



Scaling up renewable energy in Tanzania

The role of the church and other faith-based organisations in bridging the rural energy poverty gap



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Front cover photo: Young Tanzanians trained to install and repair solar systems working in Dar es Salaam. SEPON Ltd, Tanzania

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Acronyms and abbreviations

CCT	Christian Council of Tanzania
CSO	civil society organisation
FBO	faith-based organisation
FYDP	Five-Year Development Plan
IR	inter-religious
LTP	long-term plan
MW	megawatt
NEP	National Energy Policy
NGO	Non-government organisation
PPP	public-private partnership
PV	photovoltaic
REA	Renewable Energy Agency
SDG	Sustainable Development Goal
TANESCO	Tanzania Electrical Supply Company
UNFCCC	United Nations Framework Convention on Climate Change
UWAKI	Ushirika wa Wanawake wa Kikristo
VICOBA	village community bank

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Executive Summary

The world is currently off-track to meet Sustainable Development Goal 7 (SDG 7), which calls for efforts to 'ensure access to affordable, reliable, sustainable and modern energy for all' by 2030.¹ Progress is lacking on all four of the SDG 7 targets, including universal access to electricity and to clean fuels and technologies for cooking. In sub-Saharan Africa, with a population of just over 1 billion people, close to 600 million are without electricity, representing over two-thirds of the global total still lacking access. More than 900 million people in sub-Saharan Africa do not have the resources for clean cooking, the majority relying on polluting and unsustainable fuels.²

Global initiatives, such as the UNFCCC Paris Agreement,³ Sustainable Energy For All,⁴ and the Intergovernmental Panel on Climate Change's (IPCC) report, *Global Warming of 1.5 Degrees*,⁵ all call for leapfrogging to and promoting renewable energy as part of efforts to build community climate resilience.

Approximately 70 per cent of Tanzania's population live in rural areas, with only 17 per cent of this population connected to electricity.⁶ A lack of reliable and clean power creates a cycle of poverty for rural communities,⁷ as it has multiple social impacts on health, education and other basic services, as well as limiting livelihoods opportunities. Tanzania has considerable untapped renewable energy potential that, if properly exploited, can play an integral part in the country reaching its middle-income status target. However, to date, these resources remain largely untapped.

The report examines challenges and opportunities for Tanzania, at a policy and community level, in utilising its renewable energy potential in rural areas. It discusses opportunities and entry points for civil society, and particularly churches and other faith-based organisations (FBOs) to influence policy and practice. The report also highlights how FBOs are already spearheading community renewable energy initiatives in rural Tanzania and could, with targeted support from government and donors, scale up this provision to further decrease rural energy poverty.

FBO initiatives range from electrifying church buildings and other services linked to faith-based institutions, such as schools and hospitals, to piloting projects and programmes. Examples include pioneering the installation of small solar photovoltaic units in households and businesses, and training communities to build energy-saving stoves with local and renewable materials. The socio-economic benefits of these interventions to people's livelihoods in rural areas, and the impacts of reducing energy poverty are tangible.

Conversely, the increasing levels of e-waste associated with renewables are shown to be a key challenge in the cities of Dar es Salaam and Arusha in Tanzania. Awareness of the impacts of poor e-waste disposal is

¹ UN Economic and Social Council (2019). *Special Edition: Progress towards the Sustainable Development Goals*. Report of the Secretary-General.

² International Energy Agency (IRENA) (2019). *Tracking SDG7: The Energy Progress Report (2019)*.

³ United Nations, The Paris Agreement, available at <https://unfccc.int/process-and-meetings/the-paris-agreement/the-paris-agreement>, accessed 10 June 2020.

⁴ Sustainable Energy for All, available at <https://www.seforall.org>, accessed 10 June 2020.

⁵ IPCC (2018). *Global Warming of 1.5°C. An IPCC Special Report on the Impacts of Global Warming of 1.5°C*.

⁶ International Energy Agency (IRENA) (2017). *Renewables Readiness Assessment: United Republic of Tanzania*. Renewable Energy Agency, Abu Dhabi.

⁷ GTZ (2007). *Eastern Africa Resource Base: GTZ Online Regional Energy Resource Base: Regional and Country Specific Energy Resource Database: IV – Energy Policy*.

limited at a community level. Current e-waste policy, legislation and management is lacking and inadequate.

The research highlights that the church and related FBOs have considerable reach and influencing power in rural areas, regularly connecting with over 15 million people across Tanzania. They are in a strong and unique position to:

- mobilise efforts to educate, advocate and campaign for greater government focus and funding for renewable energy provision and associated e-waste management in rural areas;
- make interventions in the policy and planning process for rural renewable energy access; and
- be enablers for scaling up renewable energy pilot projects and programmes across rural communities.

With targeted support from the government and donors, churches and FBOs could reduce rural energy poverty and help meet Tanzania's goal of becoming a middle-income country.

Summary of recommendations (see Chapter 5 for further details)

Donors and the Government of Tanzania should focus efforts on:

1) Improving data and information-gathering on renewables

- Map and quantify all renewable energy potentials including solar and wind in the central regions of Tanzania to lower the perceived risks of investment.

2) Strengthening the policy and implementation framework for renewable energy provision and related e-waste management

- Establish stand-alone national and local policies and implementation frameworks for renewable energy provision, and for e-waste management, aligned with adequate provision from the central government budget.
- Strengthen the policy enabling environment for renewable energy provision, addressing current financial disincentives.
- Decentralise to local government authorities and embrace a bottom-up approach in the renewable energy sector, with clear lines of responsibility.

3) Stakeholder coordination, local participation and dissemination of information

- Provide clear avenues and platforms for early involvement of civil society and FBOs in local energy planning processes.
- Put in place mechanisms to increase multi-sectoral cooperation and coordination in the renewable energy sector between government ministries, as well as the private sector, civil society organisations, FBOs, donors, and development partners.
- Establish channels for dissemination of information on energy access planning and development to the grassroots level.

Donors should specifically **support civil society and FBOs** with:

4) Raising awareness and advocating at all levels – government, potential investors, communities

- Raise awareness and advocate for the government to prioritise scaling up renewable energy in rural areas with adequate budget allocation and strategic planning.
- Use the reach of the church and FBOs to mobilise and educate communities to uptake renewable energy options, and participate in campaigning and advocacy.
- Tangibly demonstrate benefits of decentralised renewable energy by investing in rural pilot projects and programmes.
- Raise awareness within government, and educate at a local level, as to the harmful effects of unmanaged renewable energy e-waste disposal.

5) Unlocking access to finance for scaling up rural provision

- Invest in the reach, community accessibility and technical know-how of civil society organisations, and in particular FBOs, by financially supporting the scaling up of pilots in renewable energy provision in off-grid rural areas.

1. Introduction

The world is currently off-track to meet Sustainable Development Goal 7 (SDG 7), which calls for efforts to ‘ensure access to affordable, reliable, sustainable and modern energy for all’ by 2030.⁸ Progress is lacking on all four of the SDG 7 targets, including universal access to electricity as well as access to clean fuels and technologies for cooking. In sub-Saharan Africa, with a population of just over 1 billion people, close to 600 million are without electricity, representing over two-thirds of the global total still lacking access. More than 900 million people in sub-Saharan Africa do not have the resources for clean cooking, the majority relying on polluting and unsustainable fuels.⁹

In parallel, at a global level and across industries, there is a growing advocacy and business development movement towards a circular economy that is a radical departure from the old linear, ‘take, make, waste’ production and consumption models.¹⁰ A circular economy keeps resources in use for as long as possible. Waste and inefficiencies are eliminated at every stage.¹¹ A circular economy relies on closing materials loops and using renewable energy sources.

Other global initiatives, such as the UNFCCC Paris Agreement,¹² Sustainable Energy For All,¹³ and the IPCC’s report, *Global Warming of 1.5 Degrees*,¹⁴ all call for leapfrogging to and promoting renewable energy as part of efforts to build community climate resilience.

This study builds on the 2018 Tearfund report, *Pioneering Power*,¹⁵ which highlights that off-grid renewable electricity, especially solar, now offers a wider range of modern solutions, such as solar lamps and stand-alone solar panels, that are often cheaper, faster, more reliable, safer and cleaner than extending a centralised grid, as well as having a transformative impact on livelihoods in countries in Africa and Asia.

This report discusses opportunities and entry points for civil society, and particularly churches and other faith-based organisations (FBOs), to influence policy and practice in rural renewable energy provision in Tanzania. It also highlights how FBOs are already spearheading community renewable energy initiatives in rural Tanzania, and could, with targeted support from government and donors, scale up this provision to further decrease rural energy poverty, and help meet Tanzania’s goal of becoming a middle-income country.

1.1 The Tanzanian context

Tanzania is classified by the UN as one of the world’s least developed countries, with urban households comparatively better off than rural households in terms of living standards, access to social services such as electricity, assets owned and level of education.¹⁶ Approximately 70 per cent of the population live in rural

⁸ UN Economic and Social Council (2019). *Special Edition: Progress towards the Sustainable Development Goals*. Report of the Secretary-General.

⁹ International Energy Agency (IRENA) (2019). *Tracking SDG7: The Energy Progress Report (2019)*.

¹⁰ Ellen MacArthur Foundation, ‘Concept: What is the Circular Economy?’, available at <https://www.ellenmacarthurfoundation.org/circular-economy/concept>, accessed 10 June 2020.

¹¹ Tearfund (2017). *Going Full Circle, Tackling Resource Reduction and Inequality*

¹² United Nations, The Paris Agreement, available at <https://unfccc.int/process-and-meetings/the-paris-agreement/the-paris-agreement>, accessed 10 June 2020.

¹³ Sustainable Energy for All, available at <https://www.seforall.org>, accessed 10 June 2020.

¹⁴ IPCC (2018). *Global Warming of 1.5°C. An IPCC Special Report on the Impacts of Global Warming of 1.5°C*.

¹⁵ Tearfund (2018). *Pioneering Power. Transforming Lives through Off-grid Renewable Electricity in Africa and Asia*.

¹⁶ International Fund for Agricultural Development (IFAD) (2014). *Annual Report 2014*. Rome, Italy.

areas and are dependent on natural resources for their livelihoods.¹⁷ This rural population includes about 90 per cent of all poor Tanzanians¹⁸ with limited access to affordable, reliable and efficient electricity. A lack of access to reliable and clean power creates a vicious cycle of poverty for rural communities,¹⁹ as it has multiple social impacts on health, education and other basic services provision, as well as limiting livelihoods opportunities.

The Tanzania Development Vision 2025, launched in the early 1990s, specifically outlined the country's social, economic and political aspirations, with an underlying drive to reach middle-income country status by 2025. The Tanzania Development Vision 2025 recognises the important role that energy has to play in meeting this goal, as one of its key socio-economic pillars. A more recent outworking of this is the National Five-Year Development Plan (FYDP) 2016–2021, which places emphasis on strengthening power infrastructure investment in Tanzania in terms of generation, transmission and distribution.

In addition, Tanzania has adopted and is in the process of implementing the Sustainable Development Goals (SDGs), which comprise SDG 7. Recent national energy plans and policies outline on-grid and off-grid solutions, including the use of solar, wind and other renewable technologies.²⁰ However in reality, initiatives in Tanzania to increase power production and supply are still highly dependent on natural gas, hydropower, coal, and grid extension, with limited advancement²¹ in the utilisation of renewable energy in decentralised ways.

There is huge potential to scale up off-grid renewable electricity to boost the rural economy and youth employment in Tanzania. Churches and other FBOs have for decades played an important role in facilitating community transformation in Tanzania, targeting the rural majority and marginalised groups.²² This has included linking energy access to other services, such as education, health and water. They are a critical component of the country's social fabric and well positioned to aid this transition of utilising renewable solutions to end rural energy poverty in Tanzania.

1.2 The study

- Tearfund, through the Christian Council of Tanzania (CCT), commissioned the Climate Action Network Tanzania to conduct an assessment with the following objectives:
- Identify and assess the institutional and policy framework that governs renewable energy and associated e-waste management of related products (see Box 1) in Tanzania.
- Identify the role of churches in using renewable energy to meet community energy needs in rural areas, with a focus on solar and e-waste management of related products.

¹⁷ World Bank (2019). *Tanzania: Country Environmental Analysis – Environmental Trends and Threats, and Pathways to Improved Sustainability*. World Bank, Washington, D.C.

¹⁸ IFAD (2014). *Annual Report 2014*. Rome, Italy.

¹⁹ GTZ (2007). *Eastern Africa Resource Base: GTZ Online Regional Energy Resource Base: Regional and Country Specific Energy Resource Database: IV – Energy Policy*.

²⁰ United Republic of Tanzania (URT) (2016). *National Five-Year Development Plan 2016/17 – 2020/21. Nurturing Industrialization for Economic Transformation and Human Development*. Dar es Salaam, Tanzania.

²¹ Bishoge, O. K. et al. (2018). *Clean Technologies: The Potential Renewable Energy for Sustainable Development in Tanzania: A Review*, pp. 70–88.

²² Sambaiga, R. et al. (2018). *Make it Possible - How Tax Commitments Can Move Tanzania to Universal Health Coverage*. Dodoma, Tanzania.

- Identify capacity and knowledge needs and make recommendations.

Box 1 - Renewable energy and e-waste²³

Electronic waste (e-waste) refers to all electrical items and electronic equipment that have been discarded as waste without the intent of reuse. This includes the waste from renewable energy installations. For example, as off-grid solar solutions become an enabler for increasing access to energy in off-grid regions around the world and in Africa in particular, solar portable lights and off-grid solar home systems are rapidly spreading across Africa. These products or systems consist of one or more photovoltaic (PV) modules, some electrical and electronic components to provide light or charge electrical devices, and battery storage.

As solar usage increases, impacts of this type of e-waste can be direct or indirect. As well as the e-waste from end-of-life lamps, PV modules, cabling and control systems, there will also be an increased volume of e-waste generated by households resulting from greater access to energy, such as consumer electronics, IT gadgets, household appliances etc. Environmental impacts include local contamination, for example from hazardous materials used in batteries, or burning e-waste releasing toxic fumes directly into the local environment.

1.3 Methodology

This study included a literature review of relevant energy policies, strategies and laws, and explored information from selected churches, civil society organisations (CSOs) and relevant government institutions. Data collection methods included interviews with top and mid-level church leaders and church members, and field observations of solar power installations. Key informant interviews and focus group discussions were undertaken at a community level to gain an understanding of the plans, perceptions and challenges facing both solar energy uptake and related e-waste management.

The research was undertaken at churches located in the rural central zone of Tanzania, in the dioceses of Dodoma, Singida, Kondoa, Babati and Hanang. The dioceses are within three neighbouring regions in central Tanzania: Dodoma, Manyara and Singida.

²³ Box information taken from: DFID (2016). *Electronic Waste Impacts and Mitigation Options in the Off-grid Energy Sector*.

2. Tanzania’s energy sector institutional and policy framework and opportunities for churches and Faith Based Organisations

This chapter reviews the institutional set-up within Tanzania’s energy sector. It also highlights key policies and long-term plans (LTPs) that provide entry points for civil society, and particularly FBOs, to input with actions that aim to scale up renewable energy use in rural Tanzania. The current status of policy and practice relating to the disposal and management of renewable energy e-waste in Tanzania is also discussed.

2.1 Institutional set-up in Tanzania’s energy sector

The key stakeholders in Tanzania’s energy sector institutional framework, with a mandate to drive renewable energy policy and practice towards reducing energy poverty, are presented in Table 1, together with their key roles.

The Ministry of Energy has the remit of policy formulation, while the Energy and Water Utilities Regulatory Authority is in charge of developing regulations in the power sector and monitoring their implementation. The national parastate utility, the Tanzania Electrical Supply Company (TANESCO), owns and operates the main grid and presides over power transmission and distribution of electricity generated from its own facilities, as well as from independent power producers. In addition, small power producers and stand-alone system providers operate in rural areas with the support of the Rural Energy Agency (REA).²⁴

Table 1: Key stakeholders with a remit of renewable energy provision

Name of institution	Role
Ministry of Energy	<ul style="list-style-type: none"> Formulates and oversees policies, strategies and laws within all areas of the energy sector Proposes and manages relevant budgets Creates the environment for renewable energy investments
Tanzania Electric Supply Company Limited (TANESCO)	<ul style="list-style-type: none"> Project development In charge of power generation, transmission and distribution
Energy and Water Utilities Regulatory Authority	<ul style="list-style-type: none"> Oversees the technical and economic regulation of the energy and water sectors
Rural Energy Agency (REA)	<ul style="list-style-type: none"> Project developer with focus on rural areas Funds renewable energy projects Develops mini-grids in rural areas
Tanzania Investment Centre	<ul style="list-style-type: none"> Primary agency of the government to coordinate, encourage, promote and facilitate investment in Tanzania Acts as a one-stop centre for new local and foreign investors because of the incentives offered to projects it approves

²⁴ International Energy Agency (IRENA) (2017). *Renewables Readiness Assessment: United Republic of Tanzania*. Renewable Energy Agency, Abu Dhabi.

Tanzania Geothermal Development Company	<ul style="list-style-type: none"> ● A subsidiary company of TANESCO at the forefront of geothermal development in Tanzania
Local government authorities (LGAs)	<ul style="list-style-type: none"> ● Promote off-grid production and distribution of energy in their own constituencies/areas using decentralised energy systems and mini-grids
Academic and research institutions	<ul style="list-style-type: none"> ● Research and provision of capacity building to relevant personnel
Small power producers	<ul style="list-style-type: none"> ● Private companies operating small renewable-based power projects (up to 10MW)
Private solar energy companies	<ul style="list-style-type: none"> ● Organised under the Tanzania Renewable Energy Association but legally permitted to work independently in solar PV installation, importing and selling solar PV products
Private biomass energy companies	<ul style="list-style-type: none"> ● Engaged in the fabrication and supply of improved and clean wood cooking stoves
Civil society organizations (CSOs)	<ul style="list-style-type: none"> ● Includes non-governmental organisations (NGOs), FBOs and renewable energy networks. Many of the mini-hydropower plants in the country are owned, operated and managed by FBOs

Garcia, I. et al. (2017). *Policy Roadmap for 100% Renewable Energy And Poverty Eradication in Tanzania*. Hamburg, Germany.

2.2 Policy, legal and planning framework in Tanzania’s energy sector

This section discusses key energy and environment policies and LTPs aligned with the National Development Vision 2025, which sets out a strategy for Tanzania to become a middle-income country, enabling 50 per cent of the population to access electricity. It focuses on policies and plans that affect the renewable energy sector, and highlights potential opportunities for interventions from civil society, including FBOs.

2.2.1. National Energy Policy 2015

The National Energy Policy (NEP) was updated in 2015 under the Ministry of Energy and Minerals. It aims to:

“create conducive conditions for provision of reliable, affordable, safe, efficient and environment friendly modern energy services to all while ensuring effective participation of Tanzanians in the sector.”

The NEP recognises that Tanzania has a huge renewable energy resources base including wind, solar, biomass, small-scale hydro, geothermal, tidal, waves, and ocean thermal conversion, which is currently untapped and under-utilised. The policy calls for efforts to scale up the use of renewable energy and

includes approaches to ease the entry of the private sector and alternative energy technologies.²⁵

Nevertheless, up to now, most productive sectors of the Tanzanian economy are still facing unaffordable, unreliable and/or limited access to electricity. Other bottlenecks identified in the NEP 2015 include:

“... low private sector participation in large scale power generation, over-reliance on few generation sources; expensive energy supply; over dependency on Government subsidies; limited access to modern energy services; limited human resources with needed skills and knowledge and inadequate financial resources dedicated for sector development and strengthening.”

Despite these constraints, the NEP 2015 aims to diversify energy sources and supply in Tanzania, increase energy efficiency and conservation across all sectors, and promote strategic participation, interventions and equitable benefit-sharing. It has a dedicated objective towards renewable energy that aims to:

“enhance utilisation of renewable energy resources in order to increase contribution of renewable energy in diversifying resources for electricity generation.”

The NEP 2015 includes approaches to facilitate the integration of renewable energy technologies in buildings and industrial design, and to establish feed-in-tariffs for renewable energy technologies. In this regard, the policy is aligned with other national and international policies and frameworks, such as Tanzania’s Five Year Development Plan, and other global initiatives. These include the UNFCCC Paris Agreement,²⁶ Sustainable Energy For All,²⁷ the IPCC’s report, *Global Warming of 1.5 Degrees*²⁸ and the SDGs, which all call for leapfrogging to and promoting renewable energy so as to build community climate resilience. They further call for universal access to modern, reliable and affordable energies with an increased share of renewable energy in the country’s electricity generation mix.

Tanzania has participated in all these international initiatives, represented by the Ministry of Finance and Planning, the ministry responsible for the environment and/or the Ministry of Energy. These different ministerial authorities have been working together to ensure mainstreaming of all agreed international initiatives into national policies, plans and frameworks, and the development of monitoring and evaluation systems.

Box 2: Opportunities for civil society interventions linked to the NEP 2015

- Lobbying for implementation of policy actions relating to renewable energy investment. As the NEP 2015 encourages civil society and stakeholder participation in the energy sector, FBOs can use this as an entry point.
- Holding the government to account on delivering the incentives set out in the NEP 2015 that aim to create an enabling environment to attract private investments.
- The NEP 2015 is aligned with other national and global initiatives calling for renewable energy investment. These initiatives, such as the SDGs, encourage inclusivity and

²⁵ United Republic of Tanzania (URT) (2015). *Tanzania Energy Policy*. Dar es Salaam, Tanzania.

²⁶ United Nations, The Paris Agreement, available at <https://unfccc.int/process-and-meetings/the-paris-agreement/the-paris-agreement>, accessed 10 June 2020.

²⁷ Sustainable Energy for All, available at <https://www.seforall.org>, accessed 10 June 2020.

²⁸ IPCC (2018): *Global Warming of 1.5°C. An IPCC Special Report on the Impacts of Global Warming of 1.5°C*.

stakeholder engagement, and hence are other avenues whereby FBOs can hold the government to account on commitments made.

2.2.2 The Rural Energy Act

In 2005, the government of Tanzania formulated the Rural Energy Act as one of its strategies to facilitate sustainable rural development. The Act recognises that access to modern energy is a prerequisite to reducing rural poverty. It also clearly states that in order for sustainable development to be achieved, modern energy services in rural areas must be promoted, facilitated and supported through private and community investment and involvement.

The Act established the REA, the Rural Energy Fund, and the Rural Energy Board with a mandate to electrify rural areas with small power projects producing up to ten megawatts (MW) of power. The REA is autonomous and the leading agency responsible for rural electrification and promotion of improved access to modern energy services in rural areas.²⁹ The Rural Energy Fund is resourced from governmental annual budgetary allocation, contributions from international partners, levies on the sale of electricity by the national utility, and also through Special Purpose Funds for rural energy by development partners.³⁰ The REA provides grants through the Rural Energy Fund to the state-owned parastatal utility, TANESCO, responsible for decentralised generation, transmission and distribution of power in rural areas. However, TANESCO is often cited as among the obstacles limiting decentralisation, sustainability, efficiency and resilience of Tanzania's energy sector.

In addition, the Rural Energy Fund also provides money to qualified project developers in the following areas:

- grants towards the capital costs of projects
- capacity-building activities in relation to planning and project preparation
- financial assistance, e.g. for co-financing investment
- innovative projects related to the objects of Special Purpose Funds created by development partners.³¹

The Rural Energy Act provides legal priority and attention to rural development partners, including civil society and FBOs, companies and individuals to work with the government on establishing energy projects that aim to improve the well-being of rural households. It further supports renewable energy initiatives, including solar PV, wind, small-scale hydro, biogas and geothermal.

²⁹ Kitonga, J. F. (2014). *Electricity Industry Restructuring in Tanzania*. Seoul National University, Seoul, Republic of Korea.

³⁰ International Energy Agency (IRENA) (2017). *Renewables Readiness Assessment: United Republic of Tanzania*. Renewable Energy Agency, Abu Dhabi.

³¹ Ibid.

Box 3: Opportunities for civil society interventions linked to the REA

- Lobbying the REA on targeting projects funded by the Rural Energy Fund towards sites in rural communities with particularly low levels of access and high energy poverty. Given that FBOs are responsible for implementing most small off-grid renewable energy projects in Tanzania to date, their knowledge and know-how in this area can be used to do this effectively.
- Finding entry points to leverage funding, potentially through partnerships with other project developers, through the Rural Energy Fund for rural projects.

2.2.3 Long-term plans

Tanzania has developed a number of actionable plans to meet the National Development Vision 2025, with regards to energy access.

Electricity Supply Industry Reform Strategy and Roadmap 2014–2025

The document provides an implementation strategy for restructuring Tanzania’s electricity market over 11 years.³² It translates the Electricity Sub-Sector Reform Strategy into implementable activities that aim to sustainably increase electricity connection coverage to 50 per cent by 2025, and 75 per cent by 2033. The strategy calls for significant investment in generation, transmission and distribution systems, aiming to:

- increase investment from both private and public sectors
- enhance private sector participation
- increase availability, reliability, affordability and sustainable quality of electricity
- increase connectivity and access level
- diversify sources of energy generation
- enhance affordability and reliability of electricity supply
- reduce system losses, and
- establish a competitive wholesale and retail electricity market.

The roadmap recognises the role of private sector participation in increasing affordable and reliable energy in the country. It clearly states that modern power generation will be undertaken by both public and private companies, and that small power projects will be further promoted under the Standardised Small Power Purchase Agreement.

Under this reform, generating companies are given the means to sell power to either bulk off-takers or distribution companies, by paying wheeling charges to the transmission company. Moreover, distribution companies are required to operate as separate entities in which commercially viable zones will be converted into zonal distribution companies. These companies can sell power to retailers in their territories. The ownership of distribution companies will be either public or private. This arrangement has

³² United Republic of Tanzania (URT) (2015). *Electricity Supply Industry Reform Strategy and Roadmap 2014–2025*. Dar es Salaam, Tanzania.

potential to provide a wide choice to retailers resulting in improved quality of service, competitive prices and increased electricity connection and access levels.

However, despite the opportunity provided by this roadmap, like many other national energy strategies in Tanzania, it has not paid the required attention to the potential of modern renewable sources of energy in meeting future energy demands. So, this remains as a gap to be addressed.

Tanzania power system master plan

In 2016, Tanzania updated its power system master plan, aiming to provide an estimate of power demand and supply for achieving economic growth, energy security and environmental protection.³³ The overall objective of the plan is to reassess short-term (2013 –2017), mid-term (2018–2023) and long-term (2024–2035) generation and transmission plan requirements, as well as the need to connect currently off-grid regions, and increase the supply of reliable power.

Government policy aims to attain a 78 per cent electrification rate by 2035. In identifying new power projects, the plan evaluates a range of power generation technologies, including a review of capital investment, project lead time, fuel costs and availability, both locally and imported. The power sources considered to achieve national development targets include hydro, wind, solar and geothermal, among others.

The plan aligns population growth and national development scenarios with power capacity demands. It proposes a total installed capacity of 8,990MW by 2035 consisting of 3,304MW-hydro, 995MW gas-fired generation, 3,800MW-coal, 100MW-solar, 120MW-wind, and 40MW-biomass to support industrialisation.

The plan also directs that power generation should be a responsibility of both government and the private sector, including businesses, NGOs, FBOs and CSOs. The government commits to working with independent power producers through a public–private partnership (PPP) mechanism to identify and research additional sites for renewable power generation. The government’s role in this respect will be two-fold:

- to mobilise financial resources to implement some of the earmarked projects
- to create a conducive environment to attract investors in the power sector.

Regrettably, the plan has placed much emphasis on large hydro power and non-renewable sources of energy, such as coal, natural gas, petroleum and uranium. Sustainable and renewable energy sources such as solar and wind have been assigned a small contribution towards the national agenda of industrialisation, decent work and green growth. Solar PV technology, for example, is lacking in the master plan, referred to mainly in relation to piloting.

National Public–Private Partnership Policy 2009

The PPP Act came into effect in 2010 with the PPP Regulations, followed by various subsequent amendments to the legislation, the latest taking place in 2018. PPPs have been identified as a viable means to effectively address constraints of financing, management and maintenance of public goods and services. Additionally, PPPs can enable the government to fulfil its responsibilities in efficient delivery of

³³ United Republic of Tanzania (URT) (2016). *Power System Master Plan 2016 Update*. Dar es Salaam, Tanzania.

socio-economic goods and services by ensuring efficiency, effectiveness, accountability, quality and outreach of services.

Under this policy, the government directs that participation in PPPs may take place in a wide range of both productive and socio-economic service sectors. This includes the energy sector. Notably, in the policy, NGOs such as FBOs and religious institutions have been mentioned as important partners for public service delivery. For example, it is emphasised that in the case of service delivery, PPPs have been implemented successfully by FBOs in the education, health, energy and water sectors in Tanzania for many years.³⁴ This indicates that FBOs have full government support at a policy level for investments in service delivery to combat poverty, including modern renewable energy provision. Furthermore, rural areas, where churches and FBOs are currently focused in energy provision in Tanzania, remain the major target for development programmes.

National Five-Year Development Plan 2016–2021

The second FYDP 2016–2021 outlines recommendations for the inclusion and increasing share of renewable energy in the national energy mix, as well as the link to poverty reduction, decent jobs and green economic growth. However, although reference is made to the utilisation of renewable energy sources, the language used is still not clear and lacks specific strategies. There is also a lack of fixed time frames and critical details on how to progress. These gaps provide an opportunity for input from civil society and FBOs.

Box 4: Opportunities for civil society interventions linked to long-term plans

- Lobbying for adequate inclusion of sustainable renewable energy sources and technologies in LTPs and strategies, e.g. plugging the gap in the *Electricity Supply Industry Reform Strategy and Roadmap* and calling for more emphasis on solar and wind technologies in the *Power System Master Plan*.
- Advocating and holding government authorities to account to follow through on action plans relating to stakeholder involvement, e.g. lobbying for dissemination of information on plans for sites of rural energy projects through PPP mechanisms, and opportunities to engage and feed into the process.
- The *National PPP policy* provides a supportive framework for FBOs to engage in PPPs and investment in the renewable energy sector in rural Tanzania. Follow through is needed with clear channels to enable civil society to engage.
- Making interventions and recommendations to government authorities to include specific details and time frames regarding scaling up of renewable energy options in rural areas. For example, lobbying for these details to be incorporated into LTPs, such as the next FYDP.

³⁴ United Republic of Tanzania (URT) (2009). *National Public–Private Partnership (PPP) Policy 2009*. Dar es Salaam, Tanzania.

2.2.4 E- waste management

Tanzania has made slow progress in the area of management of electronic waste, which includes waste from the installation and use of renewable energy technologies, such as solar-powered appliances (see Box 1). To date, the country lacks a stand-alone renewable energy e-waste policy and regulations. This has resulted in the disjointed implementation of sparsely available sectoral e-waste regulations. And with the exception of the National Environmental Management Council, there are no clear e-waste management systems in place in Tanzania. Large quantities of e-waste, together with other solid wastes, are dumped, unsorted, at informal and uncontrolled sites, especially in urban centres such as Dar es Salaam, Mwanza and Arusha.

Additionally, there is no long-term financing mechanism dedicated to e-waste management. Discussion with key informants revealed that e-waste management is only allocated a minimal slice of the annual national budget, and this is not always disbursed as required. Further discussion indicated that negligence in this area is linked to the low budget allocated generally to renewable energy development. For example, between 2009/2010 and 2016/2017, the government of Tanzania allocated almost US\$2 billion to finance energy access, with only \$40 million (2 per cent) budgeted for off-grid energy projects.³⁵

Corrupt practices in this area are also a challenge. Concerns were raised by key informants that the e-waste management sector has to contend with untrustworthy investors generating profits using fake facilities. Respondents from churches echoed this, adding that dubious solar company investors supply counterfeit and low-quality products that distort the solar energy market and increase solar-related waste. This emphasises the need for both (i) the regulation of e-waste products and equipment, with the development of a robust legal framework and standards with product testing and monitoring of producers to ensure compliance; and (ii) the creation of e-waste policies specifically in the areas of renewable energy and waste management.

A study by the World Bank (2019)³⁶ revealed the same scenario and recommended more education and awareness programmes targeted at end users and regulators of renewable energy technologies in Tanzania.

Box 5: Opportunities for civil society interventions linked to e-waste management

- Lobbying the government to develop a legal and regulatory framework and implementation strategy for e-waste management in the area of renewable energy.
- Raising awareness within communities about the environmental and health impacts of inadequate management and disposal of e-products and equipment from renewable energy installation and use, particularly solar products, and educating end users how to dispose of e-waste safely.

³⁵ World Bank (2019). Tanzania: *Country Environmental Analysis: Environmental Trends and Threats, and Pathways to Improved Sustainability*. World Bank, Washington D.C.

³⁶ Ibid.

3. The role of churches and FBOs in delivering renewable energy access and its impact on rural communities

This chapter discusses the potential for renewable energy usage in Tanzania, and the current role of churches and FBOs in delivering decentralised renewable energy, such as wind and solar, to rural communities. It also highlights the observed impacts of this energy provision on livelihoods and in reducing energy poverty, as well as the negative impacts associated with unmanaged renewables e-waste disposal.

3.1 The potential of renewable energy

Biomass supplies more than 90 per cent of the energy consumed in Tanzania, and is used in households and institutions for cooking and heating.³⁷ The other major sources of energy are large hydropower schemes, natural gas and petroleum.³⁸ A decade ago, two-thirds of the country's installed capacity for electricity generation was supplied by hydropower. Now, large hydropower constitutes significantly less generation capacity, and is likely to be hindered in future, as water sources deplete due to droughts and unpredictable rainfall patterns, coupled with an increase in water use conflicts.

3.1.1 Untapped resources

Tanzania is rich in untapped high-quality renewable resources which include mini-hydro, wind, solar, geothermal and biomass. Discussions with respondents revealed that renewable energy (excluding large hydro) currently accounts for about 4.9 per cent of generation capacity.³⁹

Available information indicates that Tanzania has wind speed and solar radiation levels for grid-scale electricity generation, as well as a vast usable biomass resource base. In the East Africa Rift Valley System and coastal areas there are enough geothermal resources to produce approximately 650MW of electricity. However, despite this resource potential, the utilisation and role of renewable energy resources in terms of Tanzania's socio-economic growth and transformation is negligible.⁴⁰

³⁷ Garcia, I. et al. (2017). *Policy Roadmap for 100% Renewable Energy And Poverty Eradication in Tanzania*, Hamburg, Germany

³⁸ Bishoge, O. K. et al. (2018). *Clean technologies: The Potential Renewable Energy for Sustainable Development in Tanzania: A Review*, pp 70–88.

³⁹ Ibid.

⁴⁰ Ibid.; Kroll, M., (2018). *Climate Finance — Policy Brief 6/2018 Financing 100% Renewable Energy for All in Tanzania*. World Future Council. Hamburg, Germany

Box 6: Summary of the current status of renewable energy usage in Tanzania

Biomass

This is the highest usable renewable energy resource in Tanzania (dependable range from 73 per cent to 90 per cent) on which most households, institutions and small and medium-sized enterprises depend for heat production and fuel for cooking.⁴¹ Household consumption of charcoal, wood and crop residues accounts for more than 90 per cent of biomass demand in the country while the remainder is shared between industries and institutional sectors.

Hydropower

More than 45 per cent of the power utilised by Tanzanians comes from hydropower.⁴² For so many years in the country, power generation has been dominated by large hydropower schemes, however climate change and variability has resulted in rainfall shortages and droughts over recent years. In addition, unsustainable agricultural practices along river basins have limited the water required to support turbines for electricity generation in hydropower plants across the country.

Wind

Tanzania has high potential to harness wind energy. A 2014 assessment confirmed two areas of value for the generation of power from wind energy resources: Kititimo in Singida (average wind speed of 9.9 miles/second) and Makambako (8.9 miles/second).⁴³

Solar

Tanzania receives about 2,800–3,500 hours of sunshine per year with a global horizontal radiation of 4–7KW hours per square metre per day. Most of the areas with a power resource harnessing potential are found in the central zone of the country. At the end of 2017, Tanzania had already installed solar PV capacity of approximately 11MW.⁴⁴

⁴¹ World Health Organization (2009). *Fuel for Life, Household Energy and Health*.

⁴² African Development Bank (AfDB) (2015). *Renewable Energy in Africa – Tanzania Country Profile*.

⁴³ Detollenaere et al. (2019). *Solarize Market Report Africa*. Berlin, Germany.

⁴⁴ International Energy Agency (IRENA) (2017). *Renewables Readiness Assessment: United Republic of Tanzania*. Renewable Energy Agency, Abu Dhabi.

3.1.2 Rural energy access

Countrywide, approximately 32.8 per cent of the population has access to electricity. In urban centres, access is at 65.3 per cent, compared to only 16.9 per cent in rural communities.⁴⁵ Studies indicate that less than two per cent of the rural population uses electricity for cooking and heating due to this low level of access, as well as affordability and reliability.⁴⁶ Poor people, especially in rural areas, are economically impacted hardest, contributing 35 per cent of their household income to try and ensure energy access, while the relatively better-off spend approximately 14 per cent of their income.

Historically, Tanzania has used decentralised solutions for energy development – and as of 2017, 300MW of decentralised power generation capacity had been installed in the country. This includes 93 mini-grids (mostly hydropower based), serving about 800,000 people, as well as diesel generators.⁴⁷ Tanzania is home to the second-largest African market for household solar solutions, after Kenya, although according to the National Bureau of Standards (2017), only 8 per cent of households use solar energy as an energy source for lighting, and most solar energy use is by individuals. It is more commonly utilised in rural areas, due to limited grid extension.

3.2 The role of churches and other Faith Based Organisations in rural renewable energy provision

The NGO sector in Tanzania includes thousands of FBOs and religious institutions engaged in development, operating not only at a local, grassroots level, but also in advocacy at the national, regional and international levels. CSOs, including FBOs, have a complex history with the state, ranging from government restrictions on CSO activities to official state support and sponsorship. Today, these organisations are a critical component of Tanzania’s social and political landscape, remaining on the front line of service delivery, especially in rural areas.⁴⁸

Responses from group discussions and in-depth interviews with religious leaders indicated that FBOs and religious institutions are at the forefront of scaling up renewable energy in their localities, and have played a huge role in promoting and providing access to renewable energy in rural and remote settings. This includes missionary organisations who installed mini-grids in Tanzania as far back as 1928.⁴⁹ Many mini-hydropower plants and other off-grid energy generation projects are owned, operated and managed by FBOs, especially Catholic and Lutheran churches.

3.2.1 Use of renewable energy by churches and religious institutions

A number of churches in Iringa, Mpwapwa, and in the Rift Valley are using solar energy for lighting, heating (see Figure 1), water pumping and running/operating televisions and music systems and electronic instruments, as well as to power associated religious institutions, such as health centres. In Njombe and

⁴⁵ International Energy Agency (IRENA) (2017). *Renewables Readiness Assessment: United Republic of Tanzania*. Renewable Energy Agency, Abu Dhabi.

⁴⁶ Garcia, I. et al. (2017). *Policy Roadmap for 100% Renewable Energy and Poverty Eradication in Tanzania*. Hamburg, Germany.

⁴⁷ Ibid.

⁴⁸ International Partnership on Religion and Sustainable Development (PaRD) (2019). *Faith and Development in Focus in Tanzania*.

⁴⁹ International Energy Agency (IRENA) (2017). *CSOs and Rural Energy Supply in Tanzania*. Renewable Energy Agency, Abu Dhabi.

Mufindi, the church is using small hydro installations for irrigation, and providing electricity to nearby villages.

Figure 1: Church use of solar energy in Kondoa



 Solar energy used for water heating in UWAKI hostel at an Anglican church in Kondoa town, August 2019. Photo: Jophillene Bejumula/Climate Action Network, Tanzania

Solar technology has also created more opportunities for churches to increase public investment in and improvements of social service delivery to their communities. Many church institutions such as schools, dispensaries and hospitals require a reliable and uninterrupted power supply. The installation of solar panels on church buildings and institutions such as health centres and schools has also motivated households and individuals to do the same on their rooftops.

Figure 2: Manyara household with solar installation



 Household solar energy installation, Minyenyi village in Manyara, August 2019. Photo: Tondelo Mateso/Climate Action Network, Tanzania

Discussions with church leaders and members revealed that in rural areas such as Manyara, Mpwapwa, Kondo, Babati, Manyoni, and Kiteto there are many religious institutions and government- and church-owned education and health centres either not connected to the national grid, or affected by unreliability, blackouts and the high costs of grid connectivity. The use of renewable energy alternatives in these areas could be of significant benefit to communities.

3.2.2 Christian Council of Tanzania projects

The CCT is an umbrella ecumenical organisation bringing together protestant denominations and other church related organisations. In total, this includes thirteen National Church denominations, such as the Anglican Church in Tanzania, the Moravian Church in Tanzania, and the Evangelical Lutheran Church in Tanzania (ELCT), as well as ten church related organisations. It has an enormous sphere of reach and influence, connecting with a total of approximately 15 million Tanzanians across all 31 regions in Tanzania.⁵⁰ Interfaith partnerships are key in a country as religiously diverse as Tanzania, and the CCT has mobilised Inter Religious (IR) groups within its member church villages, to enable community inclusivity.

The CCT is demonstrably involved in a number of environmental programmes in Geita, Gairo, Chunya and Same districts, including tree planting, terracing and other sustainable farming initiatives. These programmes aim to reach 1,500 IR groups who work through a village community bank (VICOBA) membership model (see Box 7).

Box 7: The village community bank model

VICOBA is a tailored micro-finance programme. It brings together groups of 25 to 50 people, and allows them to combine their savings to create a community-based bank. People interested in forming a VICOBA are provided with training on how to start up and run the group. The VICOBA group provides a mechanism for savings and credit services within the group, facilitating the funding for the start-up and running of income-generating or saving activities in the community, such as sustainable farming, access to renewable energy for homes and businesses etc. The model aims to:

- increase the ability of community groups to identify, utilise and develop their local resources;
- provide increased access to credit for community initiatives;
- increase employment and self-employment opportunities;
- ensure long-term success by providing participants with accounting and business management skills;
- help improve living standards for the wider community.

Kitega Community Centre, 'Village Community Banking', available at <http://kitegacc.org/campaigns/village-community-banking-vicoba/>, accessed 10 June 2020.

⁵⁰ Pers.comm. Gloria Mafole, CCT

Specific CCT programmes relating to sustainable renewable energy solutions include the Solar Yetu project in Manyoni.

Small solar panel installation – the Solar Yetu project in Manyoni

With support from Tearfund, the Anglican Diocese of Rift Valley based in the great East African Rift Valley district of Manyoni is implementing a three-year (2018–2021) pilot project to install small solar power panels for lighting in three villages (Makutopora, Sasajira and Makasuku) (see Figure 3). A solar kit consists of five lamps, a battery pack, a small solar panel and control unit with a USB port that can be used for several things, battery charge permitting.

Figure 3: Household-installed solar panels at Makutopora village



📷 Household solar energy installation, Makutopora village in Manyara, August 2019. Photo: Hannington Muyenje/Tearfund

Households (from multi-faith backgrounds) are encouraged to become members of the VICOBA group in order to meet the criteria to have solar installed at a subsidised cost. Subsidies from the diocese reduce the cost of a complete solar system for an individual household affiliated to the VICOBA by approximately 75 per cent (from TZS. 450,000 to TZS. 120,000). The payment of TZS. 120,000 is then spread across the year. This project has to date seen more than 400 households from 120 groups save for and obtain solar kits for their households, which in turn tangibly impacts livelihoods (see Box 8).

Box 8: Paulina

Paulina owns a restaurant that is now powered by solar electricity. *'I now make 150 chapatis [a pancake-like savoury] per day and over 65 doughnuts, up 25 before I got solar'*, she says. Previously she missed most of the business from early risers who need chapatis and mandazis for their breakfast. *'Now, I can start as early as 4am so that by 6am, breakfast is ready for my clients'*, she says. Her eldest daughter has just completed her Form 4 exams (GCSEs) and performed better than expected, as she had more time to study in the evenings with access to a reading light. Paulina is now keen to work towards installing solar systems with a bigger capacity to power a TV, fridge and to light up her street. In this really arid part of Tanzania, solar-powered fridges could be good business.

Makutopora village, August 2019

Energy-saving stoves in Same

Traditional methods of cooking in rural Tanzania use firewood and charcoal as fuel. Driven by a need to protect unsustainable forest produce consumption and lower carbon emissions, IR groups were tasked to mobilise households in communities in the district of Same using the VICOBA model (see Box 7) to use energy-saving stoves for cooking. The Diocese of Rift Valley supports the training of VICOBA groups to build their own stoves from local materials, such as clay, ash, dry grass, carpentry dust, burnt bricks, cow dung and water. Individuals can in turn transfer the knowledge to others in the community. To date, 120 households have switched to energy-saving stoves across 18 communities.

Further sensitisation is needed within IR VICOBA groups to increase understanding as to the benefits of adopting energy-saving stoves, and encourage wider uptake. Nevertheless, the project serves as an important step towards raising community awareness about sustainable renewable energy resource use.

Box 9: Maria Peter

Energy-saving stoves use less firewood than traditional three-stone cooking stoves. They also have more holes than traditional stoves, which can all be used to cook different food. Maria's energy-saving stove uses just one-fifth of the firewood that her traditional stove consumed. *'Moreover, I do not smell of smoke when I come out of the kitchen when I use the energy-saving stove'*, she says. With three cooking positions and less firewood needed, Maria Peter now spends less money on firewood, less time cooking, and can more easily provide a balanced diet for her family. The time and money saved can be spent productively in other ways. Her pans were visibly free of the characteristic black coating produced by traditional stoves.

Kirangare village, August 2019

3.3 Impacts on livelihoods

In communities visited in the regions Dodoma, Manyara and Singida in the rural central zone of Tanzania, there was evidence that communities and individuals are using both solar and wind as sources of energy for lighting, heating water, drying, charging mobile phones, opening internet services, and in small kiosks where they sell beverages, ice-creams and other products. Furthermore, renewable electricity has made communication and the gathering and sharing of information possible in these rural areas. It has increased self-employment and household income.

In summary, livelihoods have been improved in the villages visited, with access to renewable energy through the church and FBOs, in the following ways:

- *The creation of income generating opportunities due to extending existing business hours, or starting new businesses* – solar-powered electricity for lighting and appliances has resulted in young men and women opening barbershops or salons and makeshift cinemas to show films and international football games.
- *An increase of access to market information* – possibilities have opened up to charge and use mobile phones, increasing the access and flow of market information and climate updates which is invaluable to farmers and other local traders.
- *Electrified pumps are reducing the burden of water collection and improving farming* – the use of solar energy to pump water in Kondoa and Chemba has considerably reduced the long hours that women and children usually spend fetching water, which instead can be used to improve household livelihood activities, or to do homework. Pumped water can also be used for irrigation purposes, positively impacting farming practices.
- *Improvements to basic services, such as healthcare provision, education and increasing access to water for domestic use and irrigation* – church institutions (including offices, health centres and schools), especially those located far away from the main grid, are powered using solar and wind energy sources for lighting, enabling them to serve communities. Specific examples cited by respondents include:
 - Vaccines and antibiotics can be stored in fridges, and doctors and nurses can work at night, improving the effectiveness of healthcare provision. In the Rift Valley Diocese in Singida region, the church-owned hospital, Kilimantindinde, is using solar energy to enable night-time opening hours and for the refrigeration of medicines.
 - Lighting in schools has provided more time for students to study at night in Hangang district in Manyara region.
- *Reduced dependency on unsustainable use of biomass* – promoting the use of energy-saving stoves across the Same district in Kilimanjaro region reduces the use of charcoal and firewood, saving women money and time that can be used in other productive ways.

3.4 Impacts of e-waste

With an increase in the use of solar and wind energy, the associated direct and indirect e-waste (see Box 1) can cause significant negative impacts on health and the environment if not managed properly.

In Tanzania, e-waste management is a serious challenge which needs special attention and budgeting. About 55 per cent of all interviewees reported that they have never seen e-waste-related guidelines, and all churches and other institutions interviewed lack knowledge on how to dispose of solar and other e-wastes. Seventeen per cent of the interviewed participants from both the government and churches indicated that e-waste and other solar wastes remaining after installation are thrown away.

Globally, the increase in levels of e-waste produced ranges between four and five per cent, while in Tanzania the rate of e-waste increase is projected to be as high as 33 per cent.⁵¹ Different studies have revealed that there are no specific areas for disposing of e-waste in many places in Tanzania.⁵² Most of the solar energy products which are used by low-income communities (rooftop solar and lithium batteries) are of short lifespan and contain toxic metals, but are disposed of together with other general waste in sanitary landfills. Some e-wastes are burned openly, and even disposed of anywhere in farms or streets or buried – a situation that can cause long-lasting consequences to the environment and health, especially when there are leakages that may contaminate groundwater.

These issues of safe disposal are attributed to a low level of awareness of the dangers posed by e-waste, negligence and a poor legal framework and coordination for e-waste management. A recent study by Kaijage and Mtebe (2017) supports this inference, showing a low knowledge and awareness of e-waste management among a sample of 512 ICT students interviewed from two universities in Tanzania. This conclusion suggests the extent to which the problem is neglected in Tanzania, and is set to increase in impact as e-waste levels increase, unless interventions are made.

⁵¹ Kaijage, Z., and Mtebe, J. (2017). *Understanding ICT Students' Knowledge and Awareness on e-Waste Management in Tanzania*. IST-Africa 2017 Conference, Windhoek, Namibia.

⁵² Ibid.; World Bank (2019). *Tanzania: Country Environmental Analysis: Environmental Trends and Threats, and Pathways to Improved Sustainability*. World Bank, Washington D.C.

4. Challenges preventing growth of decentralised renewable energy in Tanzania

Tanzania has vast, well-documented renewable energy resources with potential to withstand and satisfy energy demands across the country for many years. However, to date these resources remain largely untapped and renewable energy is under-utilised, despite its potential to aid socio-economic transformation.

The research uncovered a number of challenges and barriers to the growth of decentralised renewable energy in Tanzania. These include:

- **A lack of prioritisation by the government.** Historically, like many countries, Tanzania has been electrified through a grid, and national energy policies reflect this approach. Despite recognising the potential of renewable energy in policy documents, the government has continuously prioritised energy access through expensive grid extension, supported by fossil fuel infrastructure. Consideration of renewable energy options is limited to large hydropower. Hence, development of renewable energy technologies and infrastructure is not allocated a substantial percentage of the government budget.
- **Financial constraints.** As well as a lack of government funding towards renewable energy development, and a resultant over-dependence on donors and development partners to plug the gaps, finance from the private sector is also limited. Some investors perceive high risks in investing in renewable energy – stemming from a lack of awareness about the costs, and the reliability of technology – and the financial environment is also restrictive. Obtaining investment loans is difficult because of the high cost of borrowing, with inflated interest rates and significant bank charges.⁵³ In rural areas, the low purchasing power of end users is also an issue. Fifty per cent of community respondents cited the high instalment costs of solar power as a barrier to usage.
- **An inadequate policy framework for implementation.** Although the foundations are in place for a positive enabling environment for the development of renewables, for example in the form of the NEP 2015, specific LTPs and strategies are not yet developed. In addition, there has been little effort to date to translate and customise national documents into a specific regional context. For example, solar could perform well in the central part of Tanzania, while wind and mini off-grids could be effective in the southern highlands. Overall, there is a lack of stand-alone and dedicated renewable energy policies, laws, and institutional structure and funding mechanisms to operationalise growth and development. This is also the case for renewables e-waste legislation and management.
- **A centralised approach to energy governance and e-waste management.** Energy infrastructure development and financing mechanisms have remained centralised and top-down to date, excluding the rural population who are isolated and far off from the grid. A decentralised and integrated approach which aligns key sectors and ministries with LGAs could help to address this challenge. It could also provide more opportunities for the rural majority to participate in planning for energy access, and for technical and financial support at a local level. Decentralisation of governance and financing for renewables e-waste management is also key, as most e-wastes are improperly disposed of at a local level, impacting local health and the environment.

⁵³ International Energy Agency (IRENA) (2017). *Renewables Readiness Assessment: United Republic of Tanzania*. Renewable Energy Agency, Abu Dhabi.

- **Limited knowledge, technical know-how and motivation.** Discussion with key informants from both civil society and government institutions revealed that the country is still facing a lack of Tanzanian trained personnel in the area of planning, designing installation and maintenance of renewable technologies. At the vocational training level, only five of the 40 higher education institutions across the country offer courses related to the renewable energy projects value chain.⁵⁴ This has created a dependency on foreign expertise, increasing the costs of implementing renewable energy projects and technologies. At a local level, however, there is readily available human capacity for installing smaller systems (e.g. solar home systems).⁵⁵
- **Low levels of awareness.** There is a low level of awareness about the potential and benefits of renewable energy, from policy and decision makers to community members. In the communities surveyed, over 70 per cent of people were unaware of the short and long-term benefits of renewable energy versus fossil fuel alternatives. There is also a lack of awareness at a community level relating to installation and maintenance of solar appliances, and associated e-waste disposal and management.
- **Lack of clear opportunities for civil society engagement.** Although national policies and plans pay lip service to the importance of civil society participation (see Chapter 2), there are no clear dissemination channels or clarity from government authorities as to how NGOs, FBOs and individuals can actively feed in and engage in discussions relating to energy governance and access.
- **Consumer protection and quality assurance.** There is currently a lack of any quality control mechanisms for renewable energy equipment, despite tax exemptions and benefits from reductions in import duties.⁵⁶ Therefore a large influx of low-quality and fake solar products have made their way onto the market, resulting in short product lifetimes and high costs for users who need to replace faulty products or components. It has also contributed to higher levels of associated e-waste.

⁵⁴ Ibid.

⁵⁵ Tearfund (2018). *Pioneering Power. Transforming Lives through Off-grid Renewable Electricity in Africa and Asia.*

⁵⁶ International Energy Agency (IRENA) (2017). *Renewables Readiness Assessment: United Republic of Tanzania.* Renewable Energy Agency, Abu Dhabi.

5. Conclusions and recommendations

Tanzania has considerable untapped renewable energy potential which, if properly exploited, can play an integral part in the country reaching its middle-income status target. To date, despite acknowledging the potential for renewables in national policy documents, the government has not adequately prioritised strategic planning in implementing decentralised renewable energy provision in rural areas. This is due to a number of reasons, such as a historical energy focus on grid extension, a lack of information and data relating to renewable energy technologies, a perceived high risk factor for investors etc. The research revealed that this is exacerbated by a number of governance issues relating to the renewable energy sector, challenges stemming from a lack of awareness at all levels and across sectors, as well as a lack of knowledge and technical expertise in the renewables sector in Tanzania.

Research also shows that the church and FBOs in Tanzania have played a considerable role in implementing small-scale renewable energy initiatives in rural areas. These range from electrifying church buildings and other services linked to faith-based institutions, such as schools and hospitals, to pilot projects and programmes, for example, the CCT Solar Yetu project in Manyoni (see Chapter 3). The socio-economic benefits of these interventions to people's livelihoods in rural areas, and the impacts of reducing energy poverty are clear. Conversely, the increasing levels of e-waste associated with renewables are also shown to be a key challenge in Tanzania. Awareness of the impacts of poor e-waste disposal is limited. Current e-waste policy, legislation and management is lacking and inadequate.

The church and related FBOs have considerable reach and influencing power in rural areas, regularly connecting with over 15 million people across Tanzania. They are in a strong and unique position to: i) mobilise efforts to educate, advocate and campaign for greater government focus and funding for renewable energy provision and associated e-waste management in rural areas; ii) make interventions in the policy and planning process for rural renewable energy access; and iii) be enablers for scaling up of renewable energy pilot projects and programmes across rural communities.

Recommendations

Donors and the government of Tanzania should focus efforts on:

1) Improving data and information-gathering on renewables

- Map and quantify all renewable energy potentials, including solar and wind in the central regions of Tanzania. This will motivate investors, as well as raise awareness in the financial sector and lower the perceived risks of investment.

2) Strengthening the policy and implementation framework for renewable energy provision and related e-waste management

- Establish stand-alone national and local policies and implementation frameworks for renewable energy provision, and for e-waste management of renewable energy products and equipment, aligned with adequate provision from the central government budget.
- Strengthen the policy enabling environment for renewable energy provision, addressing current financial disincentives, such as: ensuring equal subsidies for grid and mini-grid renewable energy

provision, reducing taxes on solar batteries and related solar products, and introducing a quality control mechanism and standards for renewable energy equipment.

- Decentralise and embrace a bottom-up approach in the renewable energy sector, with clear lines of responsibility. Specifically, decentralise responsibility from TANESCO to LGAs for power generation, transmission and distribution at a local level, as a way of ensuring efficiency, availability, access and affordability.
- Encourage renewable energy investment in small power producers, for example with access to microfinance and low-interest loans.

3) Stakeholder coordination, local participation and dissemination of information

- Provide clear avenues and platforms for early involvement of civil society and FBOs in local energy planning processes.
- Put in place mechanisms to increase multi-sectoral cooperation and coordination in the renewable energy sector between the REA, the Ministry for Energy, the Ministry for Environment and Minerals, the Ministry for LGAs, and the Ministry of Finance and Planning, as well as the private sector, CSOs, FBOs, donors and development partners. These could include setting a joint mandate, selecting representatives, establishing a committee and working groups, regular stakeholder forums etc.
- Establish channels for dissemination of information on energy access planning and development to the grassroots level, and ensure opportunities for input and feedback.

Donors should specifically **support civil society and FBOs** with:

4) Raising awareness and advocating at all levels – government, potential investors, communities

- Raise awareness and advocate for the government to prioritise scaling up renewable energy in rural areas with adequate budget allocation and strategic planning. Specifically, make interventions in relation to specific policies and LTPs as per the opportunities outlined in Chapter 2.
- Use the reach of the church and FBOs to mobilise and educate communities to uptake renewable energy options, and participate in campaigning and advocacy on the topic.
- Tangibly demonstrate benefits (socio-economic and other) of decentralised renewable energy by investing in pilot projects and programmes in rural communities (see also Recommendation 5).
- Raise awareness within government, and at a local level, as to the harmful effects of unmanaged renewable energy e-waste disposal, and educate communities how to safely dispose of and manage e-waste.

5) Unlocking access to finance for scaling up rural provision

- Invest in the reach, community accessibility and technical know-how of CSOs, particularly drawing on the sectoral experience of FBOs, by financially supporting the scaling up of FBO pilots in renewable energy provision in off-grid rural areas. Specifically, consider use of models such as the IR VICOBA initiative (see Box 7) in delivery of projects, to empower communities and generate the local finance needed.

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