ENERGY
CATALYST

Country Guide: Tanzania

June 2020

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Tanzania is located within the African Great Lakes region. It borders Kenya, Uganda, Rwanda, Burundi, D.R. Congo, Zambia, Malawi, Mozambique and the Comoro Islands. The terrain consists of coastal plains, a central plateau and highlands in the north and south. Tanzania's climate is divided into four main climatic zones: the hot humid coastal plain, the semi-arid zone of the central plateau, the high-moist lake regions, and the temperate highland areas.

Figure 1: Map of Tanzania. Source: d-maps

Tanzania comprises of mainland Tanzania and the islands of Zanzibar (the two main islands are Unguja and Pemba, alongside a number of small islands). Major towns are Dodoma, Dar es Salaam, Arusha, Mbeya and Mwanza. One political party, Chama Cha Mapinduzi (CCM), has been in power since independence. President John Magufuli won his first five-year term in the the October 2015 presidential election. He also secured a two-thirds majority in parliament. Parliament is constituted of elected and appointed representatives, with 30% female representation. Politically, Tanzania is a stable country. It is ranked as a Least Developed Country with a Human Development Index of 0.528, though it has adopted a series of development plans with the aim of achieving middle-income status by 2025. Tanzania is implementing a Five-Year Development Plan (2017-2021) focussing on developing the industrial sector, developing skills and a better environment for doing business, and strengthening research and development. Agriculture is the backbone of the Tanzanian economy, with about 75% of its citizens depending on it for their livelihoods.

Economy

Tanzania has sustained relatively high economic growth over the last decade, averaging 6–7% a year. While the poverty rate in the country has declined from 34.4% to 26.8%, the absolute number of poor citizens has not because of the high population growth rate.

Tanzania is member of the United Nations, the African Union, the East African Community, the Southern African Development Community, and COMESA.

In the yearly World Bank survey on "Doing Business", a comparison of business regulation in 190 economies, Tanzania scores very low. The 2020 edition of Doing Business ranks Tanzania as 165 out of the 190 with a score of 74.4 out of 100 for the ease of starting a business. Figure 2 provides a comparison of Tanzania to neighbouring economies for starting a business.

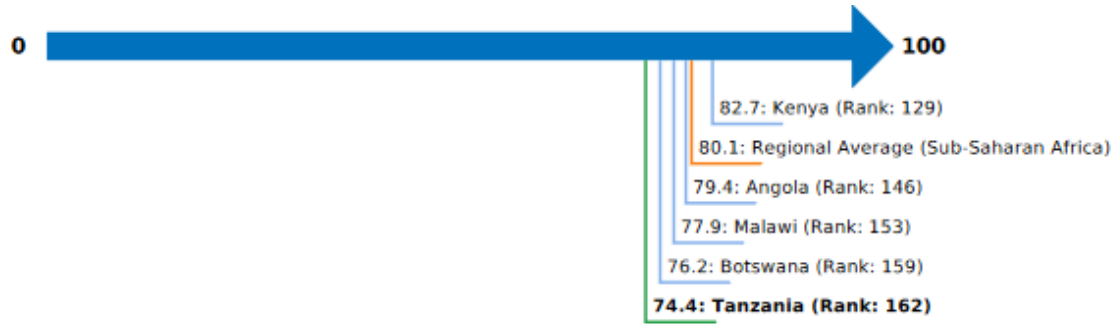

Figure 2: Doing Business 2020 score for starting a business. Data from: World Bank Group, 2020

The energy sector in Tanzania

Tanzania's electricity sector relies mainly on power from hydroelectric and natural gas plants. As of February 2020, the total installed capacity was 1.602GW. Peak electricity demand was recorded at 1,026 MW in 2016 (averaging 95 MW). Growth in electricity demand is projected to increase at 12-15% annually buoyed by economic growth, the planned expansion of industry and rural electrification. TANESCO, the state-owned power utility company, owns the bulk of generation power plants (about 77%), with the balance owned by Independent Power Producers.

Table 1: Tanzania at a glance

Capital	Dodoma
Total Area	947,303 km^2
Population	56.31 million (2018)
Official languages	Swahili English
Rural Population	66% (2018)
GDP	US $ 61B (2019)
GDP Per Capita	US $ 1,172 (2019)
Currency	Tanzanian Shilling (TZS)
Exchange rate 01/03/2020	1 GBP = 2,926.01 TZS
Exchange rate 01/03/2018	1 GBP = 3,153.66 TZS
Access to Electricity	32.81% (2019)

Tanzania is currently implementing the National Rural Electrification Program (2013–2022), whose goal is to increase the country's overall electricity access of the population to 50% by 2025 and at least 75% by 2033.The National Rural Electrification Program, led by the Ministry of Energy and Minerals and the Rural Energy Agency, includes both on-grid and off-grid solutions and has four priorities: (i) the connection of new customers to the grid in already electrified settlements; (ii) new connections to the grid; (iii) electrification through off-grid investments; and (iv) the development of distributed technologies, in particular off-grid solar and other renewable technologies.

Only 10% of households in Tanzania are connected to the national grid, and only 1% can use electricity for cooking. This situation is compounded by the low level of electrification, where only 7% of rural people and 40% of urban people have access to electricity, seriously constraining the potential for growth and level of earnings of the population. Above and beyond, the poor spend about 35% of their household income on energy while the better-off spend only 14%.

Small hydropower

Hydropower is the main source of electricity in Tanzania, providing 45% of power generated. However, intermittent river flows have decreased its reliability. Another key challenge facing hydropower is the regional mismatch between hydro sites and major demand centres, which requires investment in transmission lines. Tanzania does intend to further develop its large-hydro capacity with estimated potential calculated as high as 4,000 MW.

Of the presently installed grid connected capacity, two small-scale hydro power plants are owned by TANESCO (Nyumba ya Mungu 8MW, Uwemba 4MW), and a further two by private developers (Mwenga 4MW, Yovi 1MW). Beyond these existing developments Tanzania has significant small hydropower potential (installed capacity <10 MW) estimated at 315 MW. Further site level assessments undertaken by TANESCO and financed by the Ministry of Energy and Minerals (MEM) have identified 131 specific small hydro sites across the country.

Table 2: Overview of the main stakeholders in the energy sector in Tanzania

Institution	Role
Ministry of Energy and Minerals (MEM)	Policy and strategy formulation, facilitating the development of energy and mineral resources
Renewable Energy Fund (REF)	Financing of REA implemented activities from Tanzania's budget, from foreign donors, levies from electricity production and other levies as well as interest rates and returns
Tanzania Electric Supply Company Limited (TANESCO)	Generates, transmits, distributes and sells electricity to the Tanzania mainland and sells bulk power to the Zanzibar Electricity Corporation (ZECO) which in turn sells it to the public on the islands of Unguja and Pemba.
Rural Energy Agency (REA)	Boosting modern energy services in rural areas, supervision of projects, and technical assistance of project development
Energy and Water Utilities Regulatory Authority (EWURA)	Technical and economic regulation of the electricity, petroleum, natural gas and water sectors
Tanzania Commission for Science and Technology (COSTECH)	Supports research and development, innovation, technology transfer, infrastructure (RE is cross-cutting research issues, focussing on physical, life, social, innovation and commercialization)
National Environment Management Council (NEMC)	Promotion of environmental management in Tanzania through coordination, facilitation, awareness raising, enforcement, assessment, monitoring and research

Solar energy

Tanzania has promising levels of solar energy, ranging between 2,800 and 3,500 hours/year of sunshine and daily global horizontal radiation of 4–7 kWh/m^2. Solar radiation is particularly high in Tanzania's central region.

So far, 6 MW of solar off-grid PV has been installed countrywide for use at villages, schools, hospitals, health centres, police stations, small telecommunications enterprises and households, as well as for lighting, street lighting and basic electricity needs. The government, through the REA and various donors, has supported a few solar PV expansion programmes. One 1 MW grid-connected PV plant has been commissioned, while the potential for grid-connected solar PV is estimated to be 800 MW.

In the short-term, the Power System Master Plan (PSPM) 2007-2031 envisages that by 2025, about 800 MW will be served into the national grid from solar power generation. By July 2018, there were more than 1 million solar-powered homes in Tanzania, with solar photovoltaic panels ranging from 10 to 100 kW per home. Several private companies have expressed interest in developing 50–100 MW solar plants.

The Tanzanian solar energy sector has been fast-growing in recent years and solar products are now a common sight in shops and markets throughout the country. Contributing factors have been the reduced costs of solar PV panels, the frequent power outages and the high cost of connection to the grid.

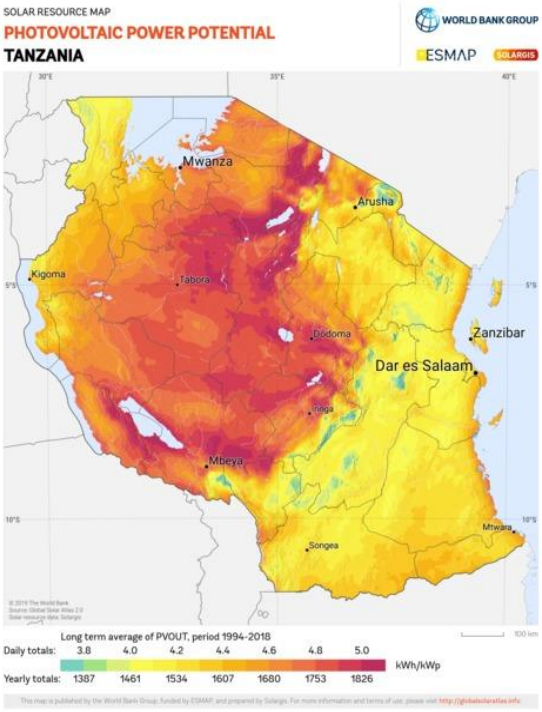

Figure 3 Solar resource Tanzania. (2019 The World Bank, Source: Global Solar Atlas 2.0, Solar resource data: Solargis)

Biomass energy

Most Tanzanians rely on biomass for energy consumption; mostly in the form of fuelwood or charcoal that is used for cooking and heating. Wood energy demand accounts for approximately 90% of Tanzania's overall energy supply and demand. Almost 90% of that demand comes from the household sector.

Apart from the environmental impacts of biomass energy use, there are economic impacts on household spending. Poor households spend a considerable share (from 35-50%) of their total income to meet their domestic energy needs. Biomass energy alone accounts for 63.5% of a typical family's household energy budget.

Initiatives are running that aim to reduce the negative economic, environmental and health effects of using biomass for cooking. These include the implementation of improved cookstoves by the government and other actors.

For electricity generation, there is only one grid-connected biogas plant (18 MW) in place. However, several agro-industrial companies have constructed captive power systems. The potential for modern biomass use is high, considering that the raw material available is abundant and includes sugar bagasse (1.5 million tons per year), sisal (0.2 MT/year), coffee husk (0.1 MT/year), rice husk (0.2 MT/year), municipal solid waste (4.7 MT/year) and forest residue (1.1 MT/year).

Wind energy

Initial assessments have shown Tanzania to have promising wind resources, with Kititimo (9.9 m/s average wind speed at 30m) and Makambako (8.9 m/s) having been identified as having adequate wind speeds for grid-scale electricity generation. The Ministry, in collaboration with TANESCO, is conducting wind resource assessments on eight further sites throughout the country. In addition, REA supports wind measurements on Mafia Island. As of July 2018, four private companies had expressed interest in investing in wind energy, considering construction of farms in the 50–100 MW range. The first wind power project in Makambako District in Njombe region, in the southwest, was launched in 2019.

Geothermal

Tanzania has significant geothermal potential that has not yet been fully quantified. Estimates based on analogue methods indicate a potential exceeding 650 MW, across 50 identified sites in three main prospect zones located in the East African Rift Valley.

Natural gas

Proven natural gas reserves in Tanzania are estimated at more than 45 billion m^3. Natural gas deposits in Tanzania are found at Songo Songo in Lindi region, Mnazi bay in Mtwara Region and Mkuranga in Coast Region. The reserves at Songo Songo and Mnazi bay are estimated at 30 and 15 billion m^3 respectively. A 232 km gas pipeline from Songo Songo Island to Dar es Salaam has been constructed and is supplying natural gas for power generation and other industrial thermal processes. Songas' 190 MW Ubungo gas powered plant contributes approximately 20% to the Tanzanian grid.

Mini grid sector development

By 2016, Tanzania had at least 109 mini grids located in 21 regions, with an installed capacity of 157.7 MW and connecting 180,000 people. 93 of these mini grids are off-grid. The government estimates that, given the large size of the country and the low population density in rural areas, the most cost-effective way to serve half of the rural population is through decentralised energy options. About 65% of rural households were served by solar power by 2016.

Figure 4: Mini grids in Tanzania as of 2016. Source: WRI, 2017

Since 2015, Tanzania has been proactive in developing and revising mini grid policies and regulations to encourage more investment in the decentralised energy space. The 2008 small power producers (SPP) framework has so far been revised twice, in 2015 and 2017, to widen the scope of renewable energy technologies, include flexible feed-in-tariffs, improve the licensing process, and make provisions for the arrival of the main grid for isolated mini grids. The government has developed a mini grid portal dedicated to providing comprehensive information to stakeholders, e.g. licensing requirements and the government's on-grid and off-grid electrification plan.

Tanzania's mini grid specific policies and regulations include:

- An SPP framework for projects between 100 kW-10 MW with technology specific FiTs, e.g. renewable energy FiTs (REFiT) for hydro, wind, biomass and wind projects between 0.1 – 1 MW capacity
- Cost-reflective retail tariffs for direct sale to customers
- Projects with capacities less than 100 kW do not require approval for retail tariffs, subject to community approval of tariffs
- Licensing requirements are only needed for mini grids exceeding 1 MW
- Single licensing for multiple mini grids developed by the same company at multiple locations using the same technology
- Provisions for the arrival of the main grid for isolated mini grids
- Registration with the National Environment Management Council (NEMC) for all off-grid projects

Despite these inclusive policies, Tanzania has no clear regulations on tax exemptions for solar PV components. The government initially had exemptions on import duty and VAT for major solar components. The 2015 VAT Act and 2016 Customs Law, however, revised these requirements and removed some components from the list, though enforcement is still not clear.

Major active companies in the mini grid space in Tanzania include:

- Ensol
- Jumeme
- Ludewa
- Power Corner
- PowerGen
- Redavia
- Rift Valley Energy
- Ruaha Energy
- TaTEDO & HPS

Table highlights some of the active mini grid and off-grid energy programmes in Tanzania.

Table 3: Active support programmes in Tanzania

Programme	Main activities
The Lighting Africa Tanzania Programme	Facilitating the development of a commercial market for quality solar lanterns and solar home systems
Power Africa Off-grid project (2018 – 2022)	Working on three main areas: increasing the number of off-grid connections, improving access to commercial finance for private companies, and improving the enabling environment for the off-grid energy market
Rural Electrification Tanzania (2015 – 2021)	Country-wide initiative to connect 335,000 rural households either through grid connection, or off-grid options such as mini grids and standalone solar home systems
Tanzania Rural Electrification Expansion Project (2016 – 2022)	Provides loans for working capital for renewable energy companies and small power producers.
The Green Mini Grid Help Desk (under the Green Mini Grid Market Development Programme)	Mini grid developers receive technical assistance, from support on demand assessments to technical sizing, capital raising, procurement and installation support, commissioning, and optimisation of operations

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The Women in Renewable Energy programme (WIRE)	Funded by the Adventure Project and managed by Energy 4 Impact. Provides support to women-led energy microenterprises in energy-poor rural areas in Kenya and Tanzania, to further develop the clean cooking and solar market.

Industry associations

Tanzania Renewable Energy Association promotes the sustainable development of Renewable Energy Technologies in Tanzania Mainland. TAREA cooperates with all important enterprises in Tanzania, as well as (inter-)national organisations. They have 30 corporate members and a high number of individual members.

Africa Minigrid Developers Association works collaboratively with policy-makers, government authorities, regulators, national utilities, professionals, donors and other stakeholders to build an optimal energy network based on innovation and adoptive clean technology that will meet the needs of African economies.

References and further reading

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Market Information about Tanzania
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Official UK Government travel advice for Tanzania
https://www.gov.uk/foreign-travel-advice/tanzania

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