



ELECTRIFICATION OF HEALTH FACILITIES IN ZAMBIA:

ACTION PLAN



FOREWORD

The Government of Zambia recognizes that without access to electrified health facilities, the quality of healthcare provision for most of the population is adversely affected, as many health facilities countrywide operate with unreliable energy sources. Electrifying health facilities using off-grid solar solutions is a high priority for the government to bridge the gap.

Even though start-up costs for electrifying these health facilities seem high, it does not compare to the medium to long-term benefits, especially when the number of lives that will be saved, is considered. Electrification of health facilities in Zambia will power various equipment including refrigeration units which will improve the capacity to store COVID-19 vaccines and other medical products. Other benefits include safer maternal and child health services, and improvements to operative surgery, critical care and anesthesia, and diagnostics services.

Better infrastructure at health facilities also help to motivate and guarantee retention of health personnel. Further, electrification of health facilities with renewable solutions will contribute to the government's commitment to attaining Sustainable Development Goal (SDG) number 3 on health and well-being, SDG number 7 on affordable and clean energy, and SDG number 13 on climate change.

This Action Plan or Solutions Brief is part of an initiative that the Ministry of Health, in collaboration with the Ministry of Energy, is undertaking to help bring electricity to the country's unelectrified healthcare facilities. The Ministry of Health recognizes that electrification of health facilities, especially in rural and remote areas, is a daunting task and cannot be undertaken by Government alone but is possible with the support of development partners and the private sector. The Action Plan identifies barriers and challenges to universal electrification of health facilities in Zambia and proposes solutions to improve health outcomes for millions of Zambians.

We urge all stakeholders to work together with the Government to address these challenges, in order to make universal electrification of health facilities in Zambia a reality.



A handwritten signature in black ink, appearing to read 'Sylvia T. Masebo'.

Hon. Sylvia T. Masebo, MP
MINISTER OF HEALTH



A handwritten signature in black ink, appearing to read 'Peter C. Kapala'.

Eng. Peter C. Kapala,
MINISTER OF ENERGY

ACKNOWLEDGEMENTS

This work has been the result of close collaboration between the Ministry of Health and Ministry of Energy, working with the Africa Clean Energy Technical Assistance Facility (ACE TAF) programme and Power for All, and stakeholders who are essential for implementing off-grid solar (OGS) solutions. The Multi-Stakeholder Coalition (Coalition) made up of stakeholders from Government institutions, healthcare associations, private sector renewable energy solution providers, medical equipment manufacturers, international donors and civil society groups, worked together to identify solutions to challenges affecting electrification of health facilities.

The Coalition issued a “Call to Action” to fund Zambia’s electrification of health facilities. The “Call to Action” makes a case for health facility electrification to increase the urgency amongst funders and development partners to work together with the Government, to provide the needed financial and technical support to make this objective a reality.

On behalf of the Ministry of Health, we wish to thank all the Coalition members who were part of this process. We also wish to acknowledge the support from the ACE-TAF, a programme funded by the UK Government, Commonwealth and Development Office (FCDO) and implemented by TetraTech in partnership with World Resources Institute (WRI) and Power for All.

Finally, our gratitude goes to the Ministry of Health and Ministry of Energy staff for their dedication to improving health outcomes and energy access for all Zambians.



Dr. George Magwende,
**Permanent Secretary - Administration,
MINISTRY OF HEALTH**



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ACRONYMS

ACE TAF	Africa Clean Energy Technical Assistance Facility
DRE	Decentralized Renewable Energy
IEC	International Electrotechnical Commission
GWh	Gigawatt hour
OGTF	Off-Grid Task Force
O&M	Operations and Maintenance
MoE	Ministry of Energy
MoH	Ministry of Health
PV	Photovoltaic
RE	Renewable Energy
REA	Rural Electrification Authority
SDG	Sustainable Development Goal
SHS	Solar Home Systems
VAT	Value Added Tax
WRI	World Resources Institute

1.0 The Context: Inequality in Health Services in Zambia

The current COVID-19 crisis has brought into sharp relief the adverse impact lack of electricity has on health outcomes, especially in rural areas. Energy poverty makes it difficult to adequately treat COVID-19 patients who need a ventilator, and the lack of refrigeration also makes it difficult to get the vaccine to un-electrified health facilities. Across all the main health facilities in Zambia, only 27.5 percent¹ of those in rural areas have a functional connection to the grid. This means that more than 60% of the rural population are locked out from modern health services.

Reliable access to electricity provides lighting for childbirth and safe emergency night-time care, refrigeration for medical supplies and vaccines, sterilization facilities for medical instruments, and electricity for simple medical devices. Furthermore, access to electricity is better able to attract and retain staff and enable health information systems to facilitate evidence-based decision making. In the absence of grid power, many facilities use diesel generators, which are expensive to run and maintain, adding to the financial burden of running a health center. Not to mention the negative impact the diesel generators have on the environment.

2.0 The Opportunity: Off-grid solar provides a low-cost option to electrify health centres

Many health facilities are located too far from the grid to be connected and even those with a grid connection often face power outages.³ Off-grid solutions present a key opportunity to provide low carbon, reliable and cost-effective electricity to health centers. These solutions have the potential to dramatically transform the quality of healthcare services provided to communities.

Furthermore, it will support the government's goal of providing equitable quality health service for all, and support Zambia to become a middle-income country by 2030 as laid out in the Vision 2030. In addition, the electricity could be extended to the community and the benefits could extend to public lighting, creation and scale of small businesses, and skills development and employment, especially for the youth.

Policy formulation and other initiatives by the government, led by the Ministry of Health (MoH) and the Ministry of Energy (MoE) indicate that electrification of health facilities using off-grid solar is a priority. The Zambian National Energy Policy of 2019 recognizes that solar energy is critical to rural electrification. Additionally, the Vision 2030 plan looks to increase the share of renewable energy. The Rural Electrification Authority (REA) has been tasked to oversee and coordinate grid extensions to health facilities.

Sources:

1. Based on Zambia's Ministry of Health 2017 health facility census

2. Javedi et al. (2020) Implementation research on sustainable electrification of rural primary care facilities in Ghana and Uganda, Health Policy and Planning, Volume 35, Issue Supplement_2, November 2020, Pages i124–i136, <https://doi.org/10.1093/heapol/czaa077>

3. WHO (2015), Access to Modern Energy Services for Health Facilities in Resource-Constrained Settings, https://apps.who.int/iris/bitstream/handle/10665/156847/9789241507646_eng.pdf?sequence=1

A World Bank study⁴ of 2017 found that mini-grid or stand-alone systems based on solar PV are Zambia's least-cost option for attainment of modern energy access for almost half the population by 2050, yet its full potential has not been reached. Initially donors, Non-Governmental Organizations (NGOs) and public institutions were responsible for carrying out distributed energy projects, but a commercial market is emerging with support from donors to incentivize and finance off-grid energy businesses to scale up operations.

Small-scale solar home systems (SHS) dominate the distributed renewable energy market. REA estimates that 7.4% of rural households have an SHS and the government has set a target of 7.3 million rural Zambians receiving energy from a solar home system by 2030.⁵ There are also 15 mini-grids in the country, a mix of solar PV and mini-hydro, recognized by the government as a key component of the country's strategy to serve the off-grid household market, with a target of connecting 1.4 million Zambians to mini-grids by 2030.

3.0 Multi-Stakeholder Coalition Established

The Government of Zambia has worked with the Africa Clean Energy Technical Assistance Facility (ACE TAF), World Resources Institute (WRI) and Power for All to build a multi-stakeholder coalition consisting of over 30 institutions representing governmental agencies, the private sector, private financiers and civil society from the health and energy sectors to identify barriers to the universal electrification of health facilities in Zambia and identify corresponding solutions.

4.0 Challenges and solutions are being discussed to electrify health facilities without electricity

The Coalition has identified key challenges that need to be addressed to clear the way for electrification of health facilities, and these include:

- Need for additional enhanced enabling policies (Inadequate enabling policies)
- Necessity to identify and assess demand of health facilities (inadequate data on the energy demand for health facilities)
- Need for the integration of operation and maintenance funding considerations (inadequate integration of operation and maintenance funding consideration)
- Need for further capacity building and technical assistance for the public and private sector (Inadequate capacity building and technical assistance for public and private sector)
- Need for improved coordination between governmental agencies, funders, and stakeholders (inadequate coordination between governmental agencies, funders and stakeholders)

4. World Bank (2017), Project Appraisal Document on a Proposed Credit in the Amount of SDR 19.4 Million to the Republic of Zambia for an Electricity Service Access Project, Report No. PAD2303.
5. Renewable Energy Strategy and Action Plan for Zambia, DRAFT 2021

- Lack of innovative, reliable, and favorable financing
- Lack of practical models to ensure sustainability

Tackling these challenges makes it possible to move from one-off projects to a situation in which the costs and risks of doing business are lowered, enabling the growth of renewable energy (RE) investments, and scaling up of the electrification of health facilities, ultimately resulting in better health outcomes. If the electricity generated is shared beyond health facilities to the community, it could also build business opportunities for micro, small and medium enterprises, as well as support skills development and provide employment opportunities for youth, and improve economic conditions.

5.0 The Way Forward: All stakeholders must play a role in overcoming barriers to improved health care delivery

(i) Policy Formulation by Government

The Zambian government has improved the policy and regulatory framework promoting renewable energy, however, the ability for policies to be adapted to a dynamic and fast changing environment in a timely manner is lacking. Mini-grid regulations are under development, and these should be operationalized quickly. These are expected to be clear, transparent and aligned with other regulations, such as the Electricity Act of 2019 and the Energy Regulations Act of 2019. In addition, the adoption and gazetting of International Electro technical Commission (IEC) standards for solar home systems promotes high-quality products and hence longevity of the solar technologies installed at the health facilities. The on-going process of ensuring enforcement and quality assurance compliance is vital.

Streamlining the business licensing process is necessary to facilitate the ease of doing business by private sector energy companies. Currently the private sector needs to get approvals from numerous agencies and the procedures are not always clear, especially for new investors or newcomers in the market.

The current effort by the government to provide tax incentives and clarify VAT and customs duty exemptions for solar equipment is commendable. Ensuring clear tax legislation and consistent application creates more favorable conditions for doing business for renewable energy companies. It is essential that private companies are informed throughout the process of developing these tax policies.

(ii) Data to Identify and Assess Health Centers

In order to scale up electrification of health centers and improve health outcomes, sufficient data regarding their current electrification status, what equipment is most appropriate to provide quality service, and the energy capacity needs, is required. To resolve this challenge, the Government of the Republic of Zambia has conducted a study to understand the off-grid energy requirements of

unelectrified health care facilities and quantified the energy capacity needs as well as the costs associated with electrification. Using the Energy Access Explorer (EAE) platform, mapping of healthcare facilities and their electrification status, and costing has been provided to the government for improved energy planning. The EAE can be accessed at <https://www.energyaccessexplorer.org/tool/s/>.

(iii) Operation and Maintenance

Often operations and maintenance (O&M) costs are not provided for by financiers to companies. This considerably shortens the lifespan of decentralized solar systems because companies are unable to afford after sales service. Therefore, developers should identify the O&M needs and after sales service requirements and financiers should factor in costs of O&M, to ensure that the investment is viable and sustainable.

(iv) Capacity Building and Technical Assistance

Currently there is lack of skilled staff, particularly in rural areas, to operate and maintain equipment. Yet, the long-term success of distributed RE is dependent on such skilled human resource being available. The Government, with support from development partners, is working to address this issue through initiatives such as supporting vocational training and education on off grid solar technology. Efforts are being made with vocational training centers to develop short-term courses on off-grid solar PV technology installation in order to increase skills within the country, including rural areas.

On the project preparation front, technical assistance is also needed to support the development of renewable energy business plans that are attractive to financiers. Existence of a platform or facility that can walk project developers through the project development steps and provide training for key skills in project planning, would increase the quality of projects being developed.

(v) Coordination

The electrification of public facilities falls between sectors and agencies. The health and energy ministries frequently lack any mechanism for collaboration, limiting knowledge sharing amongst stakeholders such as the private sector, civil society and financiers. Within the government, it can be difficult to coordinate due to the number of agencies involved in the electrification of health facilities, spread across various ministries.

Nevertheless, the Government of Zambia has demonstrated the efficacy of cross-ministry collaboration through the development of the Multi-Stakeholder Coalition and is committed to putting further structures in place to facilitate the coordination across ministries and agencies, while also facilitating exchange with external stakeholders. Expertise from both the health and energy sectors is needed to make the effort to electrify health facilities a success. This Coalition has shown that bringing actors from the public sector, civil society, companies, financiers and donors together facilitates exchange of information and results in a greater understanding of barriers and solutions and creates a consensus across all sectors for the way forward.

Currently, the Off-Grid Task Force (OGTF) provides a focus for coordination and overview of initiatives by the government within the off-grid sector in Zambia and ensures that there is a

platform for addressing concerns from market players in the sector. The OGTF provides a hub for the exchange and dissemination of ideas, know-how and information garnered from programme implementation, regulatory or policy developments, and a forum in which participants from the government, cooperating partners, industry representatives and civil society can present and analyze challenges and solutions in the sector. The OGTF provides a mechanism to reduce duplicity and increase effectiveness of programmes being implemented while holding implementers accountable. To ensure that the health and energy communities continue to collaborate and liaise with the government, the Coalition will become a working group under the OGTF.

(vi) Financing

Financing and economic challenges probably represent the biggest challenge for upscaling renewable energy (RE) in Zambia and hence providing health facilities with power required. High upfront costs, including customs duties, coupled with limited access to capital and low electricity tariff requirements in the case of mini-grids, make it difficult for project developers to recoup their initial investment. In the case of rural health facilities, those which would benefit the most from off-grid electrification, are also the ones that are least profitable due to their small size and remote location.

Access to finance is especially difficult for small and medium sized RE companies and concessional finance provided by international programmes has not been enough to leverage additional finance from the development community so the sector can scale. International lending is burdened with high transaction costs and lending from local banks results in high interest rates. Further the depreciation of the Kwacha makes the cost of borrowing extremely high.

One solution to increase sustainability of electrification for health facilities is for the individual health facilities to pay for power. This will increase the sense of ownership and willingness to see operations and maintenance through by both the public and private sector. For this to be actualized, a financing model should be developed that includes payments by the health facilities, however, during the health facilities budgeting process, energy expenses should be considered.

The Coalition has identified a number of other steps that can be taken to make funding affordable, reliable, innovative and inclusive in order to reduce the risks to developers and investors. Such conditions will make it possible to scale up the electrification of health facilities in Zambia, to improve clean energy access, decrease air pollution and CO2 emissions, protect the climate and most importantly, improve health outcomes. These include:

- Giving developers and private sector companies access to grants, subsidies, long-term and low-cost financing to off-set upfront capital costs;
- Financiers using contractual templates to facilitate clarity and transparency around contractual obligations and responsibilities;
- Ensuring that international financing schemes/programs that are made available to small and medium local enterprises;
- A hedging mechanism (risk management strategy) to protect companies from currency fluctuations and other potential losses;
- Creating blended finance options and concessional financing that cover the whole process -

from project conception to the purchase of appliances and other equipment to the maintenance of solar panels; and

- Using a market aggregator to bundle the health facility demand in order to drive investment toward the most remote facilities and to make projects more financially attractive.

The support provided to the sector, by funders and implementing agencies is essential. Thus, enhanced coordination amongst the different stakeholders, will ensure easier synergies with the government efforts and reduce duplication of efforts and resources. A one stop, client-driven approach underlain by a common strategy and methodology, will ensure alignment between funders and government, in order to increase the success of electrification of health facilities initiative, at a much faster pace and to scale.

(vii) Sustainability

There are too many examples of off-grid installations, from health facilities to schools, which are in disuse within a few years because of lack of attention to post implementation support. Therefore, the development of sustainable models, which plan for the full life cycle of the project (from conception to maintenance), and promote local ownership, job creation and skills development, is critical.

The sustainability of the electrification of health facilities will increase only if the solution is holistic. Thus, the model should be built around the possibility of a private or public-private operated system that provides electricity both to the health facility and the community. A supporting policy and legal framework needs to be formulated to enable this process.

6.0 Conclusion: Equitable Healthcare for All

There is a lot of work that is yet to be conducted in order to electrify all the un-electrified health facilities. Continued coordination across the Health and Energy Ministries, and knowledge sharing across the sector on solutions is vital. Most importantly, planned funding requirements are imperative for electrification of health facilities to become a reality. Finally, addressing these issues will ensure that electrification of health facilities is a viable and profitable venture for investors and project developers and the Government of Zambia will make significant progress towards SDG13, SDG7 and SDG3; and its target of universal energy access for all by 2030.

This Action Plan was developed by the Government of Zambia - Ministry of Health and Ministry of Energy in collaboration with the Africa Clean Energy Technical Assistance Facility, funded by the UK Government, Commonwealth and Development Office (FCDO), Power for All and World Resources Institute.



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