

Tanzania Energy Sector Overview

Introduction

The Applied Research Programme on Energy and Economic Growth (EEG) aims to influence energy policy in developing countries. EEG brings together world-class academics to produce new evidence on the links between energy and economic growth in low-income countries. This evidence will be specifically geared to meet the needs of policymakers, filling in the knowledge gaps that obstruct their ability to develop sustainable, reliable and inclusive energy systems.

To this end, EEG will hold a **Sub-Saharan Africa Policy Workshop** in Dar es Salaam, Tanzania on 14 July 2016. The workshop will bring together senior energy policy-makers, researchers and representatives from the private sector, NGOs and donors in Sub-Saharan African countries to discuss the energy challenges facing the region, and consider policy relevant research questions that could address these constraints. This report offers an introduction to the key challenges and opportunities facing the energy system in Tanzania, and aims to facilitate discussion at the workshop.

Energy Sources and Access to Electricity

Access to electricity is still very limited. Extending electricity access has remained a critical challenge for Tanzania. The national electrification rate in Tanzania was 24% as of 2013. Further, in urban areas electricity is available to 70.6% of population while in rural areas to 3.8%. According to the last available estimates, 37.4 million people do not have access to electricity.¹ The Tanzanian government set expanding electricity access to 250,000 people annually as one of its objectives.²

TANESCO - a struggling parastatal. The Tanzania Electric Supply Company (TANESCO), a parastatal for generating and distributing electricity, was created by the government in 1964 when it bought all the shares from two private companies and combined them into a single utility (Figure 1).³ In 2013, TANESCO generated 53% of the country's electricity (Figure 2). Further, four of the seven priority generation projects to be completed by 2018 are expected to be owned by TANESCO with some Public-Private

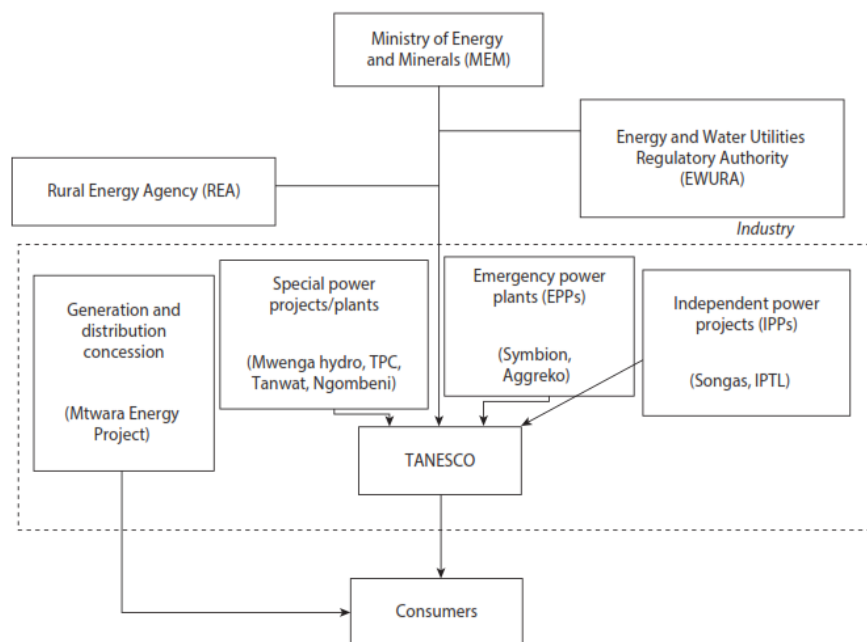
1 The World Energy Outlook (WEO), "WEO 2015 Electricity Access Database," *World Energy Outlook (WEO)*, 2015, <http://www.worldenergyoutlook.org/resources/energydevelopment/energyaccessdatabase/>.

2 The African Development Bank, "The Renewable Energy in Africa: Tanzania Country Profile," 2015, <http://www.afdb.org/en/news-and-events/article/tanzanias-untapped-renewable-energy-resources-ripe-for-investment-states-report-14439/>.

3 Anton Eberhard et al., "Independent Power Projects in Sub-Saharan Africa: Lessons from Five Key Countries" (The World Bank, April 18, 2016), <http://elibrary.worldbank.org/doi/book/10.1596/978-1-4648-0800-5>.

Partnership arrangements.⁴ The company has experienced numerous financial and technical problems over recent years. Its financials and investment capacity further worsened as it had to acquire expensive emergency energy generation capacity due to droughts in 2012.⁵

Figure 1: Tanzania’s electricity sector⁶



Note: IPTL = Independent Power Tanzania Ltd; TANESCO = Tanzania Electric Supply Company; TPC = Tanganyika Planting Company.

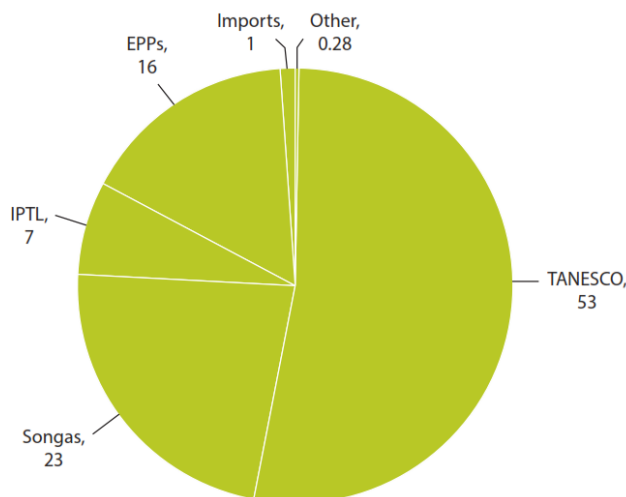
Figure 2: Share of Grid-Generated Electricity Production in Tanzania, 2013 (by Type of Producer)⁷

⁴ Ibid.

⁵ The African Development Bank, “The Renewable Energy in Africa: Tanzania Country Profile.”

⁶ Anton Eberhard et al., “Independent Power Projects in Sub-Saharan Africa.”

⁷ Ibid.



Source: Compiled by the authors, based on TANESCO data.

Note: Other (0.28 percent) includes the small private producers Tanwat, TPC, and Mufindi.

EPP = emergency power plant; IPTL = Independent Power Tanzania Ltd.; TANESCO = Tanzania Electric Supply Company; TPC = Tanganyika Planting Company.

Various energy sources are available - many of them untapped. Due to its natural resources and geography, Tanzania could have access to a varied mix of energy sources, including natural gas, biomass, hydropower, geothermal, coal, solar and wind power.⁸ Biomass supplies more than 90% of energy consumed. The remaining energy sources are fossil fuels (6.6%), gas (1.5%), hydro (0.6%) and coal and peat (0.2%).⁹

Two-thirds of the country's installed capacity for generating electricity was supplied by hydro-power a decade ago. Now large hydropower energy constitutes only 35% of total generation capacity.¹⁰ As generation of electricity through hydropower has been constrained by droughts and unpredictable rainfall patterns, causing electricity shortages and blackouts, TANESCO has been looking to increase its capacity through thermal energy and gas.^{11,12} Meanwhile, the country relies heavily on imported fuel.¹³ It imports 10 MW of electricity from Uganda and 3 MW from Zambia. It also imports over 1.8 million tonnes of refined petroleum products. Finally, which 75% of all fossil fuels is consumed by the transport sector.¹⁴

Recently discovered gas reserves could aid in alleviating Tanzania's energy constraints. However, so far the country is not benefiting from the reserves

⁸ UNDP, "Tanzania," accessed June 10, 2016, http://www.undp.org/content/undp/en/home/ourwork/environmentandenergy/strategic_themes/climate_change/carbon_finance/CDM/tanzania.html.

⁹ Reegle, "Tanzania (2014)," *Reegle - Clean Energy Information Gateway*, accessed June 10, 2016, <http://www.reegle.info>.

¹⁰ The African Development Bank, "The Renewable Energy in Africa: Tanzania Country Profile."

¹¹ Ibid.

¹² UNDP, "Tanzania."

¹³ Anton Eberhard et al., "Independent Power Projects in Sub-Saharan Africa."

¹⁴ Reegle, "Tanzania (2014)."

because of lack of investment and lack of planning and implementation including developing pipeline and creating gas processing infrastructure.¹⁵

Grid expansion constrained by large geography and low population density. Extending traditional grid over large and sparsely populated areas is expensive. Off-grid electrification schemes engaging small power producers could help alleviate the grid expansion constraints.¹⁶ Recurring network failures weaken the limited energy supply. As a result, roughly 46% of power consumption comes from off-grid self-generation.¹⁷

Household reliance on biomass energy. Biomass is one of the primary sources of energy for Tanzanian households. As of 2014, 90% of total energy consumption used biomass. Using traditional biomass cooking stoves in-house carries significant health risks and causes environmental damage as a result of incomplete fuel wood combustion.¹⁸ Further, as wood is often used unsustainably, Tanzania loses 100,000-125,000 hectares of forest coverage annually due to current charcoal demand.¹⁹

Energy Sector Reforms and Institutional Framework

Progress in Energy Reform. Notable reforms include the Energy and Water Utilities Authority Act, 2001 and 2006, National Energy Policy, 2003, Rural Energy Agency Act, 2005, and Electricity Act, 2008. Some of the key achievements in electricity access expansion thus far constitute the creation of the Rural Energy Agency (REA) and Rural Energy Fund (REF) and the Big Results Now (BRN) initiative.²⁰

Energy and Water Utilities Regulatory Authority Act, 2001 and 2006, established the Energy and Water Utilities Regulatory Authority (EWURA) and the EWURA Consumer Consultative Council, stipulated rules defining powers and functioning of the Authority and the Council and defined resolution of disputes about regulated services and goods. EWURA is an autonomous multi-sectoral regulatory authority in charge of technical and economic regulation of electricity, petroleum, natural gas and water. Its responsibilities include licensing, tariff review and monitoring performance related to quality, safety, health and environment. The President of Tanzania appoints The Chairman of the Board of EWURA.²¹

15 Anton Eberhard et al., "Independent Power Projects in Sub-Saharan Africa."

16 The African Development Bank, "The Renewable Energy in Africa: Tanzania Country Profile."

17 Anton Eberhard et al., "Independent Power Projects in Sub-Saharan Africa."

18 The African Development Bank, "The Renewable Energy in Africa: Tanzania Country Profile."

19 Ibid.

20 Ibid.

21 "Overview - Energy and Water Utilities Regulatory Authority," accessed July 4, 2016, http://144.76.33.232/?page_id=891.

National Energy Policy, 2003, produced by the Ministry of Energy and Minerals (MEM), aimed to create efficient and sustainable energy production, procurement, transportation, distribution and end-use systems.

Rural Energy Agency Act, 2005, aimed to enhance access to energy in rural areas. The Act created the Rural Energy Agency (REA) and the Rural Energy Fund (REF).²² REA is an autonomous body under the Ministry of Energy and Minerals. The REA promotes rural energy development by working with the private sector, NGOs, community based organizations, and government agencies. Its main functions include promoting energy access and efficiency and financing rural energy projects through the REF.²³

The REF functions as a trust and disburses funds. The income of the REF comes from the Government through an annual budgetary allocation, contributions from international financial organizations, multilateral and bilateral agencies and other development partners, levies of up to 5% on the commercial generation of electricity to the national grid, fees for programmes, publications, seminars, consultancy and other services by the REA and return on investments.²⁴

The Rural Energy Board (REB) governs both the REA and the REF with the Director General of the REA acting as a chief executive officer of the REA and the REF. The REB consists of the following: a representative from the Ministry responsible for energy, a representative from the Ministry of Finance, a representative from the Ministry responsible for regional administration and local government, a representative of the Private Sector, a representative of the Tanzanian Bankers' Association, a representative of a civil society, a representative of the Development Partners and a representative of consumers.²⁵

Electricity Act, 2008, outlined the rules for the generation, storage and distribution of electricity, including rural electrification. The Act also made electricity and the Energy and Water Utilities Regulatory Authority the Minister's responsibility. It mandates the Minister to work with the Rural Energy Agency to create a Rural Electrification Plan and Strategy.²⁶ The Act

22 FAO, "Un. Rep. of Tanzania: Rural Energy Act, 2005," accessed June 15, 2016, [http://faolex.fao.org/cgi-bin/faolex.exe?](http://faolex.fao.org/cgi-bin/faolex.exe?rec_id=142174&database=faolex&search_type=link&table=result&lang=eng&format_name=@ERALL)

[rec_id=142174&database=faolex&search_type=link&table=result&lang=eng&format_name=@ERALL](http://faolex.fao.org/cgi-bin/faolex.exe?rec_id=142174&database=faolex&search_type=link&table=result&lang=eng&format_name=@ERALL).

23 The Rural Energy Agency (REA), "Rural Energy Agency (REA)," accessed June 15, 2016, <http://www.rea.go.tz/>.

24 The Rural Energy Agency (REA), "The Rural Energy Fund," accessed July 4, 2016, <http://www.rea.go.tz/Projects/TheRuralEnergyFund/tabid/150/Default.aspx>.

25 The Rural Energy Agency (REA), "Organization Structure," accessed July 4, 2016, <http://rea.go.tz.dnnmax.com/AboutUs/OrganizationStructure/tabid/146/Default.aspx>.

26 FAO, "Un. Rep. of Tanzania: Electricity Act, 2008," accessed June 14, 2016, [http://faolex.fao.org/cgi-bin/faolex.exe?](http://faolex.fao.org/cgi-bin/faolex.exe?rec_id=069200&database=faolex&search_type=link&table=result&lang=eng&format_name=@ERALL)

[rec_id=069200&database=faolex&search_type=link&table=result&lang=eng&format_name=@ERALL](http://faolex.fao.org/cgi-bin/faolex.exe?rec_id=069200&database=faolex&search_type=link&table=result&lang=eng&format_name=@ERALL).

mandates the Energy and Water Utilities Regulatory Authority with the ability to approve the initiation of procurement of power projects.²⁷

Petroleum Act, 2015, made the government responsible for the strategic oversight and management of oil and gas. It mandated the Ministry of Energy and Minerals (MEM) to supervise policy, licensing and authorization. It made the Tanzania Petroleum Development Corporation (TPDC) and the National Oil Company (NOC) the owner of licenses. It established the Oil and Gas Advisory Bureau (OGA), Petroleum Upstream Regulatory Authority (PURA) and Energy and Water Utilities Regulatory Authority (EWURA) as institutional oversight agencies.²⁸

Extractive Industry (Transparency and Accountability) Act, 2015, mandated that concessions, contracts and licenses pertaining to the extractive industry must be published.

Oil and Gas Revenues Management Act, 2015, established an Oil and Gas Fund for maintaining fiscal and macroeconomic stability and increasing social and economic development.

Key Initiatives

Better Results Now (BRN) Initiative started in 2013 and was based on the Electricity Act, 2008. In this initiative, energy and natural gas are denoted as one of the six priority areas in Tanzania's development strategy along with agriculture, water, education, transport and mobilization of resources.²⁹ This initiative functions at the presidential level and may be more likely to be implemented faster than previous programs due to its higher profile. The initiative emphasizes the need for unbundling and privatizing the energy sector. BRN states that by 2025 the country should install 10,000 MW, sixfold the current capacity, according to Tanzania's development planning framework Tanzania's Development Vision (TDV) 2025.³⁰

Power Sector Reform Strategy and Roadmap (PSRS) aims to reform Tanzania's electricity sector including implementing risk and mitigation measures. It also presents the Reform Strategy on the proposed market structure and the Roadmap to implement that Strategy. The Strategy is rooted in Tanzania's Development Vision (TDV) which aims to transform Tanzania into a middle income country with an annual income per capita of at least USD 3,000 by 2025.³¹

27 Anton Eberhard et al., "Independent Power Projects in Sub-Saharan Africa."

28 Ernst & Young, "Tanzania Enacts Legislation Impacting the Oil and Gas Industry," August 11, 2015.

29 The United Republic of Tanzania Prime Minister's Office, "Big Results Now," accessed June 10, 2016, <http://www.pmoralg.go.tz/quick-menu/brn/>.

30 Anton Eberhard et al., "Independent Power Projects in Sub-Saharan Africa."

Policy, Capacity and Finance – the Main Constraints to Energy Sector Growth

Poor governance impedes the development of energy sector. The MEM suffered from high turnover disrupting its decision making process. In the absence of clear and up-to-date planning, the government fails to coordinate efficiently among its various agencies. State actors are not representing a united policy position and, in some instances, they contradicted and worked against each other's objectives.³²

Lacking institutional capacity impedes further energy sector development. Shortage of skilled and experienced officials results in low institutional capacity. In TANESCO and Tanzania Petroleum Development Corporation (TPDC), numerous experienced engineers and senior officials are close to retirement and this will result in a further skills shortage. Upstream gas and alternative energy sector development are new areas for MEM and thus its officials may not have the required training and experience in the sector.³³

Private investment is crucial to raise sufficient finance for energy sector development. Lack of finance significantly impedes further development of the energy sector. Greater private sector involvement is necessary to fill the financing gap. However, the government has sometimes been reluctant to increase private sector involvement in providing basic public goods. Private investors argue that projects with public funding are favoured over the ones funded privately. Numerous recent and upcoming large longer-term projects were and will be developed and owned by TANESCO despite the concerns about its financial sustainability. In the near future, all projects with private sector involvement will be developed as public-private partnerships (PPPs).³⁴ Private sector investors are cautious to invest in energy and infrastructure projects as the regulatory framework governing Independent Power Producers (IPPs) and Public-Private Partnerships (PPPs) is ambiguous.³⁵ Finally, private investment will expand only if the policy environment is stable and favourable and institutional capacity increases.³⁶

Uncompetitive bidding creates a barrier to using domestic energy resources. Government's contracting and distributing public and private generation projects is inconsistent and unclear. The government shows lack of commitment to increasing private investment and establishing

31 The United Republic of Tanzania Ministry of Energy and Minerals, "Electricity Supply Industry Reform Strategy and Roadmap 2014 - 2025," June 30, 2014.

32 Anton Eberhard et al., "Independent Power Projects in Sub-Saharan Africa."

33 Mark Henstridge et al., "Final Report: Support to the Delivery of Energy and Gas Sector BRN" (Oxford Policy Management (OPM), 2014).

34 Anton Eberhard et al., "Independent Power Projects in Sub-Saharan Africa."

35 Mark Henstridge et al., "Final Report: Support to the Delivery of Energy and Gas Sector BRN."

36 Ibid.

competitive bidding. Negotiated deals and non-transparent and uncompetitive procurement are still common practices.³⁷

Sustainability of TANESCO presents crucial financing concerns in energy sector. Due to concerns about TANESCO's financial sustainability, the Treasury tried to fill the financing gap by using funds raised through taxes. Nevertheless, TANESCO carries a high debt burden. Its arrears to its suppliers were estimated to be USD 400 million as of 2014. The company struggled to raise revenues for covering operating costs due to operational inefficiencies, costly generation contracts, inefficient applications process for tariffs increases to the Energy and Water Utilities Regulatory Authority (EWURA).³⁸ Finally, even though favourable regulations exist for tariff setting to recover costs, increasing tariffs is perceived as politically unpopular.

Its evolving relationship with China may help Tanzania raise additional financing. The relationship between China and Tanzania evolved and resulted in various financing deals. For instance, China's Exim Bank agreed to provide USD 1.2 billion loan in 2012 to finance the Mtwara-Dar es Salaam natural gas pipeline. Further, the Chinese National Offshore Oil Corporation (CNOOC) that already operated in Uganda, has recently bid for one of the offshore blocks.³⁹

More coordination and government leadership are needed when working with DPs. The government should show stronger leadership in working with DPs and ensure stronger coordination. Development partners (DPs) are often fragmented and duplicate work. MEM and other agencies have requested overlapping capacity-building support from various partners. In 2009, development partners and governments committed to expanding the sustainable development effort in Tanzania created the Energy Development Partners' Group (EDPG), a coordination mechanism for working with the government. This group facilitates a Joint Energy Sector Working Group (JESWG) to promote dialogue among DPs and governments. DFID has recently provided the most aid for budget support for Tanzania. Also, the largest donors overall have been the World Bank, the US and DFID.⁴⁰

Financial aid provided through the sector budget support (SBS) along with common results frameworks may be preferred by donors. Multilaterals, such as the European Commission and the World Bank, along with a number of bilateral aid agencies provide Tanzania with general budget support. The World Bank and the African Development Bank were the initial organizations to negotiate sector budget support (SBS) programmes in which

37 Anton Eberhard et al., "Independent Power Projects in Sub-Saharan Africa."

38 Mark Henstridge et al., "Final Report: Support to the Delivery of Energy and Gas Sector BRN."

39 Rasmus Hundsbak and Peter Bofin, *The Politics of Gas Contract Negotiations in Tanzania: A Review* (DIIS, 2015), http://pure.diiis.dk/ws/files/276453/WP_2015_03.pdf.

40 Mark Henstridge et al., "Final Report: Support to the Delivery of Energy and Gas Sector BRN."

they expressed sector specific conditions and defined results frameworks. A number of other donors providing assistance to energy related programs are interested to develop a common results framework or at least align conditions for compatible financial aid.⁴¹

41 Ibid.

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