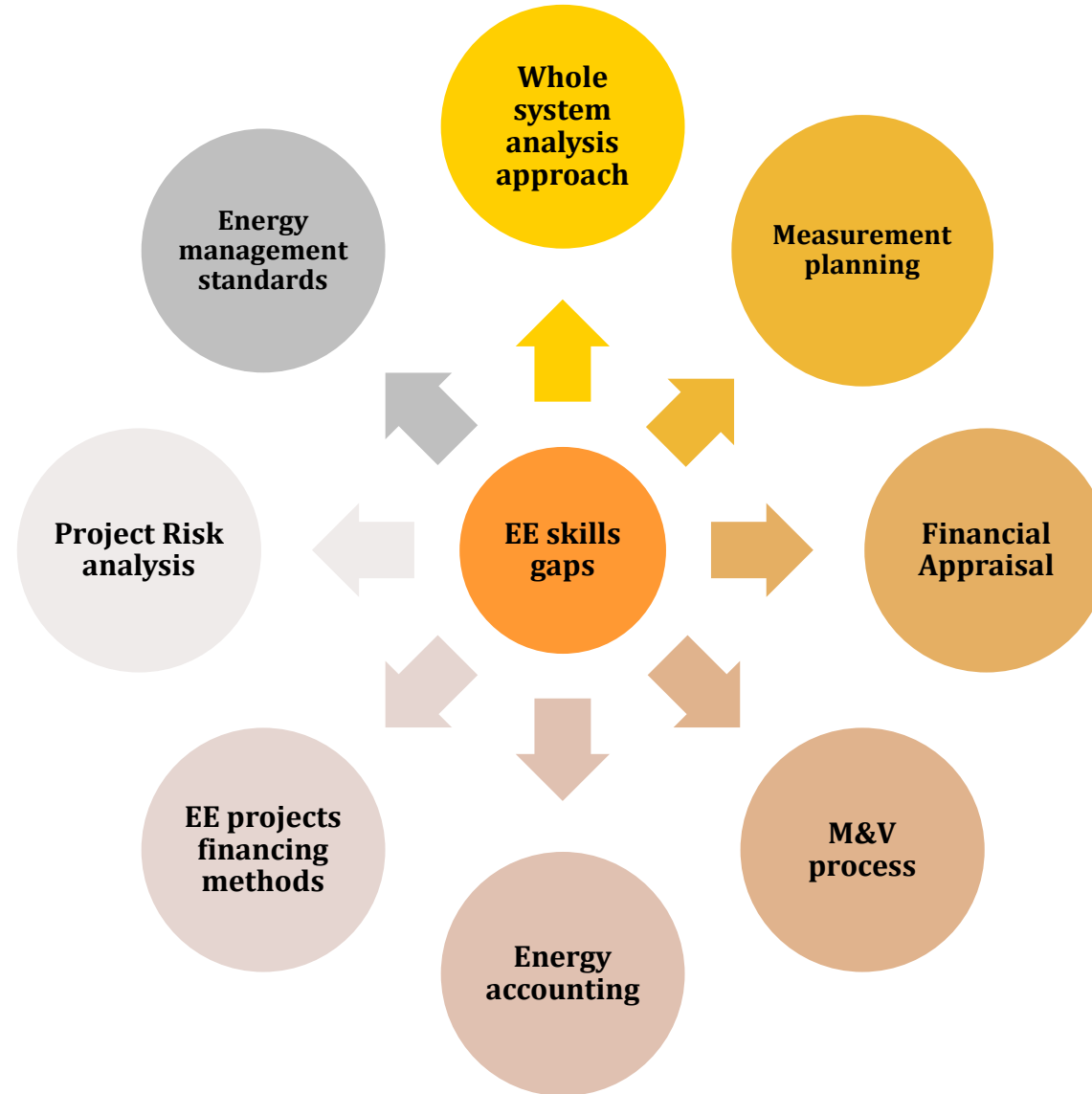
Data collection and analysis

Understanding energy pricing & tariffs

Identifying appropriate EnPI

Identification and evaluation of potential EE opportunities

# Gaps in EE skills



# Bridging the EE skills gap

EE professionals	Short course area/topic
	<ul style="list-style-type: none"><li>◆ Energy systems optimisation</li><li>◆ Energy measurement techniques and monitoring</li><li>◆ Energy accounting &amp; metering</li><li>◆ Financial analysis of energy savings</li><li>◆ Energy efficiency project financing: mechanisms &amp; resources to fund EE projects</li></ul>
Energy auditors	<ul style="list-style-type: none"><li>◆ Risk assessment and management for EE projects</li><li>◆ Energy economics, financing energy projects, and performance contracting</li><li>◆ Introduction to measurement and verification</li><li>◆ Energy management regulations and standards</li><li>◆ Energy audit report writing</li></ul>

# Topics for postgraduate programs

## Energy management

- ❖ Energy management and auditing:
- ❖ Instrumentation and control for energy systems
- ❖ Energy measurement techniques
- ❖ Energy modelling and optimization
- ❖ Energy use and resource management
- ❖ Material and energy balance
- ❖ Solar thermal energy
- ❖ Energy and water efficiency
- ❖ Energy efficiency in buildings
- ❖ Measurement and verification
- ❖ Energy management and transport
- ❖ Codes and standards

## Economic analysis

- Energy economics and planning
- Energy, climate change and carbon trade
- Financial and project management
- Project economics and evaluation