



**UNLOCKING ZAMBIA'S POTENTIAL**

## **COMMITTEE ON ENERGY, WATER DEVELOPMENT AND TOURISM:**

### **REPORT OF THE AUDITOR GENERAL ON THE PROMOTION OF RENEWABLE ENERGY SOURCES IN RURAL AREAS IN ZAMBIA**

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## INTRODUCTION

The office of the Auditor General in accordance with the Provision of Article 250 of the Constitution of Zambia (Amendment) Act No. 2 of 2016, Public Audit Act No. 13 of 1994 and the Public Finance Management Act No. 1 of 2018 carried out an audit to bring out the level of promotion of renewable energy sources in rural areas of Zambia. The performance audit on the Promotion of Renewable Energy sources in Rural Areas sought to explore the extent to which Zambia is diversifying its energy production into other untapped renewable energy sources and examine whether the Ministry of Energy had put in place measures that are effective for facilitating increased access of Renewable Energy Sources (RES) to targeted rural beneficiaries.

The audit focused on Renewable Energy projects carried out by the Department of Energy under the Ministry of Energy and Rural Electrification Authority to promote the use of Renewable Energy Sources in rural areas in order to facilitate increased access to targeted rural beneficiaries. The audit covered the period 2015 to 2019.

## FINDINGS OF THE AUDITOR GENERAL'S REPORT

### 1. To what extent has the Ministry implemented effective measures to promote the use of Renewable Energy Sources in rural areas?

#### Alternative Energy Resources to Electricity Generation

- According to the Ministry of Mines, Energy and Water Development Strategic Plan 2014-2016, one of the strategies was to increase the use of renewable and alternative sources of energy. The output indicators were to increase contribution from renewable energy sources from solar and mini-hydro resources from 0.72% in 2013 to 2.7% in 2016. However, this target was not met within the stipulated time frame as the contribution from renewable energy sources from solar and mini-hydro sources stood at 1.2% in 2016. It was only in 2019 that the target was met and exceeded which stood at 4.5%
- From the period between 2013- 2018 solar energy contribution was below 1%, it was only in 2019 that there was an increase in solar energy from 0.038% in 2018 to 3%. Overall, the contribution of mini- hydro was significantly higher than solar between 2013- 2018. It was only in 2019 that the contribution of solar was higher than mini- hydro, which was attributed to the Ministry commissioning the 54.3 MWp Scaling solar project.
- An analysis of the contribution of alternative energy (solar and wind) to the electricity generation mix was also carried out. The electricity generation mix stood below the targeted 18.7% as of 2019. The contributions stood at 0.042% and 1.89% in 2018 and 2019 respectively. The causes of the low contribution of renewable energy sources to the energy mix was due to:
- Lack of Specific Legislation for Promotion of Renewable Energy Technology There is no specific legal framework dealing with renewable energy in their entirety, however, these were regulated under the Energy Regulation Act and when used for electricity generation, the Electricity Act also applied. Going forward, there is need for the enactment of an Act which will provide an adequate legal framework governing renewable energy in Zambia.
- Renewable Energy Strategy not in Place The Ministry did not have a Renewable Energy Strategy which would take into account the Renewable Energy Sources in the country and the potential of the sources for exploitation. Without a strategy in place, it is difficult to provide a roadmap for enhancing renewable energy in rural areas. It also makes it hard for the Ministry

to ascertain for example which places solar can be best used and how much of it can be exploited. Having a strategy in place will make it possible for the Ministry to set targets on how to exploit energy sources as well as to come up with a comprehensive Monitoring and Evaluation Frame to monitor progress made.

- Policy Emphasises Grid-Connected Hydropower at the Expense of Other Renewable Energy Technologies Zambia's policy direction with regard to RETs is only guided by the National Energy Policy of 2008. With regards to renewable energy, the policy tool seeks to address barriers to the use of RETs. However, in its present state, the policy emphasises grid-connected hydro-power at the expense of other RETs. This is evident for the inadequate policy framework governing off grid systems as the current policy does not cover such issues. A revival of this and other useful strategies could go a long way in diversifying renewable energy away from hydro-powered electricity to having a mix of technologies which households could adopt.

## **Data on the Resource Potential or the Production and Consumption of Renewable Energy Resources**

- According to the Ministry of Mines, Energy and Water Development Strategic Plan 2014-2016, the Ministry planned to undertake a Renewable Energy resource mapping country-wide by 2016. The report of the Auditor General indicated that the Ministry had not undertaken the renewable energy resource mapping as planned. The renewable energy resource map was earmarked for completion in 2016 resulting in a delay of two years without availability of data. The cause for the delay was that the Ministry was undertaking the data collection exercise which commenced in 2015 and was concluded in December 2018 and launched in June 2019.
- It is cardinal to have a renewable energy resource mapping to identify potential for production and consumption of renewable energy sources. Availability of data plays a critical role in planning which is needed for the increase in renewable energy.
- As regards to the unavailability of data on other renewable energy potential such as geothermal which also needed to be quantified, the Ministry had not undertaken further studies to ascertain potential of other forms of renewable energy as a way of diversification.
- It is important for the Ministry to spearhead the collection of data on other renewable energy sources to identify sources which would require the least cost of production as well as identify the potential for the equipment to be manufactured locally as opposed to importing. Therefore, the availability of data will help the Ministry conduct a comparative analysis which will inform decision making.
- Further, the availability of the resource mapping on solar and wind energy sources, the Ministry would have a focussed approach in terms of how they exploit renewable energy sources as they would be aware of the potential energy sources in each area.
- Developing the Investment Plan for Renewable Energy Projects
- The Auditor General's report revealed that the Ministry of Energy had conducted activities to assist with the preparation of an Investment Plan for priority projects and programs on renewable energy in Zambia. These activities included advertising the Expression of Interest (EOI) for the development of the Investment Plan as well as advertising for pre-feasibility studies. The report further showed that evaluation of the EOIs was conducted and firms were shortlisted.
- The success of the investment plan lies in the formulation and implementation of the communication strategy as it's the basis for communication to potential investments. Therefore, the ministry must help expedite the communication strategy for REA.
- However, the Report also showed that the Ministry of Energy had yet to request for proposals

from the shortlisted firms and sign a contract for the consultant to prepare the Investment Plan. PMRC believes that it is imperative for the Ministry to make this request for proposals from the shortlisted firms and make their final decision. The availability of the Investment plan would speed up the implementation of renewable energy solutions and thereby increase energy access for the Zambian people.

### **Beneficiaries in Rural Areas not Accessing Energy from Renewable Energy Sources**

- The Auditor General's Report revealed that although the Ministry of Energy and the Rural Electrification Authority were implementing renewable energy projects in rural areas, there was slow progress in implementing renewable energy projects by the Ministry. In some cases, inadequate funding hampered the Ministry's efforts to complete on-going projects. PMRC would like to urge the Ministry of Energy and Ministry of Finance to ensure that there is greater co-operation between them. In many cases the Ministry of Energy either did not receive funding or it was inadequate. Therefore, there is a need for the Ministry of Finance to understand the importance of renewable energy projects and to support them by making sufficient funds available.
- The Auditor Generals report showed that the Ministry of Energy, through the Rural Electrification Authority, was developing the Lunga Solar Mini Grid Project located in Lunga district of Luapula Province. This would involve the construction of a 300 Kilowatt Solar Mini Grid on Kasomalunga Island.
- It was reported that the contract for this project was initially awarded to Astor Investments Limited and 15% of the contract sum was paid in advance. However, subsequent delays led to the contract being terminated with no works having commenced. The reported cause for the delays was that the contractor did not have the required equipment on site to undertake the works and had also failed to provide key site personnel.
- The report states that subsequently, WAH Kong Enterprises Limited was engaged to complete the outstanding work. However, further delays, this time attributed to the late submission of the detailed design and drawing by the Contractor as well as the delayed provision of construction equipment/materials and approved personnel on the project site meant that no further progress on the project was made. PMRC notes with concern the unfolding of the Lunga Solar Mini Grid Project. The occurrence demonstrates the need for a robust monitoring and evaluation mechanism to ensure contracted firms carry out their work in good faith.
- Furthermore, the report observes that the Ministry of Energy only conducted a market, economic and financial analysis study to establish the suitability of the project. For future projects, a feasibility study may be a better option, especially in the case of terrain such as that found on Kasomalunga Island.

### **Maintenance of renewable energy projects**

- The Auditor General's report revealed that the Ministry of Energy had not carried out maintenance on various renewable energy projects after they were installed. This was despite the fact that the terms of contract stipulate that the contractor should provide maintenance for a period of one year before the project is then handed over to the community.
- For example, solar water pumps were installed in the Eastern Province at Musipazi. However, it was observed that these solar water pumps were non-functional. Interviews with the beneficiaries at Musipazi revealed that they did not have the capacity to maintain and provide security for the equipment. This highlights the need for the Ministry to ensure that the one year

of project maintenance is carried out. Furthermore, the beneficiaries should be educated and trained so that they can maintain the projects for themselves once the one year has elapsed.

- The report also states that solar water pumps had been installed in the Eastern Province at Mugabe, Khapinde, Maguya and Chikando RHC. However, several issues had arisen at these sites including; leaking tanks, control boxes not switching off (resulting in water wastages), vandalism and theft of solar systems and control panels. This again highlights the need for the Ministry to regularly inspect sites and rectify issues, especially during the first year when maintenance is an obligation. In addition, PMRC believes that the Ministry should seek to provide adequate security at the various sites. This is especially important given the cost of installing the projects to begin with.
- The Ministry of Energy did not manage to carry out quarterly monitoring and evaluation (M&E) activities of renewable energy projects in various districts across the country due to insufficient funding. The report further reveals that released funds according to the budget allocation were not adequate to undertake monitoring and evaluation activities.
- PMRC believes that a greater demonstration of commitment to M&E for renewable energy projects needs to be shown by increasing the amount allocated for it. Furthermore, it appears that the one year of stipulated maintenance is either not being conducted well or is not being conducted at all. Perhaps, the one year of maintenance should be extended to two years, with regular site inspections during that period. During the second year, maintenance could then be conducted in co-operation with the project beneficiaries in order for them to have hands on experience with maintaining the projects while also being overseen.

### **Levels of Awareness on Renewable Energy Technologies**

- According to the National Energy Policy of 2008, the Zambian Government intends to increase information available to consumers and potential energy service providers, and provide education and technical advice in the efficient use and conservation of energy. However, the Auditor General's report highlighted that there were low levels of awareness on renewable energy technologies to the beneficiaries by the Ministry.
- The poor dissemination of information was largely due to inadequate communication infrastructure, low literacy levels and inadequate funding to the programme.
- Policies, incentives and benefits associated with RETs in Zambia had not been effectively communicated to energy users to the extent that they would make informed and deliberate decisions to transition to the use of renewable energy
- Therefore, there is need for the Ministry to develop a communication and campaign strategy aimed at increasing information dissemination targeting rural households on the benefits and efficiency of RETs
- The Government needs to prioritise funding towards sustainable renewable energy for the purpose of promoting awareness activities.
- There is need to provide a range of incentives to households that take up and make use of RETs in order to encourage other households to do the same

## **Investment in Research and Development**

- According to the National Energy Policy of 2008, Government intends to increase supply of energy and access for rural income generation activities and households through supporting applied research and development of modern energy services to strengthen the Institutional Framework for Research and Development, and promotion of RETS by:
- Strengthening the capacity of the Rural Electrification Authority (REA) in the application of RETs. At the time of the audit in 2019, the Ministry and REA had not effectively invested in Research & Development. This was because the R&D activity was very costly and there was no subsequent budget allocated for this specific activity.
- The audit found that the Ministry had not adequately invested in Research & Development. REA equally needed to develop a R&D framework in order to solicit funding from the Government for viable RET projects. This was evident in the projects that were inspected which revealed that available energy technologies were not adequately monitored and maintained. Equally, there was need for a robust information and dissemination campaign in order to raise awareness and promote the uptake of RETs in rural areas.
- Government needs to prioritize funding R&D of RETs and provide a stable budgeting framework in order to enhance works and innovation in the sector
- Similarly, REA needs to develop a R&D framework informed by a cost benefit analysis to ascertain the viability of RET projects this would aid Government to allocate the necessary funding

## **2. To what extent has the Ministry facilitated increased access to electricity through private public partnership participation in rural electrification projects for renewable energy?**

### **Private Sector Participation in Rural Electrification using RES**

- According to the National Energy Policy of 2008, in order to promote private sector participation in rural electrification, government intended to develop an investment marketing campaign programme for local and international resource mobilization.
- In order to promote private sector participation in rural electrification, REA will establish or identify institutions for the generation, distribution and supply of electricity to rural areas and undertake appropriate road shows to attract investors and participants in Small Power Projects (SPP).
- However, through a review of documents and interviews held with key personnel at REA, it was revealed that REA did not develop an investment marketing campaign framework necessary for attracting local and international resource mobilization.
- This was because the annual budgets during this period could not accommodate this activity. In addition, there was inadequate incentives i.e. private sector participation in the renewable energy sub-sector.
- Fiscal incentives and some form of smart subsidies had yet to be implemented to enable the development of renewable energy projects and make them financially attractive for private participation.
- Without an investment marketing campaign, it was very difficult for REA to develop a framework on how to implement and manage capital subsidies for generation and distribution of projects, develop a comprehensive framework for Small Power Projects (SPP) that includes

technology specific tariff structure and tariff review methodologies in conjunction with the Energy Regulation Board (ERB). Consequently, this meant that REA did not have an effective tool necessary to attract investment and how the investors will return their investment based on prevailing market and investment conditions.

## **Communication Policy and Strategy**

- In order to promote stakeholder awareness and participation in rural electrification, REA planned to review the communication policy and strategy to guide information sharing with various stakeholders in its Strategic Plan for the period 2014-2018. An effective communication strategy forges and maintains connections, allowing the business of the organization to work efficiently toward its goals and strengthening strategic partnerships.
- The audit revealed that REA was using an outdated Communication Policy and Strategy. Despite having planned to review the Communication Strategy for the period of 2014 – 2018, this was not done. The Authority developed its first Communication Strategy in 2009 which was designed on the objectives of the 2009 – 2013 Strategic Plan based on the functions of REA as defined in the Act, vision, mission and strategic objectives.
- The Communication Strategy could not be developed in the subsequent years i.e. 2015 to 2019 because the annual budgets during this period could not accommodate this activity. In addition, the department of Energy submitted that this assignment could not be undertaken because it included a huge component of performance evaluation and review of the previous strategy hence the plan to engage a consultant.
- Consequently, this meant that REA did not have an updated communication plan that would develop a profile for Public Private Partnerships for both local and international firms. This also created a gap in informing stakeholders on the existence and possible applications of PPPs that would explain the potential advantages and disadvantages of PPPs to promote best practice in the development and application of the PPP approach; and provide a resource for the general public, potential participants and interested parties to obtain information/clarify issues.
- As indicated in the findings, the implications of lack of a communication strategy were negative to the operation of the organization making it hard for the organization to send out information essential for investors to come on board as well as for members of the general public to understand the mandate of the organization.
- The lack of communication strategy may have led to loss of financial resources as anything that was done to communicate with the general public was done without any planned budget because of unplanned activities such as paid up radio and TV appearances.
- Consequently, this meant that REA did not have an updated communication plan that would develop a profile for Public Private Partnerships for both local and international firms. This resulted in loss of possible investors to take up some of the projects thereby expanding the resource base for investment for REA.

## Recommendations

Recommendations	Measures to ensure recommendations are implemented
The Ministry should ensure that the Renewable Energy Strategy is implemented to aid in the exploitation of RES in rural areas of the country.	<ul style="list-style-type: none"> <li>• Develop a legal framework which specifically addresses the promotion of renewable energy.</li> <li>• Develop a renewable energy strategy which identifies potential renewable energy sources which can be exploited.</li> <li>• Review the entire framework for RE, including the legislation and policy instruments to capture the actual requirements for implementation and enforcement.</li> <li>• Conduct a legislative audit. This review will help identify gaps and shortcomings. This will also assist entrench accountability and maintenance clauses for each project.</li> </ul>
A resource mapping should be carried out on other sources of energy such as Geothermal so as to have readily available data on renewable energy potential thereby improving the energy mix.	<ul style="list-style-type: none"> <li>• Resource mapping should be conducted in partnership with independent power producers so as to limit the costs and strengthen relations.</li> </ul>
The Ministry should ensure that a sustainability plan should be provided to the communities so that there is continuity of projects once handed over to the beneficiaries.	<ul style="list-style-type: none"> <li>• Suitable sustainability plans should be developed for projects and availed upon handover. Furthermore, the ministry should regularly follow-up in order to ensure that projects are being maintained.</li> <li>• The Sustainability Plan should be an integral part of the projects and should allow for select mechanisms in the community to participate during the process so that the transition is smooth.</li> </ul>
The Ministry should ensure that users are provided with manuals when handover of renewable energy projects is done so as to avoid them tampering with the installations when faced with challenges.	<ul style="list-style-type: none"> <li>• Develop standard manuals for specific energy projects according to the source (e.g wind, solar) which can be given to users when projects are handed over.</li> </ul>
Sensitisation on use of installations should be carried out once projects are handed over to beneficiaries.	<ul style="list-style-type: none"> <li>• Ensure that sensitisation on the use of installations is part of the contracts for projects so that developers are under contractual obligation to carry it out.</li> <li>• Establish committees in the community to be part of the process from inception of a project.</li> </ul>
Funding towards RE projects should be improved. The Ministry should also prioritise available funding to ensure that Renewable Energy projects are effectively implemented.	<ul style="list-style-type: none"> <li>• The yearly budget should include a specific amount of funding allocated for renewable energy projects.</li> <li>• The development of the Investment Plan should be completed because it includes a grant of \$300,000.</li> <li>• Budget allocations should be clearly reflected in the M&amp;E plans.</li> <li>• The Ministry should engage the private sector in order to solicit the necessary funding for viable projects</li> </ul>
Regular monitoring of projects should be carried out by the Ministry to ensure that all problems encountered are rectified by trained officers.	<ul style="list-style-type: none"> <li>• A robust monitoring and evaluation system for projects should be developed and implemented.</li> <li>• A clause in the project documentation to reflect monitoring and maintenance will make it mandatory. Where this is not done, penalties/sanctions should apply.</li> </ul>

<p>The Ministry through REA should be carrying out applied Research &amp; Development to ascertain and know the cost benefit analysis and viability of undertaking its projects and how to profitably supply electricity to rural populations in the most effective, economical and innovative way.</p>	<ul style="list-style-type: none"> <li>• More funding should go towards feasibility studies in various energy resources as well as towards the sensitization of the community on the benefits and efficiency of using RETs</li> <li>• Considering the costly nature of R&amp;D, this activity should be carried out in co-operation with independent power producers who would also stand to benefit from findings.</li> </ul>
<p>The Ministry through REA has to design and develop an Investment Marketing Campaign Strategy that will identify and attract private sector investors for the generation, distribution and supply of electricity to rural areas.</p>	<ul style="list-style-type: none"> <li>• The Ministry should solicit the services of a marketing firm in order to carry out the marketing investment campaign. Furthermore, the Ministry should seek to attract international investors in addition to local ones.</li> </ul>
<p>The Ministry through REA should review and update its communication strategy which will enable it to identify critical issues and prepare effective strategies. In particular, it can frame discussions with beneficiaries, clarify project impacts and objectives, and ultimately increase public support for a given project.</p>	<ul style="list-style-type: none"> <li>• The Ministry should also look into lessons learnt from best practices, that is learning from how other countries have developed effective communications strategies</li> </ul>

