GLOBAL YOUTH PARLIAMENT BOTSWANA

FEERS Implementation Research Report

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FEERS 2024 RESEARCH REPORT

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Exploring Energy Efficiency & Consumption Patterns In Botswana

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FEERS System, Gaborone, Botswana

KEYWORDS

FEERS
Botswana
Monitoring
Energy waste,
Sustainability
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ABSTRACT

This paper presents findings from a primary research study conducted in 2024 to inform the implementation of the Futuristic Energy Efficiency Rating System (FEERS) in Botswana. FEERS is an IoT-based innovation that combines hardware and software to help households, businesses, and building owners track and understand their energy consumption patterns. Beyond monitoring, FEERS quantifies wasted energy, translates it into monetary terms (opportunity cost), and provides tailored recommendations on how to reduce consumption. Moreover, through data analytics and sustainability-focused tips, FEERS enables users to reduce electricity waste, cut costs, and ultimately contribute to Botswana's climate action by lowering greenhouse gas emissions and thus aligning with the global goal of achieving net-zero emissions by 2050.

The FEERS journey began in October 2023 where FEERS was recognized internationally as one of the winning innovations in the energy category, securing USD 18,000 in seed funding to pilot and implement the project in Botswana. Mooiman et al., (2016) suggests that, before starting any national efficiency initiative, it is key to understand the supply and consumption of energy within that country, hence the implementation of FEERS kick-started with research as the foundational stage in April 2024 aiming to understand the energy efficiency state and energy consumption patterns of the people and industries in Botswana.

This research targeted three key stakeholders, namely, the Department of Energy (Ministry of Minerals & Energy), Botswana Energy Regulatory Authority (BERA) and Botswana Power Corporation (BPC). The key Findings of the research revealed that Botswana's energy efficiency is currently low, with progress largely attributed to incremental technology adoption rather than systemic policy interventions. Also, BERA and the Department of Energy acknowledged the importance of MEPS (Minimum Energy Performance Standards), appliance labeling, and retrofitting programs, but cited resource constraints as barriers. The inconsistency in Institutional cooperation similarly highlighted a challenge in sectoral collaboration.Therefore, based on this research, the recommendation is that FEERS will be a timely and critical tool for providing data transparency, monitoring, and awareness that can support Botswana's energy efficiency policies. This paper further recommends a conceptual framework that elaborates how the adoption of FEERS will intervene in the current efficiency challenges Botswana faces.

LIST OF ABBREVIATIONS

BPC *– Botswana Power Corporation*

BERA *– Botswana Energy Regulatory Authority*

DoE *– Department of Energy (under Ministry of Minerals & Energy)*

DSM- *Demand Side Management*

EE - *Energy Efficiency*

FEERS *– Futuristic Energy Efficiency Rating System*

IEA *– International Energy Agency*

IMF *– International Monetary Fund*

IoT *– Internet of Things*

IRP *– Integrated Resource Plan*

kWh *– Kilowatt-hour*

MEPS *– Minimum Energy Performance Standards*

SACREEE - *SADC Centre for Renewable Energy & Energy Efficiency*

SDG *– Sustainable Development Goal*

SEForALL *– Sustainable Energy For All*

TJ - *TeraJoules*

MW *– Mega Watts*

UNDP *– United Nations Development Programme*

UNFCCC *– United Nations Framework Convention on Climate Change*

Y4C *– Youth4Climate Initiative*

1. INTRODUCTION

Energy efficiency is essential to sustainable development, offering economic, environmental, and social benefits. Globally, it is recognized as one of the "**first fuels**" of the energy transition because it reduces emissions while lowering costs and reliance on imports. In Botswana, electricity access has expanded, but supply security remains fragile. The country often relies on imports from South Africa and other neighbors to meet demand, while its own generation capacity mostly coal-based struggles to keep pace. Blackouts and supply disruptions have been common, underscoring the need for demand-side solutions.

Therefore, as a developing nation striving for sustainable development, reduced greenhouse gas emissions, energy security, and cost savings, Botswana had put in place various policies and strategies aimed at enhancing energy efficiency, even though often these have been limited by resource constraints, institutional capacity, and gaps in implementation.

According to a country report by (IMF 2017), Botswana's domestic electricity production has been historically low compared to the demand; this has led to reliance on electricity imports from neighboring countries, especially South Africa. Even though there is abundance of renewable energy potentials such as solar, given Botswana's high solar irradiance, its unfortunate that the uptake has been slow due to policy, financial, and infrastructural barriers, (Mutoko, 2019).This corresponds with the questionnaire findings where DoE confirmed that even though renewable energy projects are in the pipeline, there is a gap between potential and implementation. Prior reviews of energy efficiency initiatives in Botswana have identified problems such as lack of reliable data, weak monitoring, limited incentives, and low awareness among end users (Mooiman et al., 2016)

The Origin of Feers

The idea for the FEERS system was born from the observations of Lesego Montsho during her time as a university student at the University of Botswana between year 2019 and 2023. She noticed how lights and air conditioning were routinely left on in dormitories, study halls such as the infamous **"247"** computer labs, lecture rooms, offices, and even government and UN buildings long after knock off time.

This wasteful behavior was particularly concerning given Botswana's dependence on South Africa for electricity and this was at a time when South Africa itself was struggling with constant power cuts and supply crises.

Realizing the long-term risks of such inefficiency, an IoT-based system that could monitor consumption patterns, quantify waste, translate it into financial losses, and provide tailored recommendations to encourage sustainable behavior was envisioned. In early 2023, a proposal detailing this vision of a **"complex electronic box"** with software features enabling it to sense the waste of energy and quantify it was submitted under the global innovation call and was selected among the top 100 global innovators to pitch in Rome, Italy. FEERS won in the energy category, receiving funding of USD 18,000 to pilot the project. The initiative officially began in April 2024, with research as its first stage, and has since progressed to a patented IoT prototype. By 2025, FEERS had gained global recognition, including a nomination for the Africa Renewable Energy Awards 2024 and recently selected in the Global Leaders Awards 2025 for Best Innovative Start-up.

2. LITERATURE REVIEW

Research and surveys have shown that Botswana imports over 50% of its energy supplies (Mooiman et al., 2016). Despite having the abundance and wealth of renewable energy sources such as solar, Botswana is not yet energy self sufficient and she continues to experience power cuts due to power shortages (Mutoko, 2019). The main supplies of Botswana's electricity is South Africa and Zambia, and this power is supplemented with the locally produced energy of 40 308 TJ from the Morupule coal fired power station (Mooiman 2016 and Musakwa, 2023). Since the coal power from this plant is not enough to power the entire country, in some rural areas people use diesel powered generators, hence the reliance on imports to bridge the shortage (Mutoko, 2019). Sadly, South Africa, where Botswana gets majority of its supplies from, has been greatly suffering constant power cuts and power shortages leading to vulnerability in Botswana's supplies (Mutoko, 2019).

2.1 Energy Efficiency in Botswana

Energy efficiency has a lot of definitions and there is no a universally accepted way of defining it (Patterson, 1996). Wattsense (2020) defines EE as the ability of a system, whether an appliance, a building or an industrial process to decrease its energy consumption while providing the same level of service. According to Nvidia (2025), energy efficiency is maximizing the amount of computational work completed for the amount of energy consumed and it is measured in terms of **"tasks per kilowatt hour"**. Other sources define it as using less energy to produce a useful output (Patterson, 1996). The aim of EE is two fold; first, to reduce consumption costs and secondly, to use less energy without any compromises on quality (Wattsense, 2020). Sathaye et al.,(2010) states that there are several factors that influence the way energy is used, such as house size, urbanization rate, electrification level of rural areas and urban areas, etc.

Meanwhile, an energy supply and consumption flow analysis focused on Botswana revealed that a total of 112 199 TJ is supplied from both imported and local power plants, then a larger part of this supply is consumed as follows; 30 846 TJ goes to Transportation, 27 645 TJ goes to Households and 14 046 TJ goes to Industry (Mooiman et al.,2016). Additionally, this analysis showed that about 40 308 TJ of the overall supply is generated from Botswana's coal plant of Morupule, from which, a total of 31 458 TJ (79%) is lost during the conversion at the power plant. This therefore highlights that our energy inefficiency crisis is not just at the consumer level, it exists even at the production level (Mooiman et al.,2016).

Again, natural resources are becoming scarce and excessive consumption is leading to negative environmental impacts. Therefore, EE seems like an ultimate solution for reducing consumption without compromising economic growth (Sathaye et al.,2010). Nilsson (2015) validates this with the concept of an **"efficient world"** which suggests that if available efficiency improvements are exploited, consequently, this will make users to act economically rational.

In 2010, the government of Botswana wrote the energy strategy draft where they committed to the United Nations' SEForALL programme, pledging to not only increase

their renewable energy contribution, but to also improve their energy efficiency, power savings and conservation by 10% towards 2020 (Mooiman et al.,2016). Its been over a decade since the commitments were made, yet the electricity system in Botswana still remains with a low efficiency (Maswabi et al.,2021), likewise the adoption of energy efficiency measures is low (Nilsson, 2015), yet it is something that can be improved by using or instigating end-use technology measures (Maswabi et al.,2021).

According to Mooiman et al.,(2016) 58% of energy waste in commercial buildings in Botswana happens after the working hours, especially through leaving the lights, computers and air conditioning that remain behind switched on. This is something that is not sustainable because Botswana has historically not been an energy self-sufficient country (IMF,2017), she still imports over 50% of its energy supply from Zambia and South Africa (Mooiman et al.,2016).

The Morupule B coal plant which was envisioned to reduce this dependence on imports has been suffering technical failures and delays leading to the compounding burden on imports from South Africa's Eskom utility (Fayayo, 2025). These vulnerabilities were inevitable because South Africa and Zambia have always suffered the worst power shortages and blackouts, they even adopted them into a new normal, yet Botswana's situation exacerbated earlier in 2025 due to the primary power plant breakdowns resulting in rolling blackouts (Fayayo, 2025). These challenges have pushed the government of Botswana to consider investments in the renewable energy sector so as to diversify their energy mix to meet her peak demand of 640 MW.

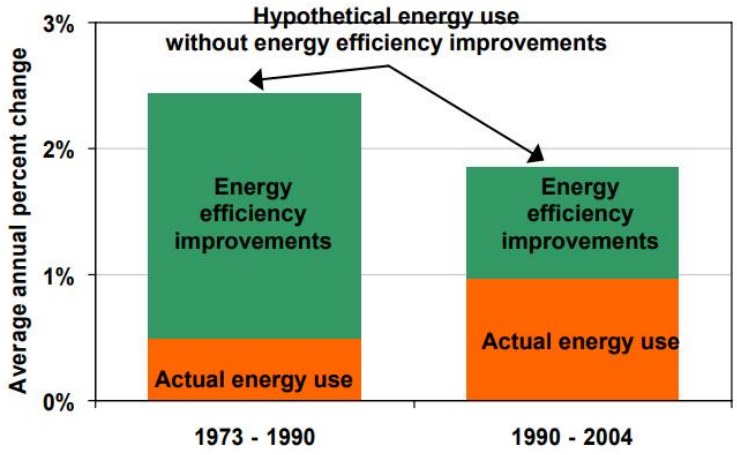
2.2 Benefits of Energy Efficiency

From the previous section, it is crystal clear that energy efficiency is important for building a sustainable future. The empirical statistics reveal that almost 75% of the global carbon emissions result from the production and consumption of energy because majority of existing electrical energy production involve combustion of fossil fuels (Nvidia, 2025) and therefore improving efficiency will minimize the carbon footprint from these processes. Also, the huge impacts and benefits of energy efficiency are birthed from

programs focusing on high energy use such as transportation, households and industry (Mooiman et al.,2016).

Figure.1 below depicts outcomes of a study that was carried out on the IEA member states in 2007 to determine the impact of energy efficiency improvements (**green**) on final energy use (**orange**). The findings showed that consumption grew by 0.4% per annum between 1973-1990, then in 1990-2004 it grew by 1% annually. This justifies the proportionate impact that EE has on consumption. In consequence, from 1973-1990 when the IEA countries improved their efficiency (**green**),consumption (**orange**) remained below 1% at 0.4%, however when they didn't improve efficiency (**green**), their annual energy consumption (**orange**) went up to 1%.

Figure 1 : Impacts of Energy Efficiency on Final Energy Use



Source : IEA (2007)

IEA reports consider energy efficiency as more important than energy supply and they crowned EE as the "**first fuel**" (IEA, 2013) and "**an invisible powerhouse**" because of its low costs (IEA, 2014) and the fact that it can be achieved by only adopting the energy efficiency technologies and measures, and not necessarily by increasing the energy sources (Mooiman et al.,2016). Moreover, unlike the traditional energy supply investments that are renowned for generating cash-flow, the EE investments do not only give the sustainability of cost savings, they provide other benefits known as **"non-energy benefits"** such as higher productivity, less noise and better working environment etc., (Nilsson, 2015). Mooiman et al.,(2016) supports this by stating that energy saved from

EE practices constitutes a larger number than the energy saved from available energy sources.

The improvements in energy efficiency have a domino effect that leads to various benefits shown below in Figure.2. These benefits are referred to as "**multiplier effects**" because of their impact in the economy, including reduction in consumption and reduction of poverty (Nilsson, 2015).

Figure 2 : Multiple Benefits of Improved Energy Efficiency

Sources : (Nilsson, 2015 ; IEA, 2014)

2.3 Policy and Regulatory Frameworks

Mooiman et al.,(2016) discusses that, a lot of national energy plans aim to fulfil national energy needs in order to support local developments, economic growth and people's livelihoods, yet they disregard the aspects of sustainable use and reduction of energy waste. Energy efficiency is however a critical aspect of the aforementioned plans, it comprises of ***1. effective use***, ***2. waste reduction*** and ***3. Government support*** for these initiatives (Mooiman et al.,2016).

Even though it is evident that energy systems transformation can facilitate emissions reduction, there is a need for transformation in regime facilitation (Maswabi et al.,2021). According to the findings of this research report, provided in the questionnaire response from the DoE, there are existing policies for energy efficiency improvement in Botswana and the only thing holding the progress is political will and government implementation. Mooiman et al.,(2016) contrarily argues that there is a lack of formal energy efficiency plans in Botswana and this is the cause for the snail paced progress. The findings of this research corresponds to this as DoE confirmed their steps towards MEPS and labeling as strategies for improving efficiency but still rated the local efficiency progress as "low" alongside BERA and acknowledged the lack of public awareness as a challenge for EE in Botswana.

In Eswatini, a study was carried out by their ministry of energy efficiency and it similarly confirmed that the slow adoption of energy efficiency improvements in buildings especially in the industrial sector, as well as low awareness on the potential benefits, budget constraints and limited in-house capacity, inadequate skills for energy management and absence of minimum energy performance requirements (MEPR) and sensitization on energy consumption and efficiency are the causes for delays in EE improvement (Emandla & Umnotfo, 2019).

According to (IEA, 2014) the policies that will succeed in exploiting the potential of energy efficiency to bring improvements in efficiency will have to focus on the following:

1. Creation of affordable financing vehicles, support for business models and provision of incentives for investing in energy efficiency.
2. Normalizing energy efficiency monitoring verification and introduction of enforcement activities to verify claimed efficiency.
3. Performance of energy end-users and service needs.
4. Sensitizing people about the importance of energy efficiency.

Zhu (2020) presents a transformative approach that was applied in formulating policies for enhancing Mozambique's energy efficiency and it underscores that an effective programme of policies must be inclusive of the following aspects:

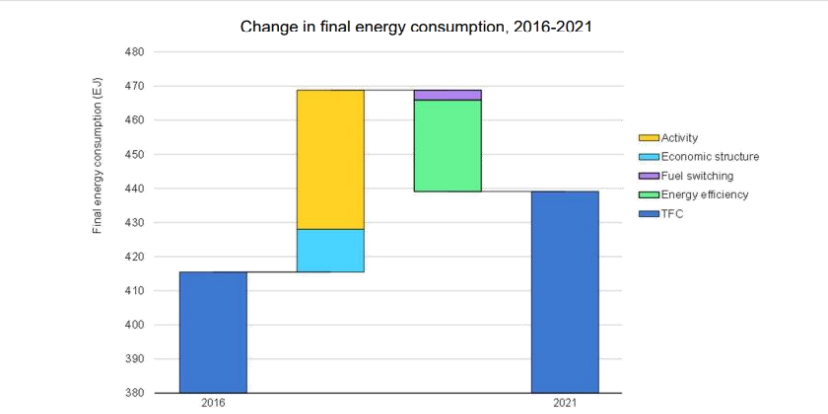
1. Necessary governance and organizational structures and control.
2. The ability to obtain financial resources from private entities.
3. Measures that address the diverse industries in a country.
4. Formulation of innovative learning and evaluation processes.

Mooney (2023) on the other hand, shares a comprehensive policy package proposed by IEA for better energy management practices which has been tried and tested as capable to deliver savings of up to 15% in a duration of 24 months without any capital injections. Mooney (2023) in the internal policy frameworks for energy efficiency stresses that policies work best when they combine the three aspects of ; ***regulation***, ***information*** and ***incentives***.

The ***regulation*** focuses on reducing energy use beyond technological viewpoint (Mooney, 2023), by covering areas such as upskilling the workforce, mandating energy audits, provision of consumption reports and introduction of energy management systems. ***Information*** focuses on allowing the industries to use digital technologies such as FEERS to track their energy use in real-time and unlocking substantial energy and cost savings opportunities. Lastly, the ***incentives*** aspect echoes (IEA, 2014)'s idea of providing incentives such as potential finance to propel energy efficient decisions at the process design level to drive transition towards "close to zero" emissions technologies. Emandla & Umnotfo (2019) to the contrary, differs with this perspective regarding the decision making process for investments in energy efficient technologies by companies, they state that firm rules, internal perceptions and corporate culture must be put in place for efficiency.

However, the impact of the approach suggested by (Mooney, 2023) is shown below in Figure.3 revealing how the efficiency gains have reduced the potential growth in the demand of energy by 50% between 2016 and 2021.

Figure 3 : The Role of EE In Consumption



Efficiency gains have halved the potential growth in global energy demand over the last six years

Source : Mooney (2023)

In addition to the aforementioned approaches to policy and regulatory frameworks, it has never happened that discussions about policy and regulatory frameworks go on without mentioning the key indicators of the policy subject matter. Patterson (1996) asserts in his study that there is no a definitive quantifiable measure of EE on the anticipated energy consumption that disregards efficiency and therefore various indicators are applied to determine the changes in efficiency. These indicators for EE are used to estimate the impact of the energy efficiency improvements in consumption (Sathaye et al.,2010). Furthermore, (Sathaye et al.,2010) alludes that if an indicator is able to break down the energy use in detail, it is best suited for estimating energy efficiency.

When indicators are brought into question, the level at which they bring precision in energy efficiency matters. For instance, if an indicator gives a broad assessment leaving out the structural and behavioral components it is considered to be at a "**macro**" level, however if the analysis pursues the deeper components and specifics ending up unveiling more information, it is considered to be at a "**micro**" level (Sathaye et al.,2010). The literature from (Sathaye et al.,2010) argues that, in the grand scheme of things, an increase in energy use per household in the residential sector does not result from decrease in efficiency but is caused by urbanization, therefore to have meaningful use of

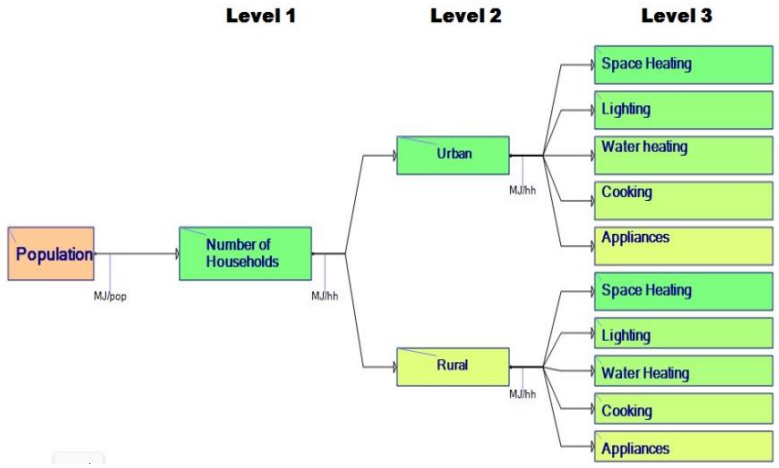
energy efficiency indicators, it is crucial to go deep into the sub-sectoral and end-user level to get a precise analysis.

This perfectly corresponds to the further explanation of energy efficiency from (Wattsense, 2020) which categorizes energy efficiency in buildings into passive and active energy efficiency; passive efficiency being the type that involves building outlines, designs and material choice used in buildings, whereas active energy efficiency on the other hand involves digital, responsive and automated systems like FEERS installed in buildings to control metrics such as heating, lighting, appliances etc., relating to energy consumption.However, (Sathaye et al.,2010) offers an energy efficiency indicator model, that further categorizes the aforementioned categories into 3 levels shown below in Figure.4 whereby;

1. ***Level 1*** is a macro level whereby end-users are not broken down into smaller units based on their unique characteristics.
2. ***Level 2*** is based on the rate of urbanization and considers how urban households are likely to have high energy demand to carry out the normal day to day activities compared to households in rural areas.
3. ***Level 3*** focuses on the end user intensity looking at the demand based on specific areas of the household such as cooking, lighting, space heating, water heating, and appliance usage etc. The categorization of rural and urban is still used here but there are specifications to the smallest details per use for easy understanding, proper setting of policy targets and implementation of energy efficiency programs.

In essence, the active energy efficiency and level 3 categories resemble the vision behind FEERS system. Nonetheless, (Sathaye et al.,2010) believes that Level 3 represents the ultimate goal for understanding trends in energy use and it needs significant efforts.

Figure 4 : The Levels For Energy Efficiency In Residential Sector



Source : Sathaye et al., (2010)

In Botswana, the policies that are available for energy efficiency include the National Energy Efficiency Strategy launched in 2018. This policy aims to achieve national energy efficiency improvement of 10% by 2030. The other policy is the Renewable energy strategy whose focus is on transition to renewable energy and it has energy efficiency as an important aspect in its mandate (Maswabi et al.,2021). Additionally, BPC has introduced the IRP in 2020, an initiative which focuses on the energy demand management, energy efficiency measures to reduce energy loses and to increase customer awareness, as well as improving rural electrification rates from 64% to 80% by 2040 (Botswana Power Corporation, 2022).

2.4 Gaps Identified in Literature

Previous research suggests that, even though a couple of EE initiatives such as solar street lights, compact fluorescent light installations, hot water load control and rural electrification project have been deployed in the past years by BPC, there is a need for strategies to implement EE in the building sector (Mooiman et al.,2016). Furthermore, these previous demand side or end user initiatives had disappointing failures and led to BPC opting to forcibly use load shedding and supply shutoffs as a way of managing demand load (Mooiman et al.,2016). As it stands right now, there is a need for robust

systems that will help to track energy consumption patterns and efficiency performance in buildings and households because there is a monitoring gap.

The energy consumption and waste challenge in buildings and households can be reduced through behavioral change (Mooiman et al.,2016). This is because, there is a huge public engagement gap where policies are drawn year in and year out, yet there is less work done to educate consumers to have awareness of what they must do to reduce energy waste and consumption in their households and buildings (Mooiman et al.,2016).

While, the importance of behavioral change cannot be overlooked, there is a huge gap in innovation and technology for this area. There are no deployed initiatives that integrate precise technologies like IoT, artificial intelligence an advanced analytics to address these challenges. FEERS intends to close that gap through its disruptive features and even through this research, as it has been specifically developed to provide an interactive, well-rounded and data driven IoT system that will not only manage energy consumption but will monitor, improve EE for all sectors and promote sustainability.

Moreover, previous researchers (Sathaye et al.,2010) stressed that, there is inadequacy of information pertaining the energy use per unit of activity in specific sub-sectors at a detailed level, highlighting that the existing sources are only limited to the energy surveys. This challenge is however among a variety of EE issues that FEERS seeks to address by offering detailed, responsive, real-time data on activities performed per second while providing quantifiable cost savings insights and awareness, while bridging the gaps in consumer engagement and weak approaches that lack detailed analysis.

Lastly, developing countries rarely produce periodic energy consumption reports and it is therefore critical that surveys must be included in implementation of EE policies (Sathaye et al.,2010).

2.5 Barriers to Energy Transition

Research has shown that there are barriers in the following areas of energy efficiency:

1. There is potential for transition into renewable and clean energy since Botswana has abundance of solar exceeding 3200 hours annually yet solar contributes less than 1% to the total energy supply and Botswana still remains dependent on imports (IMF 2007; Maswabi et al., 2021; Mutoko 2019). Likewise, the DoE confirmed in our questionnaire that even though renewable projects are in the pipeline, the reliance of imports is huge, hence the gap between potential and implementation.

2. The acceptance, adoption and practice of energy efficiency measures is relatively low (Nilsson, 2015).

3. Public education, awareness and sensitization regarding the benefits of energy efficiency remains low (Mooiman et al.,2016).

4. There are no funding incentives for the implementation of existing energy efficiency startergies and plans.

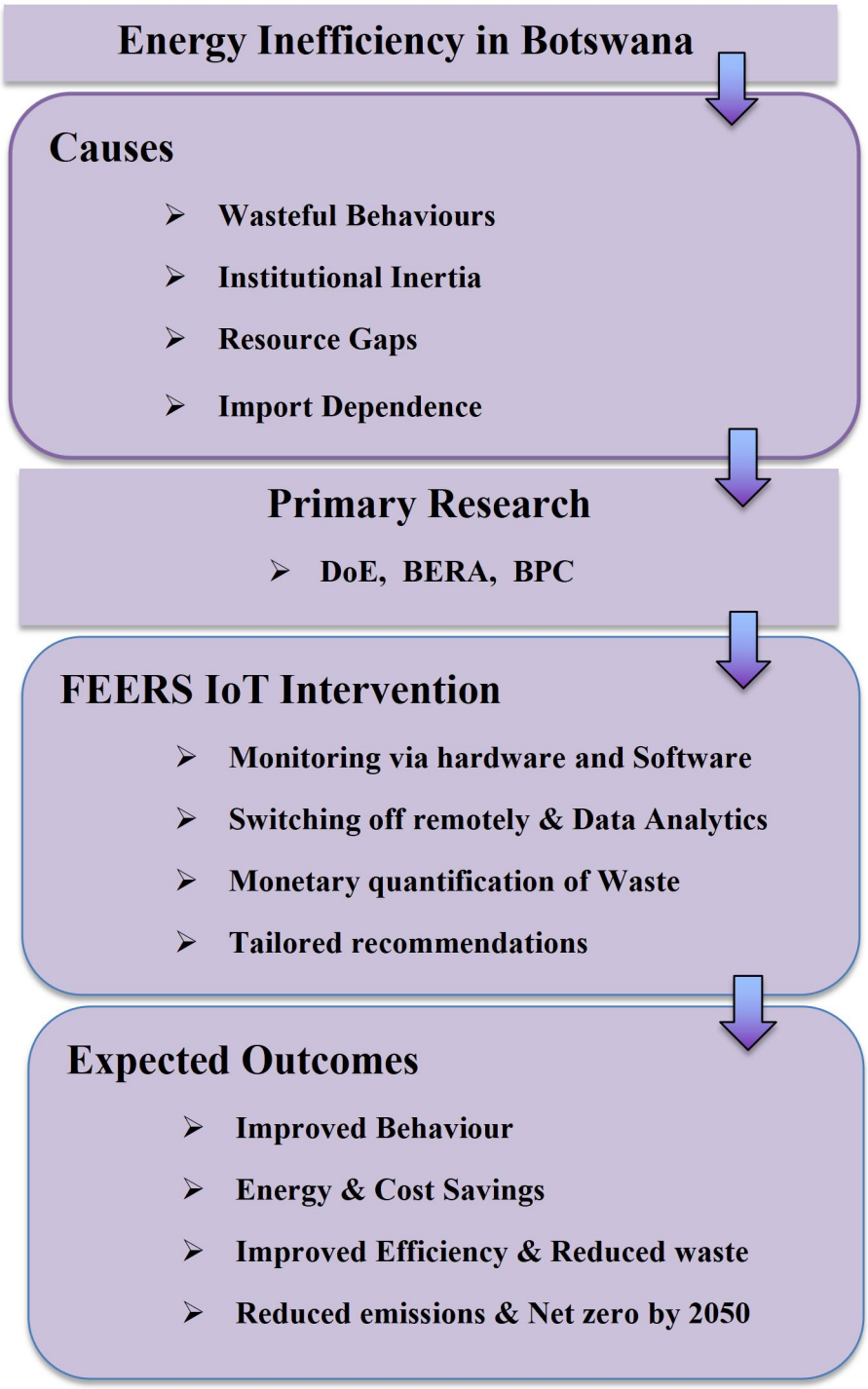
4. CONCEPTUAL FRAMEWORK

The conceptual framework guiding this study illustrates the link between Botswana's current challenges in energy efficiency, the interventions proposed through the FEERS system, and the expected outcomes for both consumers and policymakers. At the core of this framework is the recognition that Botswana experiences high levels of electricity waste and low energy efficiency, despite having policy frameworks such as the National Energy Strategy and the IRP. This inefficiency is perpetuated by several interrelated causes, including wasteful consumer behavior, institutional inertia, limited enforcement of regulations, and heavy dependence on imported electricity.

The primary research stage of this project sought to engage key national stakeholders of, DoE, BERA and BPC to validate these challenges, identify gaps in implementation, and to assess opportunities for innovative solutions like the FEERS which is designed to respond directly to these challenges. As an IoT-based system integrating both hardware and software, FEERS provides; real-time monitoring of electricity consumption, data analytics to identify inefficiencies, quantification of wasted energy in both technical and monetary terms, tailored recommendations to users for reducing waste, and support for policymakers through aggregated data on usage patterns and efficiency performance.

This section presents the conceptual model in Figure.5 below, to provide insights to policymakers and other stakeholders pertaining the root causes of low EE in Botswana and how the adoption of FEERS system could improve it for sustainability.

Figure 5 : Conceptual Framework for FEERS



Source : Figure conceptualized by author

5. RESEARCH METHODOLOGY

5.1 Research Design

This study employed a primary qualitative research design, complemented by some descriptive quantitative elements. The goal was to gather in-depth insights from key stakeholders in Botswana's energy sector to inform the implementation of FEERS. Questionnaires **(See Appendix A & B)** were selected as the main research instrument, as they allowed for structured data collection using both open- and closed-ended questions.

5.2 Data Collection

Three key stakeholders were targeted due to their central role in Botswana's electricity sector:

1. Department of Energy (Ministry of Minerals & Energy)
2. Botswana Energy Regulatory Authority (BERA)
3. Botswana Power Corporation (BPC)

Figure 6 : Key Stakeholder Details

Stakeholder(s)	Representative Position	Notes on Engagement
Department of Energy (DoE)	Principal Energy Engineer	Very supportive, prompt, and gave detailed responses.
Botswana Energy Regulatory Authority (BERA)	Senior Electrical Inspector	Reluctant to respond, obtained after multiple visits and follow-ups.
Botswana Power Corporation (BPC)	Research Department (BPC Training Center)	Did not respond despite repeated follow-ups.

Source : Figure by author

As shown in Figure.6 above, we had three respondents, the Department of Energy responded promptly with a detailed hard-copy submission. On the other hand, BERA eventually responded after multiple visits and follow-ups, though its responses were more limited in detail. As for BPC, they did not respond despite repeated outreach attempts, including emails, phone calls, and in person visits. And this resulted in a 66% response rate because two of three institutions responded.

However, to close the gap created by BPC's unresponsiveness, we leveraged literature sources from journal papers, databases, and government websites, among others.

5.3 Research Instrument

The questionnaires included both closed-ended questions (e.g., rating current levels of energy efficiency progress) and open-ended questions (e.g., identifying barriers, initiatives, and future opportunities). This combination enabled both comparability across respondents and the collection of context-rich qualitative data.

5.4 Data Analysis

Responses were analyzed using thematic analysis, identifying key themes such as:

- Electricity consumption trends and reliance on imports,
- Existing efficiency measures (MEPS, labeling, retrofits),
- Barriers to progress (financial, institutional, political, awareness-related),
- Stakeholder collaboration and openness to innovation.

This data was compared against existing literature to validate findings and highlight areas of convergence and divergence between stakeholder perspectives and scholarly insights and there was high correlation.

5.5 Limitations

While carrying out this research we had some limitations that somehow affected the duration of our research and the data collected and these limitations include :

- The lack of cooperation from BPC, which left a significant data gap for utility perspective.
- Reluctance from BERA to respond to the questionnaire, it delayed the research process and affected the richness of responses.
- Budget constraints meant that the study could not conduct wider quantitative surveys covering households or businesses country wide, therefore limiting the scope to only cover institutional stakeholders.
- However, despite all these limitations, the methodology was effective in collecting sufficient data to guide the first stage of FEERS implementation.

6. FINDINGS

This section presents the results of the stakeholder research conducted with the DoE and the BERA. The findings have been structured according to thematic areas, in order to highlight commonalities, differences, and key insights.

6.1 Electricity Consumption and Supply

- DoE reported that electricity consumption in Botswana is increasing annually due to population growth and wider access to electricity. Shortages are primarily addressed through electricity imports from neighboring countries, particularly South Africa, and by implementing DSM programs. DoE also noted ongoing and planned investments in renewable energy plants.

- BERA indicated that local generation fluctuates between less than 50% and up to 75% of demand, depending on plant performance. The authority monitors consumption trends through data provided by BPC and consumer surveys.

6.2 Energy Waste, Conservation, and Pricing

- DoE highlighted the progress in developing MEPS and an appliance labeling scheme, with support from donors such as SACREEE. They mentioned that the regulations for energy-efficient buildings are also in development.

- BERA Confirmed that electricity tariffs are determined using the revenue requirement methodology to balance affordability and cost recovery. However, conservation initiatives at BERA remain underdeveloped due to resource and capacity constraints.

6.3 Energy Efficiency Progress and Barriers

DoE rated Botswana's current energy efficiency progress as low and the currently available initiatives include:

- Conducting energy audits in government buildings,
- Piloting retrofitting programs,

- Collaborating with donors to accelerate efficiency initiatives,
- Developing regulations for efficient building standards.
- The barriers mentioned include limited awareness, lack of funding, delayed policy implementation, and political inertia.
- BERA also rated progress as low, describing improvements over the past decade as slow and estimating that most energy savings approximated at 10%, have come from technological advancements rather than deliberate efficiency policies.

6.4 Stakeholder Collaboration and Innovation Readiness

- DoE stressed its willingness to collaborate widely with donors, regulators, and private stakeholders in all energy efficiency projects. The department also invests in capacity building, including staff training abroad.
- BERA reported engaging stakeholders primarily through public consultations during tariff reviews. It noted being receptive to innovative solutions but lacked the resources to actively champion them.

6.5 Non-responsiveness by BPC

BPC was a critical stakeholder targeted in this research, given its role as the national utility. However, despite repeated outreach through emails, calls, and in-person visits to their learning center, BPC did not provide responses. On several occasions, officials indicated that the person responsible was unavailable or on leave and ultimately, no official submission was received.

7. ANALYSIS & DISCUSSION

The findings align with literature that emphasizes that policy frameworks do exist, but implementation is lagging behind. The lack of BPC's participation highlighted the institutional cooperation challenges because FEERS provides an opportunity to fill data, monitoring and awareness gaps by improving transparency and engaging end users directly.

7.1 Comparing Research Findings With Literature

DoE responses to the questionnaire confirms to the literature findings that suggested that energy efficiency is low, but steps are being made in MEPS, labeling, and audits to address that. This aligns with Mooiman et al. (2016), who identified appliance standards as low-hanging fruit for savings.

BERA's responses, particularly on tariff setting and regulatory collaboration, highlight institutional constraints that resonate with Maswabi et al. (2021), who argued that institutional inertia hinders the energy transition. This aligns with the primary research of this report where BPC's lack of participation and BERA's reluctance to respond to the questionnaire mirrors findings in literature about institutional inertia and lack of alignment among key stakeholders.

This gap underscores the risk that utilities may resist efficiency measures that could reduce electricity sales, even if they align with national goals.

7.2 Quantitative Indicators

- Botswana's electricity demand has grown at an average of 5–6% annually over the last two decades (IMF, 2017).
- Energy efficiency improvements since 2010 have only accounted for 10% savings, primarily from technological advances rather than policies (Mooiman et al.,2016).
- Rural electrification remains below 70% at 64%, while urban electrification is near universal (Botswana Power Corporation, 2022 ; Musakwa, 2024).

- These indicators emphasize the need for tools like FEERS that operate at the consumer/building level, ensuring accountability and visibility for both policymakers and end users.

7.3 How Feers Bridges The Gaps

The FEERS system provides :

- Real-time monitoring to addressing the data monitoring gap.
- Consumer-driven analytics and thus turning energy waste into monetary terms, which makes opportunity costs visible and actionable.
- Tailored recommendations that empower consumers to adopt efficient practices.
- Waste reduction and aligns with SDG 7 for affordable & Clean Energy and global targets of net-zero emissions by 2050.

7.4 Institutional Engagement Lessons

This research also provides lessons about cooperation just as we experienced DoE's positive outlook, engagement and supportive attitude. Contrarily, the reluctance of BERA and the absence of BPC show that FEERS must incorporate stakeholder engagement strategies in its roll out. For example, piloting FEERS in government buildings could build momentum and legitimacy, creating pressure for wider adoption.

8. SIGNIFICANCE OF STUDY FOR FEERS

- The study provides primary stakeholder insights that anchor FEERS in Botswana's real policy and energy context.
- It helps bridge data and knowledge gaps in energy efficiency monitoring, consumer awareness, and behavioral change.
- Findings support the achievement of Botswana's National Energy Efficiency Strategy (2018) and improve energy security by reducing reliance on imports.
- FEERS leverages the research to deliver real-time analytics, waste quantification, and tailored recommendations, directly addressing inefficiency.
- By reducing waste and emissions, the study positions FEERS as a tool that advances Botswana's climate goals and the global net-zero by 2050 agenda.
- It legitimizes FEERS as an innovative, scalable solution ready for adoption by households, institutions, and government agencies.

9. CONCLUSION

This research marked the successful completion of phase 1 of the FEERS implementation journey, providing a strong foundation for the system's development and eventual roll-out. Beginning with the recognition of wasteful energy practices in Botswana, FEERS evolved from a student-led idea into a globally recognized innovation, earning international recognition and securing funding to advance implementation.

The study engaged three key stakeholders namely; DoE, BERA, and BPC, to gather insights into Botswana's current energy efficiency landscape. While the Department of Energy and BERA responded, albeit at different levels of engagement, BPC's non-response underscored the institutional inertia highlighted in existing literature. This reinforces the need for targeted strategies to engage utilities in efficiency transitions.

The findings confirm that Botswana's energy efficiency progress remains low and fragmented, constrained by financial limitations, weak awareness, and slow policy enforcement. At the same time, initiatives such as MEPS, appliance labeling, and building efficiency codes show promising starting points for reform. Importantly, the study validates FEERS as a much-needed innovation; an IoT-based solution capable of filling data gaps, raising consumer awareness, quantifying waste in monetary terms, and directly contributing to cost savings and emissions reductions.

This research was therefore significant not only as a baseline study but as a road-map for FEERS. It demonstrates both the challenges and opportunities ahead, informing design choices, stakeholder strategies, and pathways for pilot implementation. By linking global innovation recognition with Botswana's national context, this study positions FEERS as a credible, impactful, and timely solution for advancing sustainable energy in Botswana and beyond.

10. RECOMMENDATIONS

Based on the findings and analysis, the following recommendations are proposed for policymakers, institutions, and the FEERS implementation team:

10.1 Policy & Institutional

- There is a need to strengthen utility engagement between consumers, government and utility companies to ensure cooperation in energy efficiency initiatives and data sharing.
- Acceleration of policy enforcement is needed to fast-track adoption of building efficiency codes, MEPS, and appliance labeling schemes, ensuring enforcement and monitoring.
- FEERS must be incorporated into national strategy as a national monitoring tool that complements existing strategies and provides real-time efficiency data.

10.2 Consumer Awareness

- To address the lack of awareness that was stressed by literature and questionnaire, public awareness campaigns must be initiated with robust educational programs on energy waste and conservation, while leveraging FEERS data to make opportunity costs visible.
- The FEERS prototypes must be deployed in government buildings, universities, and parastatals to demonstrate impact and create champions for adoption.
- The pilot projects must not be limited to the urban areas only, they must also reach rural communities and vulnerable groups, including women-led households and businesses, to promote equitable access to efficiency gains.

10.3 Monitoring & Innovation

- There is a need for capacity building to train energy officers and technicians on using FEERS data to inform efficiency audits and policies.
- The feedback loop must remain open from the pilots to use feedback in refining FEERS hardware and software to improve user-friendliness and Scalability.
- A strong reporting mechanism must be in place so that FEERS data can directly contribute to Botswana's climate reporting and SDG monitoring.

REFERENCES

1. Bheki Fayayo. (2025, April). Botswana Scrambles for Power as Eskom Debt Mounts. Retrieved April 30, 2025, from Botswana Mining Review website: https://botswanaminingreview.com/botswana-scrambles-for-power-as-eskom-debt-mounts/

2. Botswana Power Corporation. (2022). BOTSWANA POWER CORPORATION | ANNUAL REPORT 2022. Retrieved from https://www.bpc.bw/wp-content/uploads/2025/08/BPC-Annual-Report-2022-Website.pdf?utm_source=chatgpt.com

3. Emandla, Y., & Umnotfo, U. (2019). GOVERNMENT OF ESWATINI MINISTRY OF NATURAL RESOURCES AND ENERGY ENERGY EFFICIENCY and CONSERVATION POLICY. Retrieved from https://www.energycharter.org/fileadmin/DocumentsMedia/Other_Publications/EE-Eswatini2019.pdf

4. IEA. (2007, July 4). Energy Efficiency Policy Analysis at the IEA 2007 – Analysis - IEA. Retrieved September 24, 2025, from IEA website: https://www.iea.org/reports/energy-efficiency-policy-analysis-at-the-iea-2007

5. IEA (2013) Energy Efficiency Market Report 2013. (https://www.iea.org/publications/freepublications/publication/energyefficiency-market-report-2013.html)

6. IEA (2014-1) Energy Efficiency Market Report 2014. Retrieved from http://www.iea.org/w/bookshop/463-Energy_Efficiency_Market_Report_2014

7. IEA (2014-2) Capturing the Multiple Benefits of Energy Efficiency.

8. International Monetary Fund (IMF). (2017). Botswana: 2017 Article IV Consultation – Country Report No. 17/188. Washington, DC: International Monetary Fund. Retrieved from https://www.elibrary.imf.org/view/journals/002/2017/188/article-A001-en.xml

9. Low carbon power. (2024). Understand low-carbon energy in Botswana through Data. Retrieved October 21, 2024, from Lowcarbonpower.org website: https://lowcarbonpower.org/region/Botswana

10. Maswabi, M. G., Chun, J., & Chung, S.-Y. (2021). Barriers to energy transition: A case of Botswana. Energy Policy, 158(112514), 112514. https://doi.org/10.1016/j.enpol.2021.112514

11. Mooiman, M., Matlotse, E., & Molefhi, B. (2016, October 26). A Review of Energy Efficiency Initiatives in Botswana. Retrieved July 10, 2024, from ResearchGate website: https://www.researchgate.net/publication/311993786_A_Review_of_Energy_Efficiency_Initiatives_in_Botswana#full-text

12. Mooney, E. (2023). *International Policy frameworks for energy efficiency* (pp. 4–7). Vienna: International Energy Agency.

13. Musakwa, M. T. (2024). Electricity access and poverty reduction dynamics in Botswana: an ARDL approach. Journal of Humanities and Applied Social Sciences, 6(2). https://doi.org/10.1108/jhass-10-2023-0128

14. Mutoko, W. R., & Mutoko, P. (2019). Literature Review on the Solar Energy Potential for Botswana. European Scientific Journal ESJ, 15(34). https://doi.org/10.19044/esj.2019.v15n34p27

15. Nilsson, H. (2015). Being human is a market failure. Eceee Summer Study 2015. Retrieved from: https://www.researchgate.net/publication/277719086

16. Nvidia. (2025). What is Energy Efficiency & Why is it Important? | NVIDIA. Retrieved from www.nvidia.com website: https://www.nvidia.com/en-us/glossary/energy-efficiency/

17. Patterson, M.G., (1996). What is energy efficiency? Concepts, issues and methodological issues. Energy Policy 24, 377–390.

18. Sathaye, J. (2010, May). Energy Efficiency Indicators Methodology Booklet. Retrieved July 21, 2024, from Escholarship.org website: https://escholarship.org/uc/item/6tz8873z

19. wattsense. (2020). Energy Efficiency. Retrieved from Wattsense website: https://www.wattsense.com/resources/glossary/energy-efficiency-definition/

20. World Bank. (2023). Botswana | Data. Retrieved from data.worldbank.org website: https://data.worldbank.org/country/botswana

21. Zhu, X. (2020, November 12). *Energy Efficiency Policies & Measures; Enhancing Energy Efficiency in Mozambique*. Copenhagen Center on Energy Efficiency (SE For All EE Hub).

APPENDICES

The details **redacted in red** symbolizes confidential information such as respondents names, signatures and contact information and they are covered to preserve the confidentiality and to comply with privacy assurance provided to participants during data collection.

Appendix A: Completed Questionnaire – Department Of Energy

QUESTIONNAIRE FOR DEPARTMENT OF ENERGY (MINISTRY OF MINERALS & ENERGY)

INTRODUCTION

Thank you for participating in this important research initiative focused on energy consumption and efficiency in Botswana. Your insights and feedback are invaluable to our efforts to develop effective strategies for promoting sustainability and conservation in the energy sector. By completing this questionnaire, you are contributing to a deeper understanding of electricity usage, energy waste, and efficiency infrastructure in Botswana. Your input will help inform policies and initiatives aimed at enhancing energy efficiency and reducing environmental impact. We appreciate your time and cooperation in providing thoughtful responses to the following questions. Your contribution will make a meaningful difference in advancing our shared goals for a more sustainable future.

BACKGROUND

This questionnaire is part of a comprehensive research project conducted by Global Youth Parliament Organisation Botswana supported by the United Nations Development Programme. The project aims to assess current trends and practices related to energy consumption and efficiency in Botswana, with a focus on the electricity sector. The data collected through this questionnaire will be used to identify key challenges, opportunities, and areas for improvement in energy management and conservation. Insights gained from the research will inform the development of targeted interventions and policies to promote sustainable energy practices in Botswana.Your participation in this research is crucial to its success, and we are grateful for your willingness to share your perspectives and experiences on this important topic.

INSTRUCTIONS

- Please read each question carefully and provide your responses to the best of your knowledge and experience.
- If a question does not apply to you or if you are unsure how to answer, you may write "N/A" in that answer section.
- For multiple-choice questions, please select the most appropriate response based on your personal or professional experience.
- For open-ended questions, feel free to provide detailed responses that reflect your insights, opinions, and suggestions.
- Your responses will be kept confidential and used for research purposes only. Thank you for your cooperation.

SECTION 1 - RESPONDENT DETAILS

Names [redacted]
Age: [redacted]
Gender : [redacted]
Occupation : **Principal Energy Engineer II**
Department / Unit : **Energy Efficiency and Conservation**

SECTION 2 - ELECTRICITY CONSUMPTION & SELF SUFFICIENCY

1. **How would you describe the annual electricity consumption trends in Botswana?[Tick]- Contact BPC for proper answer**
   - **Increasing (I would suggest this one since electricity access in Botswana is growing annually and also the population is growing)**
   - Decreasing
   - Stable
2. **What percentage of electricity consumed in Botswana is imported?[Tick] - (Contact BPC for proper answer)**
   - Less than 20%
   - Between 20% and 40%
   - More than 40%

9. **How would you rate the availability of energy-efficient appliances and technologies in Botswana? [Tick]**

- Very Limited
- Limited
- **Moderate**
- Extensive

SECTION 3 - ENERGY WASTE, CONSERVATION & PRICING

1. **Do you believe the current electricity pricing in Botswana is reasonable and sustainable? - Contact BPC for proper answer**
   - Yes
   - No
2. **Have electricity prices in Botswana increased, decreased, or remained stable over the past five years?**
   - **Increased**
   - Decreased
   - Remained stable
3. **How does the Ministry assess the impact of electricity pricing policies on energy consumption patterns in Botswana? - Contact BPC for proper answer**

4. **Can you provide insights into the current pricing structure for electricity in Botswana, including any recent changes or proposed adjustments? - Contact BPC for proper answer**

5. **How does the Ministry ensure that electricity pricing encourages conservation while maintaining affordability for consumers? - Contact BPC for proper answer**

6. **How are electricity rates determined in Botswana, and what factors are considered in setting these rates? - Contact BPC for proper answer**

SECTION 4 - DEVELOPMENT & PROGRESS OF ENERGY EFFICIENCY

1. **What is the current state of energy efficiency in Botswana?**
   - Low
   - **Moderate**
   - High
2. **Which of the following technologies or projects are being adopted in Botswana to improve energy efficiency?**
   - **Smart meters**
   - **Energy-efficient appliances**
   - **Renewable energy sources**
   - Energy management systems **(they are there but at a very low rate)**
3. **How does the Ministry collaborate with international partners or organisations to enhance energy efficiency efforts in Botswana?**

- **The Ministry collaborates with a number of donors from outside who come with funds and initiatives to develop and implement EE programs.**
- **Workers/Implementors are taken for trainings / Courses / Workshops abroad, to enhance their knowledge on EE.**

4. **How does the Ministry collaborate with other government departments, regulatory bodies, and stakeholders to integrate energy efficiency considerations into national development plans?**

- **On each and every EExC project, the Ministry ensures that stakeholders (I.e Regulators, government departments. Private sectors etc) are engaged for their contributions and decision making.**

5. **What measures has the Ministry of Energy undertaken to promote the development and adoption of energy efficiency technologies in Botswana?**

- Development of MEPS and labeling schemes for cooling appliances (Refrigerators and Air Conditioners) and transformers.
- Buildings regulations are under development.

6. Can you provide examples of successful energy efficiency projects or technologies implemented in Botswana?

- Conducting energy audits in government buildings and retrofitting.

7. In your opinion, what are the main challenges or barriers hindering the widespread adoption of energy efficiency technologies in Botswana? How can these challenges be addressed?

- Lack of knowledge on consumers, awareness creations needed.
- Lack of funds to implement projects, government need to commit.
- Developed policies not yet implemented.
- Political issues, bold steps or decisions need to be taken by our leaders.

8. Looking ahead, what are the key priorities or strategies that the Ministry of Energy plans to focus on to further enhance energy efficiency and sustainability in Botswana?

- Awareness creation to both retailers, policy implementors, consumers etc. Needs to be enhanced.
- Collaborate more with other stakeholders. (e.g regulators) etc.

Appendix B: Completed questionnaire – BERA.

QUESTIONNAIRE FOR BOTSWANA ENERGY REGULATORY AUTHORITY (BERA)

SECTION 1 - RESPONDENT DETAILS Names: [redacted]

Occupation: Senior Electrical Inspector Department / Unit: Electricity

SECTION 2 - ELECTRICITY CONSUMPTION & SELF SUFFICIENCY

1. How does BERA assess the annual electricity consumption trends in Botswana, and what measures are in place to ensure self-sufficiency? THE MINISTRY WHICH IS THE POLICY MAKER SETS TARGETS AND MEASURES PERMANCE SUCH AS ANNUAL ELECTRICITY CONSUMPTION THROUGH SURVEYS AND STUDIES AND DATA FROM BPC A) Surveys and studies B) Data from utility companies C) Combination of both

2. What percentage of Botswana's electricity needs are met through local generation? Less than 50% B. 50%-75% C. 75%-90% D. More than 90%. It changes depending on the performance of local generation plants – sometimes less than 50% some other times 50 – 75%

3.What is BERA's role in managing electricity shortages or excess supply in Botswana? Key Performance Indicator framework for monitoring BPC _____

4. How does BERA monitor and regulate the importation and exportation of electricity in Botswana? BERA licences all Independent Power Producers both for export and local power generation

5. What measures has BERA implemented to promote renewable energy sources and reduce reliance on fossil fuels for electricity generation?

Development of regulatory tools, continuous monitoring of the Electricity Supply Industry to assess what needs to be done to enhance value chain activities in the sector that promote green technologies.

6. How does BERA ensure that electricity consumption patterns among different sectors (e.g., residential, commercial, industrial) are sustainable and aligned with national development goals?

BERA through technical and economic regulation supports implementation of the Integrated Resource Plan (IRP), Renewable Energy Strategy as well as the Energy Efficiency Strategy which are aligned to the NDP. BERA is also amongst other things currently undertaking studies to review the current tariff regime to see how they affect electricity consumption as well as monitoring technical losses in the BPC network.

7. How would you rate the availability of energy-efficient appliances and technologies in Botswana? [Tick] Very Limited Limited Moderate Extensive. MODERATE

SECTION 3 - ENERGY WASTE, CONSERVATION & PRICING

1. How does BERA determine electricity tariffs in Botswana, and how does it ensure that they are reasonable and sustainable? A) Cost-plus pricing B) Market-based pricing C) Other (please specify)

To determine electricity tariff BERA uses the traditional revenue requirement methodology RR = the Revenue Requirement which considers Operation and maintenance expenditures, Depreciation, Taxes, weighted average cost of capital and the rate base (sometimes called the regulatory asset base). Other things like Bank of Botswana inflationary targets, equity and affordability are considered.

2. What measures are in place to promote energy conservation among consumers in Botswana? A. Public awareness campaigns B. Energy efficiency incentives C. Mandatory energy efficiency standards

BERA is mandated to promote Energy Efficiency and Conservation (EE&C), however due to resource constraints the Authority has not yet started initiatives in this area. There is an ongoing restructuring exercise which is expected to resource the Authority to be able to cover EE&C

3. What measures has BERA implemented to encourage energy conservation among consumers, and what impact have these measures had? BERA has been working with Department of Energy

See response to question 2 above

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4. How does BERA address the issue of energy wastage in the country, and what initiatives are in place to promote energy efficiency?

See response to question 2 above

5. What strategies does BERA employ to address energy wastage in the transmission and distribution of electricity?

BERA is working with Department of Energy and BOBS on developing and enforcing Minimum Energy Performance Standards (MEPS) for Refrigerators and distribution transformers

7. How does BERA collaborate with stakeholders to review and adjust electricity tariffs to promote energy conservation and efficiency?

BERA has in the past been holding public consultation meetings/fora every time there is a tariff review. Invitation to these meetings have been publicised through social media, print media, radio etc for the public to make an input into the tariff adjustment process.

7. How would you rate the availability of energy-efficient appliances and technologies in Botswana? [Tick] Very Limited Limited Moderate Extensive. MODERATE

SECTION 3 - ENERGY WASTE, CONSERVATION & PRICING

1. How does BERA determine electricity tariffs in Botswana, and how does it ensure that they are reasonable and sustainable? A) Cost-plus pricing B) Market-based pricing C) Other (please specify)

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SECTION 4 - DEVELOPMENT & PROGRESS OF ENERGY EFFICIENCY

1. What is the current state of energy efficiency in Botswana? Low Moderate High

Low

2. How has the adoption of energy-efficient technologies and practices progressed in Botswana over the past decade? A. Slow progress B. Moderate progress C. Significant progress

Slow Progress .... According to National Energy Efficiency Strategy of 2018, most of energy savings realised in the country (10%) have been realised through improvement of technology over the years rather through policy or any regulatory intervention.

3. What is BERA's role in promoting energy efficiency in Botswana, and what initiatives has it undertaken in this regard?

See question 2 under Section 2

4. How does BERA collaborate with other stakeholders to enhance energy efficiency in households and businesses?

BERA is working with Dept of Energy and BOBS on how the distribution transformers and refrigerators can be implemented/enforced.

5. How receptive is BERA to new innovations that could potentially revolutionise the energy efficiency landscape in Botswana?

Very receptive

6. How does BERA support research and development efforts aimed at improving energy efficiency in Botswana?

See question 2 under Section 3

7. What policies or regulations has BERA implemented to promote the adoption of energy-efficient technologies and practices?

See question 4 under section 4

Appendix D : Questionnaires Submission at BPC & BERA in May 2024

BERA HQ in Lobatse & BPC Offices - Lobatse & Gaborone Training Center