



**THE POLITICAL ECONOMY OF ENERGY
PRODUCTION IN POST-INDEPENDENCE
TANZANIA: A REVIEW**

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ABSTRACT

Energy is crucial to sustainable development globally. This working paper provides a critical review of the politics of energy production and how it manifests in supply and access in post-independence Tanzania. Drawing on existing scholarly analyses and grey literature, it paints a picture of some of the main political dynamics behind energy sector development in Tanzania. Energy production, transmission, supply, and access are contestable issues. The paper examines how energy politics have influenced government energy source choice and, more importantly, how renewable energy has featured in Tanzania's energy politics since independence and what this means for the broader agenda of renewable energy and sustainable development. Even though several rounds of policy reforms have placed emphasis on renewable energy, the scene has continued to be one dominated by hydro and non-renewable energy sources. Where non-hydro, renewable, energy projects have been built, these have only been mini-grid projects concentrated in rural areas. Large, non-hydro, renewable projects have not yet attracted adequate government interest. The regulatory and policy framework has not been in favour of large-scale, non-hydro renewables, even when the Government has appeared to commit itself to promoting them.

INTRODUCTION

Debates over potential transitions to cleaner energy are gaining strength across the African continent (Oxford Energy Forum 2018). In Tanzania, new forms of renewable energy like solar and wind feature in policies and plans. But so far deployment has been limited, as is the picture in several other African countries (Kazimierczuk 2019; International Energy Agency 2022). Nonetheless, in Tanzania, energy production is a matter of great political significance and increasingly so as 'modern' energy expands globally. This paper provides a historical review of the policies of energy production in the country, with a focus on the broader political priorities that have influenced the choice of energy and energy technologies in different historical periods. Thus, the paper revolves around the question: how have political priorities influenced choice of energy sources and technologies in Tanzania?

The paper contributes to an emerging body of literature that sees energy and energy transitions as processes that are shaped by inherently political dynamics (Köhler et al. 2019; Pedersen, Andersen, and Renkens 2021). Energy production is an important aspect of development policy in post-colonial Africa, including Tanzania. Extant research shows that energy access is a major development challenge in Africa mainly because of the energy sector's underdevelopment (Hafner, Tagliapietra & Strasser 2018; Blimpo & Cosgrove-Davies 2019; Harris 2018). This remains the case despite the continent having been independent from classical colonial domination for over sixty years. While 21st century energy needs demand newer and transformed energy production systems, Africa's energy sector has continued to function on outdated, 20th century systems (Harris 2018). The paper argues that in Tanzania this has been a factor contributing to the lack of diversification of the energy mix to include non-hydro renewables such as wind and solar.

In Tanzania, the production of modern energy was and continues to be dominated by the state and a state-owned enterprise since independence in 1961. The Tanzania Electric Supply Company (TANESCO) became the sole supplier of electricity in the country with some notable success during the 1960s and 1970s and deteriorating performance since the 1980s (Eberhard et al. 2016). Although there have been repeated attempts at reforming and/or privatising TANESCO and the energy sector, this has not come to pass. A gradual liberalisation in the 1990s resulted in some grand corruption scandals whose scars continue to influence energy sector development (Gray 2015; Lyimo 2006; Energy Charter Secretariat 2015) and TANESCO remains the main generator, and sole transmitter and distributor of grid energy in the country (Bofin, Pedersen & Jacob 2020; Felix & Gheewala 2012; Eberhard et al. 2016).

Post-independence, biomass continued to be important for household consumption as the production of modern energy was primarily for industrial purposes (Felix & Gheewala 2012). Over the last decades, the pressure on power production has increased due to economic growth and rural electrification as, supported by donor funding, access to electricity has been scaled up. Up to late

2000s there was an overwhelming dependence on hydropower sources, which contributed between 70%–90% of total generation capacity (Felix & Gheewala 2012; Lyimo 2006). Until the development of domestic gas and gas-to-power projects, the first of which began production in 2004, and which now make up a major part of power production, the country also relied on the import of expensive petroleum.

Partly due to the unpredictability of hydropower generation, prone as it is to weather changes and climate variability, the energy sector continues to struggle with intermittent power cuts and rationing (CTI 2011; Felix & Gheewala 2012; Eberhard et al. 2016). Efforts to diversify the sources of energy can be observed throughout Tanzania's modern history but the extent to which they have succeeded has varied. Power Sector Master Plans (the 2016 and 2020 updates, for instance) show government commitment to diversify the country's energy mix to include other domestic resources like coal, geothermal and large-scale wind and solar, even though these have seen little progress in terms of contributing to electricity production. For solar and wind this can to some extent be explained by resistance towards the private companies involved in the promotion of these sources of energy.

The review provides an analysis of the politics of energy production with a focus on how broader political priorities have influenced the choice of different types of energy in post-independent Tanzania. It thus focuses on how energy production for economic development, state–business relations in energy production, and the role of access to modern energy each have contributed to shaping the choice of energy, albeit it also suggests that the relative importance of these elements has shifted over time. Throughout the review, particular attention is paid to the role and place of new, renewable, energy sources, whose importance has grown in energy sector planning but, however, continues to be less prioritised when it comes to implementation. The review considers three distinct political periods, namely, the socialist, neoliberal and state developmentalist periods. These broader political periods are not chosen on the basis of representing particular energy policy shifts but to reflect broader development policy change which has had major impacts on energy production.

The review is based on existing academic and grey literature on energy sector development, reform, and politics throughout the period from independence in 1961 to 2021. Even though President Samia Suluhu Hassan has demonstrated openness and commitment to private investment in energy production since assuming office in 2021, we think it is still too early to tell if anything material is emerging from this. The literature upon which this review is based was obtained by using search engines, most notably Google Scholar, using keywords such as energy, reform, Tanzania, energy policy, and renewable energy. It should be noted that not all papers that were on energy in Tanzania were reviewed; the papers that were reviewed were those whose focus is on questions of political economy. Papers that were entirely on technical aspects of renewable energy in Tanzania were not included.

Following this introduction, the rest of the paper is organised around the three major periods reflecting major ideological and/or development policy shifts in Tanzania and how these have impacted on energy production. In section two, the paper considers how socialist development strategies and policies of the period from the 1960s to 1980s affected the trajectory of energy production, supply and access in Tanzania. Section three moves on to consider how liberal reforms adopted by Tanzania from 1990s to 2000s redefined the contours of energy politics. It shows that major policy shifts at global and continental level also meant that Tanzania had to redefine its development policy by adopting liberal reforms which introduced some aspects of privatisation into the country's energy sector. Finally, in section four, the paper considers developments in the energy sector during the period from 2010 to the present, a period characterised by the return of the state in economic planning and state participation. In this period nationalist policies have seen the state place more emphasis on mega energy projects including the Julius Nyerere hydro project, the natural gas project, and increased recognition of non-hydro renewable projects, even though these have not so far been brought to implementation.

THE SOCIALIST ERA AND ENERGY POLITICS IN TANZANIA (1961-1980S)

The period from independence to the 1980s was dominated by a socialist development ideology and this was a period of economic nationalisation with the state assuming a major role in development planning. In the energy sector some of the major developments included the establishment of the state-owned utility, the Tanzania Electric Supply Company (TANESCO). Key emphasis with regard to energy production was on hydro sources. It should, however, be noted that energy production during this period was done within the context of the country's broader industrialisation agenda; thus, implying there was limited financial and policy support for electrification for purposes other than industrialisation. A key question here is: how did the socialist development politics affect energy choices and production in Tanzania?

The 1960s–1980s was a period of major socio-economic and political experimentation driven by the desire to transform Tanzania's economy. This was the period marked by several major development projects in an overarching nation building project seeking to forge a united nation from over a 120 ethnic groups. This was associated with such measures as the adoption of a mono-party political system, and the unification of Tanganyika and Zanzibar to form the United Republic of Tanzania. It also involved the adoption of socialist policies whose major means of production are under the control of peasants and workers, where democracy thrives and whose major political ideology is socialism (TANU 1967). Together, these plans sought to modernise agriculture, education and industry, to promote power production and implement self-reliance, among others (Hoag & Ohman 2008; Malima 1979).

Hydropower for development

When it became free from British colonial rule in December 1961, mainland Tanzania inherited a power sector that was dominated by two major private hydropower companies, namely, the Dar es Salaam and District Electric Supply Company (DARESCO) and the Tanganyika Electric Supply Company (TANESCO), both of which were established in 1931 (Msyani 2013; TANESCO 2016). During this early period of socialist policies, power generation was part of the broader development projects including villagisation, development services, sedentary agriculture and mechanisation, and, with time, industrialisation (Movik & Allouche 2020). The two companies were merged in 1964 and later became known as Tanzania Electric Supply Company (TANESCO) (Movik & Allouche 2020; Msyani 2013).

With socialist development ideology and policies adopted in 1967, the two companies were fully acquired by the Government. The policy of socialism was made official with the Arusha Declaration promulgated in 1967, which aimed to build a society that was self-reliant and free from exploitation. Consequently, the major means of production, including those relevant to energy such as oil and electricity and water, were put under the control and ownership of the people through their government. To realise these grand goals several development plans were adopted during this period. These included the three-year development plan (1961–1964), the first five-year development plan (1964–1969), the second five-year development plan (1969–74), and the third five-year development plan (1975–1980).

While diesel-based power generation was dominant during this period, in 1964 and 1969 TANESCO completed the Hale hydro plant in Pangani and the Nyumba ya Mungu dam in Kilimanjaro respectively. However, these were multi-purpose dams combining flood control, irrigation and power production, and produced little power, with the Nyumba ya Mungu dam, for instance, providing only 8 MW of installed capacity (Hoag & Ohman 2008; Öhman 2007). With increased emphasis on socialism and intensified economic development and modernisation in the late 1960s and early 1970s came the era of grand hydropower projects that sought to generate electricity for powering the country's industrialisation.

The most notable of these was the Stiegler's Gorge project,¹ a 2100 MW scheme on the Rufiji River (Movik & Allouche 2020). This project was proposed in the late 1970s under the Rufiji Basin Development Authority (RUBADA) in order to harness hydro energy from the river through a four phase strategy resulting in total generation of 2100 MW: 300 MW during Phase I (1990–95); 900 MW by end of Phase II (1995–2005); and 2100 MW at the end of Phases III and IV (2005–15)

¹ This is not to be confused with the later Stiegler's Gorge Project, renamed Julius Nyerere Hydropower Project (JNHPP), that was initiated recently during President Magufuli's administration.

(Kassum 2007). The conception of the Stiegler's Gorge project coincided with global interest in hydropower generation. Although initially funded by the US Government and modelled on the US Tennessee Valley Authority (TVA) hydro project, the country's socialist policies and the antagonistic bi-polar global political economy made the US halt its funding of the project. Even though other donors, such as Norway, stepped in to fund it, the project did not materialise (Movik & Allouche 2020). Funding aside, the Stiegler's Gorge project attracted great controversy especially with regard to its feasibility and environmental and socio-economic impact (Hoag & Ohman 2008; Dye 2019a). These factors combined to make the commissioning of the project impossible until it was recently revived by President Magufuli's administration as JNHPP.

Even though the Stiegler's Gorge project did not materialise, other hydropower projects were commissioned. For instance, during this same timeframe, the Great Ruaha Power project was established by TANESCO with funding from Swedish International Development Agency (SIDA) and the World Bank resulting in two dams, namely, Kidatu and Mtera, whose construction began in 1970 and 1980 respectively (Walsh 2012; Hoag & Ohman 2008; Movik & Allouche 2020). The two dams had a power generating capacity of over 300 MW, providing just over half of the country's total installed power generation capacity and over 75% of its hydropower (Walsh 2012). Under the impression of looming power shortages further hydro projects were discussed and agreed with donors, first the rehabilitation and redevelopment of the Pangani Project with Nordic donors (Sweden, Norway and Finland) around 1990 and the construction of the Kihansi Project only a little later with a wider range of donors (Norway, Sweden and Germany, The European Investment Bank and the World Bank) (Öhman 2007).

The search for alternatives

It is thus apparent that the hydroelectric projects have dominated Tanzania's energy production efforts. This does however not imply that the country did not wish to diversify its power production. In 1974 gas was found at the Songo Songo Island by Agip Tanzania, a company 50% owned by the national oil company, Tanzania Petroleum Development Corporation (TPDC). The interest in developing this and the discovery of the Mnazi Bay field in 1982 only increased with high import prices of petroleum products during recurrent oil crises, but the Tanzanian market was too small to justify the cost it would require to develop the necessary gas and gas-to-power infrastructure (Bofin, Pedersen & Jacob 2020). This notwithstanding, commercial energy production from sources such as kerosene, electricity and liquefied petroleum gas accounted for 1% of domestic energy requirements with over 92% accounted for by biomass (Sheya & Mushi 2000).

Renewable sources other than hydro remained at the fringes of energy production and supply in Tanzania. Small, non-hydro, renewable energy projects including those for solar energy, biogas and wind energy existed but were not commercially viable. For solar energy, there were about 66 solar energy installations in Tanzania by NGOs and missionaries. However, these were only for end use such as hot water supply, electricity for lighting, refrigeration and water pumping (Kassenga

1997; Sheya & Mushi 2000). Wind energy was still underdeveloped, even though there were some wind turbines established in the country for water pumping, not for commercial energy production (Sheya & Mushi 2000; Kassenga 1997). Many of these projects were introduced and financed mostly by non-government institutions in response to the energy scarcity in the country, and more so in rural areas. Some donors such as USAID supported these projects, for instance by financing the installation of wind turbines in several villages of Arusha during the 1980s (Nzali & Mushi 2006). Donor support, however, was channelled through NGOs, which unfortunately had no capacity to manage and develop the projects to fruition and sustainability (Foley 1992).

The technology for these projects was imported and where attempts were made to domestically develop the technology, as in the case of the Ujuzi Leo Industries (ULI) in Arusha, which built 20 wind turbines for water pumping, these did not go far due to lack of market and financial resources (Kassenga 1997). Further, these attempts at promoting local development of renewable energy technology did not progress due to lack of relevant support from the Government and foreign development assistance as well as failure to translate political will and interest into budgetary expenditure (Karekezi et al. 2005; Foley 1992). In part, the limited realisation of the potential of other energy sources beyond hydroelectric power was a result of there not being a national strategy for renewable energy development. As we show in the next section, it was not until 1992 that Tanzania formulated a national energy policy.

Despite the fact that, during the first twenty years of independence, energy sector performance was reportedly relatively successful (Eberhard et al. 2016), energy production in the period under review faced several challenges. These include those related to technology, funding, energy policy, and the volatile international political economy (Sheya & Mushi 2000; Kassenga 1997; Hoag & Ohman 2008). Government emphasis on energy production for industrialisation meant that there was limited financial and policy support for electrification for other purposes other. Furthermore, government emphasis on hydroelectric energy made it harder for other renewable sources of energy to adequately feature in the energy mix. More importantly, the oil crisis of the 1970s, the war between Tanzania and Uganda and the resulting economic crisis of the late 1970s to 1980s made matters worse, not only in energy production and supply but also with the rest of the socio-economic fabric, thus calling for reforms.

THE 1990S–2000S: NEOLIBERAL REFORMS AND THE POLITICS OF ENERGY PRODUCTION

Major socio-economic and political reforms were undertaken by Tanzania during this period. In the energy sector, major reforms included the formulation of an energy policy in 1992 and its revision in 2003. This policy, for the first time, made a commitment to promote private sector engagement in energy sector

development. It also committed the Government to explore and make use of indigenous energy sources, including non-hydro renewable energy, to increase energy production. Gas became an increasingly important source of energy in the second half of the period. It was also the period during which independent power producers were engaged by the Tanzanian Government following episodes of major droughts. Even though there were calls for privatisation and unbundling of the state energy utility, this was not accomplished. Mega private energy production deals secured during the time ended in corruption scandals and rent-seeking in the sector, ultimately leaving the sector even more prone to intermittent power cuts.

The 1990s–2000s were years of major socio-economic and political reforms, not only in Tanzania but across the African continent. These reforms, dubbed structural adjustment reforms, were wide-ranging but with the overall goal of liberalising African economies to give way for the private sector to become an engine of development (Mkandawire & Soludo 1998; Mkandawire 2005). Although Tanzania had adopted the second long-term perspective plan (1981–2000) that was to have been implemented in four successive five year development plans, the urgency of responding to the crisis forced the country to abandon the five year development plan strategy and adopt economic stabilisation and reform strategies in line with International Financial Institutions (IFI) policy prescriptions (United Republic of Tanzania 2012). Apart from the broader socio-economic and political reforms undertaken by Tanzania during this period, major reforms were adopted in the energy sector. These included mainly the formulation of the energy policy in 1992 and its revision in 2003 to respond to pressure from donors. Furthermore, serious droughts that hit the country during the 1990s necessitated the engagement of private power producers in the generation of energy. How did these developments and reforms impact on the energy sector in Tanzania?

The energy sector reform agenda

The 1990s were years of socio-economic and political reforms in the country and in the energy sector. During this period, privatisation was a major economic policy reform agenda in line with the prescriptions of the World Bank and the International Monetary Fund. These international institutions pushed for a reform agenda in the energy sector on the understanding that private sector participation and regulation would be a solution to insufficient public funds for new generation and sub-standard performance by state-run utilities (Eberhard, Gratwick & Kariuki 2018; Foster & Rana 2020). Among the public parastatals earmarked for privatisation was TANESCO. The World Bank, for instance, urged Tanzania to unbundle TANESCO and reform the energy sector on account of its poor performance (Eberhard et al. 2016; Eberhard, Gratwick & Kariuki 2018). The key assumption was that privatisation and/or liberalisation of the energy sector would allow private investors into energy production, supply and distribution. This would in turn address the energy challenges that confronted Tanzania and the major inefficiencies of TANESCO.

The 1990s began with the formulation of the energy policy in 1992. Emerging from the socialist policies, the energy policy adopted in 1992 introduced market friendly changes in line with the broader economic reform agenda. Around the same time TANESCO's monopoly over power generation, transmission and distribution was reformed to allow private independent producers to come into play (Lyimo 2006; United Republic of Tanzania 1992). The formulation of an energy policy was a culmination of economic reforms modelled on market economy which had begun in 1986. The energy sector with its monopoly state utility, TANESCO, had proved dysfunctional and too ineffective to allow it to continue operating as it did during the socialist era. Despite opposition both within the Government, the ruling party and beyond, policy reforms in favour of market economy were instituted in 1992 in order to regain donor confidence (Godinho & Eberhard 2018).

Even though the policy focus promoted by influential donors was on bringing the private sector into energy, in practice this was not followed up with real efforts by the Government to unbundle TANESCO and reform the sector and TANESCO was not earmarked for privatisation until 1997. TANESCO was to be unbundled to form two generation companies, that is one transmission company owned by the Government and two distribution companies with the grand goal of privatising generation and distribution (Eberhardt et al. 2005). Even after this earmarking, it was not privatised and the Government instead undertook some TANESCO management reforms to improve the utility's efficiency and effectiveness (Clark et al. 2005). These included reforms to improve the governance of TANESCO which saw a South African firm, NET Group Solutions, awarded a two-year TANESCO management contract in 2002 (Godinho & Eberhard 2018). Despite opposition from the public and from political leaders, the contract was executed, albeit not without the use of coercive state apparatus (Godinho & Eberhard 2018).

In 2005 the Government removed TANESCO from the list of parastatals to be privatised (Eberhard, Gratwick & Kariuki 2018). It is reported that 'considerable resistance to reforms continued behind the closed doors of the CCM [*the ruling party*], where those with vested economic or political (including ideological) interests pushed against or subverted interventions, specifically privatisation' (Godinho & Eberhard 2018: 12). Understandably, several decades of monopoly had meant that several senior politicians and officials had developed vested interests in TANESCO, such as the opportunity for rent-seeking and corruption (Cooksey 2017), which meant that serious reform and unbundling was tantamount to jeopardising their interests (Gray 2015; Godinho & Eberhard 2018).

One thing that did materialise from the reform agenda was the establishment of a state agency for regulating the energy sector, the Energy and Water Utilities Regulatory Authority (EWURA). EWURA was established as an independent regulator in 2001 by the EWURA Act but only became operational in 2006 (Ngamlagosi 2015). It was established to regulate the economic and technical aspects of the electricity, natural gas, petroleum and water sectors, which could all potentially involve private companies. In regulating these areas, EWURA performs several functions, namely, licencing, regulating tariffs and charges, monitoring, and resolving conflicts and disputes (Ngamlagosi 2015).

It was not until 2008 when the Electricity Act was enacted that the Government signalled a renewal of commitment to reform the sector (Eberhard, Gratwick & Kariuki 2018). The Electricity Act, for instance, makes provision for a body to apply for licences to undertake power generation, transmission, distribution, supply, system operation, cross-border electricity trade, physical and financial trade in electricity, and electrical installation (United Republic of Tanzania 2008). By liberalising energy generation, transmission, distribution, supply and trade, the law opened an opportunity for the private sector to effectively participate in the energy sector beyond the erstwhile monopoly of TANESCO. A major challenge that remains, however, is the actual adherence to the law. For instance, in 2011–12 many emergency power plants (EPPS), with a combined capacity of 205 MW, were procured and installed contrary to the goals of competition and reform (Eberhard, Gratwick & Kariuki 2018). This, like the grand corruption scandals discussed below, aggravated TANESCO's financial situation resulting in a net loss of US\$295 million in 2013 (up from US\$112 million in 2012) and accumulated losses as of US\$915 million (up from US\$620 million in 2012) in 2013 (Eberhard, Gratwick & Kariuki 2018).

Diversification of sources of supply but not from renewable energy

The 1990s–2000s is generally a period of dominance of hydroelectric power despite Tanzania being endowed with diverse renewable and non-renewable resources and despite the 1992 energy policy providing for the development of these resources (Jacob 2017; Bishoge, Zhang & Mushi 2018a). What did materialise from the reform agenda of the 1990s and the challenging energy sector situation at a time when the demand for electricity was increasing but the Government was short of funds to develop new resources, was the use of Independent Power Producers (IPPs) to complement TANESCO's power generation. The two key IPPs working in Tanzania since the 1990s are Songas and Independent Power Tanzania Limited (IPTL). The Songas project has the longer history as a gas-to-electricity project since the early 1990s and was to be funded by the World Bank and other donors. It was however overtaken – and thereby delayed – by IPTL and only began in 2004 with gas supply from Songosongo, Kilwa to Ubungo power plants (World Bank 2011).

IPPs were particularly critical during the mid-1990s following a severe drought which took a serious toll on hydroelectric power generation in the country. This called for an Emergency Power Programme (EPP) funded by the World Bank for urgent power generation (World Bank 2003, 2007). Although well intentioned, some IPPs sourced by the Government such as the IPTL and, later, Richmond/Dowans became arenas for collusion between the ruling party elites and domestic and international businesses, thereby breeding grand corruption in the energy sector (Gray 2015; Madaha 2012; Bofin, Pedersen & Jacob 2020; Cooksey 2017, 2011). For instance, TANESCO entered into a contractual arrangement with IPTL in 1995 for purchasing power, up to 100 MW (World Bank 2003; Bofin, Pedersen & Jacob 2020). While these did help in reducing load shedding, they turned out to be a burden on TANESCO and power consumers given the exorbitant fuel and capacity charges the utility continuously paid the

IPPs (Gratwick & Eberhard 2006). It has been established that agreements between TANESCO and IPPs were dubious and corrupt (Cooksey 2017, 2011). The World Bank succinctly characterised the agreement between TANESCO and IPTL as follows:

...TanESCO entered into a contractual arrangement for purchasing power (up to 100 MW) from an independent power producer, IPTL, based on hugely overstated investment costs and costly and outdated technology. The agreement was fully endorsed by TanESCO's board which was, in turn, controlled by the Government, TanESCO's sole shareholder; the Bank, however, was not informed of this decision. When the Bank eventually became aware of this arrangement and realized that TanESCO's financial viability could be threatened by the terms of the agreement, it advised the Government to take action to maintain the financial viability of the sector (World Bank 2003).

Even though the agreement was made to supply TANESCO with an emergency power to address the 1990s crisis, IPTL did not start supplying the needed power to the national grid until 2002 (Cooksey 2017). This corrupt engagement with IPTL not only soiled the relations between the Government and the World Bank but it also delayed the implementation of the Songosongo gas to electricity project, also funded by the World Bank, until later in 2004 (Bofin, Pedersen & Jacob 2020). As if the IPTL saga were not enough, the Government entered into another agreement with a dubious Emergency Power Producer, Richmond Development Company, to generate 120 MW of gas-fired electricity for an investment of US\$123.2 million in 2006 (Cooksey 2017). A parliamentary inquiry committee that was formed to investigate the Richmond deal when it became apparent that the company had not delivered power revealed that Richmond was a 'briefcase company' that lacked experience, expertise and was financially incapacitated (Tanzanian Affairs 2008). Although the implicated government leaders including then prime minister, Edward Lowassa, and minister of energy and minerals, Nazir Karamagi, were forced to step down, the losses the energy sector and the national economy suffered were irrecoverable. It has been estimated that the Richmond deal cost Tanzania 697 billion shillings (about US\$300 million) (Madaha 2012).

Whereas Tanzania succeeded in developing its gas resources, first through the Songas gas-to-electricity project that began producing in 2004 and later through the Mnazi Bay gas-to-electricity project that began production in 2007/8, less was achieved in developing the country's other domestic energy resources. The energy policies of 1992 and 2003 both made official provisions for Tanzania to explore other domestic energy resources. The 1992 policy for the first time made provisions for such renewable energy sources as solar, wind and geothermal to be commercially developed for energy production instead of their erstwhile small-scale use (United Republic of Tanzania 1992). However, despite this policy push renewable energy production in Tanzania beyond hydropower production remained underdeveloped as it did not attract adequate investor interest (Bishoge, Zhang & Mushi 2018a). The lack of investor interest can be explained by the

policy's limited focus on full energy sector liberalisation and lack of a clear implementation strategy (Mwakapugi, Samji & Smith 2010).

To give more push to domestic energy, the Government revised the national energy policy in 2003. One of the key stated goals in the 2003 energy policy version was to 'enhance the development and utilisation of indigenous and renewable energy sources and technologies' (United Republic of Tanzania 2003: 5). Not much was however done to attract investment into solar, wind and other renewable energy sources. The same can be said about coal, the development of which was also provided for in both the energy policies of 1992 and 2003 but only resulted in one coal mine, Ngaka coal mine, which was established in 2008 and only began production in 2011 (Jacob 2017). This may in part be explained by the policy's implicit support for hydro and biomass plants and failure to recognise cost differences of different renewable energy technologies (Odarno et al. 2017). Up until 2003, coal, solar and wind accounted for less than 1% of energy used in Tanzania suggesting that renewable energy production and use was still underdeveloped (United Republic of Tanzania 2003). For various reasons it appears that energy production and supply from renewable energy resources remained marginal because the major emphasis continued to be on energy generation using local resources with priority to hydropower and gas (Mwakapugi, Samji & Smith 2010). Based on the grand corruption scandals involving government elites and business interests in the non-renewable power production projects, it can be argued that rent seeking opportunities in the renewable energy resources sector may have contributed to this limited interest.

The emerging electrification agenda

Rural electrification emerged as a policy objective of the Government of Tanzania in 1992 when the first energy policy was formulated (United Republic of Tanzania 1992). Following this policy some initiatives emerged which, however, were characterised by limited government commitment. For instance, rural electrification cooperatives that were operated by a volunteer group of local businessmen that generated electricity from diesel in a mini-grid and supplied villagers though at a higher cost than that supplied by TANESCO (Marandu 2002). Some examples of these cooperatives include those in Urambo and Mginga (Ilskog et al. 2005; Marandu 2002). Despite these early initiatives, rural electrification rates remained very low, at less than 2% by 2001 as compared to the national electrification rate which stood at 7% in 1999, having declined from 8% in 1990 (Marandu 2002; Ilskog et al. 2005). This low rate of rural electrification during the 1990s was attributable to shortage of capital, the tariff policy chosen by the Tanzanian Government, the high cost of electricity generation and supply as well as an economic tightening strategy adopted by the President Mkapa administration from 1995 (Marandu 2002; Ilskog et al. 2005).

In the period from 2000 to 2010, there was increased government attention on rural electrification. The Rural Electrification Agency (REA) was established in 2005 as an independent institution under the Ministry of Energy and Minerals, responsible for several functions including promoting, stimulating, supporting

and enhancing access to modern energy for rural production use; promoting energy production and consumption and identifying energy projects and rural activities; funding rural energy projects through the Rural Energy Fund; preparing and reviewing application procedures, guidelines, selection criteria, terms and conditions of grants; building capacity and providing professional support to developers of energy projects and rural communities; and supporting the preparation of applications for rural electricity projects (Bishoge et al. 2018a). In general, REA is responsible for

...coordination and facilitation of RE [*Rural Electrification*] (both grid-extension and off-grid systems). REA facilitates RE by supporting applicants with grants for organizational capacity building and for capital investment. In addition to scaling up RE, the ambition is to increase the use of RETs [*Renewable Energy Technologies*]. REA also lobbies donors for better financial support to local investors (Ahlborg & Hammar 2014, 120).

In performing these functions, REA should work in partnership with the private sector, non-governmental organisations, social institutions, and government institutions (Bishoge et al. 2018a). For instance, in extending electricity to rural areas, REA had to work with TANESCO. Furthermore, in 2008, the new Electricity Act was enacted which, among other things, provided for rural electrification. Part VII of the act is wholly devoted to rural electrification. Among other things the act tasks the Government to ensure that the main grid is expanded into rural areas and that off-grid electricity supply systems are developed in rural areas (United Republic of Tanzania 2008). EWURA also plays a regulatory role on tariffs and charges such as those regulating the small power projects in the country (Moner-Girona et al. 2016).

Although these legal and institutional reforms sought to encourage private sector participation in rural electrification, up to 2010 little investment had been attracted into the sector (Ahlborg & Hammar 2014). Consequently, rural electrification rates remained relatively low, only increasing to a paltry less than 5% in 2010 (ibid).

2010 TO THE PRESENT: STATE DEVELOPMENTALISM AND ENERGY POLITICS

The period from 2010 embodies several developments relevant to the energy sector. This is the period in which major discoveries of natural gas in offshore Southeast Tanzania were made; the state reverted to long- and medium-term development planning; a resource-based industrialisation strategy was put in place; and plans to promote energy generation beyond the mainstream hydro projects were adopted. It was also a period which saw a backlash against fossil fuel-based energy production and the exploitation of renewable and sustainable energy sources became a focus. In Tanzania this was also the case as the period from 2010 onwards reflects; there was an increase in investor interest in non-

hydro, renewable sources such as wind and solar (even though these have so far not been developed).

The return of the state in planning, industrialisation, and energy sector development

In general, the period from 2010–2015 marked the return of the state in development planning with a key emphasis on industrialisation. Energy was considered a key input, necessary for industrialisation to take off. In its first Five Year Development Plan (2011/12–2015/16), the Government envisioned increasing electricity generation to 2,780 MW by 2015. Major emphasis was put on further developing natural gas for energy production with the implication that hydropower and renewable energy projects that had been under development were abandoned (Dye 2019a). During this period Tanzania made substantial natural gas discoveries offshore of Mtwara, the first of which was in 2010.

Following these discoveries, the Government made efforts to put in place mega infrastructure to enable power generation from natural gas. The Government plan was to generate 870 MW (31.3% of the total to-be generated electricity) of electricity from natural gas by 2015 (United Republic of Tanzania 2012). This would be generated from various power plants located in Mtwara, Somanga Fungu (Lindi region), Kinyerezi and Ubungu in Dar es Salaam. Reportedly, these efforts made natural gas-fired electricity contribute to around 61% of total electricity production in 2021 (EWURA 2021). A natural gas transmission pipeline was laid from Mtwara through Lindi to Dar es Salaam to transport natural gas to Dar es Salaam where it would be used to increase the generation of electricity. The Government defined the pipeline project as a key strategic project relevant for addressing the energy shortages confronting the nation to power the country's industrialisation drive (Muhongo 2013a, 2013b). The entire legal and regulatory framework for oil and gas was reformed during these years.

The gas transmission project opened a can of political economic issues around national–local linkages, especially when it came to the politics of resource extraction in Tanzania. In the face of this government plan, the people of Mtwara presented an alternative perspective proposing that natural gas be processed within Mtwara for power generation and then the generated power be fed into the national grid. The Mtwara perspective was grounded on perceptions of historical marginalisation and peripheralisation of the 'southern' regions by the Government in favour of 'northern' regions such as Dar es Salaam (Lal 2015; Poncian 2019; Kamat 2017). Any attempt to pipe gas to Dar es Salaam was interpreted by the people of Mtwara as yet another government strategy to further marginalise the southern regions. However, the higher stakes involved in the project and the prospect of generating power from natural gas made the Government to turn a deaf ear to community concerns, deploy the army to suppress them, and spread propaganda against them by branding them as anti national development and secessionist (Poncian 2019). Despite violent opposition from the people of Mtwara, the pipeline was commissioned and completed (ibid).

Much of government talk on energy production also centred on the use of natural gas to generate electricity in surplus to enable Tanzania start exporting energy to

neighbouring countries by 2015 after completion of the gas transmission pipeline. Then minister for energy and minerals, Professor Sospeter Muhongo, reportedly claimed: 'We are on course to start power exports in 2015 because of the surplus electricity that we will be producing after the completion of the ongoing pipeline construction' (Reuters 2013). However, by 2015 Tanzania was yet to start exporting electricity and it still had not generated the envisaged energy from natural gas to satisfy its own energy demand.

From 2015 onwards has come a period of revitalised development nationalism marked by ambitious development projects and deteriorating state–business relations. It is a period during which Tanzania has become known more for its nationalist policies, crackdowns on opposition and critical voices, and deteriorating human rights observance. A major development catchphrase of the time is '*Tanzania ya viwanda*' ('an industrialised Tanzania'). When he came into office in 2015 President Magufuli embarked on an ambitious industrialisation drive with a major emphasis on mega infrastructure development including for energy production. Power generation, mostly from fossil fuels, as well as electrification are considered, in this period, to be necessary for industrialisation and socio-economic transformation (Dye 2019b).

The shifting emphasis on diversification

Whereas the period from the socialist era to the 2000s was dominated by hydro projects and, with time, increasingly gas, 2010–2015 saw government emphasis shift to attract investment into other energy sources. Progress in this regard was, however, limited. Although a policy commitment to generate energy from coal was made in both the 1992 and 2003 energy policy documents, it was not until this 2010–2015 period that the Government started getting serious with coal. In the Five Year Development Plan (2011/12–2015/16) the Government envisioned 500 MW which would be from two coal projects, i.e. Kiwira and Mchuchuma (United Republic of Tanzania 2012). Through its State Mining Corporation (STAMICO), the Government started searching for investors to resume production at the Kiwira coal mine and to construct a 200 MW coal-fired power plant (Jacob 2017). In its Electricity Supply Industry Reform Strategy and Roadmap (2014–2025), Tanzania also sought to diversify power generation to ensure security of supply through, among others, increasing installed capacity for energy from coal from zero in 2014 to 2900 MW in 2025 (United Republic of Tanzania 2014).

It should be noted, however, that this was all taking place at the same time as global campaigns and initiatives for a carbon-neutral world were at their peak. Then President of Tanzania, Jakaya Kikwete, was coordinator of the Committee of African Heads of State on Climate Change between 2013 and 2015 and he used his coordinator role to urge African countries to commit themselves to the climate change agenda (Jacob 2017). But how could this position be reconciled with President Kikwete's government's stated intention to increase electricity generation from, among other sources, coal? It is apparent that the global climate change agenda conflicted with the country's goals for coal-fired power generation. This might explain why no major investments were made in the coal sector for

energy generation in the period during which the five-year development plan was in operation.

During the first years of the period, it appears that the Government also started putting more emphasis on renewable energy sources such as solar, wind and geothermal power. The first Five Year Development Plan 2011/12–2015/16 targeted interventions for, among others, the development of alternative sources of cleaner and renewable energy sources, including solar, wind and gas (United Republic of Tanzania 2012). Despite this broad declaration of intention, the stated objective of the plan was just to ‘explore the possibility of utilising other potential sources of energy – e.g. geothermal, solar, wind, gas, coal, etc.’ (United Republic of Tanzania 2012: 57), suggesting that not much would be done in terms of real investment into renewable energy production; this is even apparent from the plan itself not having targets for energy production from solar, wind and other non-hydro renewables as opposed to other sources which had targets set.

Unsurprisingly, progress in terms of actual installations was limited. That said, in 2012/13, for instance, the Government reported it had set aside US\$1.25 million for the off-grid solar energy project intended to connect schools and dispensaries in various districts to solar energy. Moreover, in January 2013 TANESCO signed a Standardised Small Power Purchase Agreement and Tariff with Solawazi company for the company to generate 3 MW of solar energy to feed into the national grid (Muhongo 2013a). For wind, two projects were reported to be underway in 2013/14. These are a 50 MW project by Geo-Wind Power (T) Ltd, a partnership project between Power Pool East Africa Ltd, TANESCO and NDC; and a 100 MW project implemented by Wind East Africa Limited (Muhongo 2013a). Under Magufuli government resistance towards private power producers was however growing and these projects have, so far, not materialised (see also Aly et al 2019). Further efforts with regard to renewable energy involved small hydro projects, biomass and geothermal. In general, government commitment to renewable energy is seen in the projections of contribution of renewable energy sources to energy production. According to the Electricity Supply Industry Reform Strategy and Roadmap 2014–2025, Tanzania projected to generate a total of 2029 MW (about 22% of projected installed capacity) from hydro, wind, solar and geothermal sources between 2015 and 2025 (United Republic of Tanzania 2014).

A further drive to increase power generation could be observed both under President Kikwete (2005-2015) and Magufuli (2015-2021). In the Power System Master Plan 2016 update, for instance, Tanzania envisages that by 2040, 75% of the country’s total installed capacity will be produced by fossil fuel-fired power plants (40% from gas and 35% from coal), with the remaining 20% from hydropower plants and 5% from other renewables (United Republic of Tanzania 2016b). The Natural Gas Utilisation Master Plan 2016–2045 further emphasises generation of power from natural gas with this source contributing 40% of the total installed capacity by 2040 (United Republic of Tanzania 2016a). In the medium-term, the installed capacity of the gas-fired power plants was projected to more than double by increasing from 711 MW in 2015 to 1,774 MW by as early as 2020 (United

Republic of Tanzania 2016a). While natural gas is envisaged to be the main contributor to total installed capacity, delays in the commissioning of the Liquefied Natural Gas (LNG) project during President Magufuli's administration suggest that this may be a hard vision to achieve (Harvey 2018). Thus, the existing policy framework favours power generation from natural gas and coal despite global initiatives for a carbon-free world where renewable and environmentally friendly sources of energy are prioritised (Jacob 2017). Given what is reported by extant research, it seems reasonable to argue that Tanzania's energy generation efforts privilege hydro and fossil fuels, leaving renewable sources such as solar and wind largely ignored (Harvey 2018).

Part of the strategy to achieve power generation has been the revival of the Stiegler's Gorge project in 2017, now known as Julius Nyerere Hydroelectric Power Project (JNHPP). This had featured in energy strategy and planning documents for long but became a priority under Magufuli. Construction began in 2019. This is a flagship energy production project. As we saw, this project was conceived during the early years of independence but could not be commissioned for reasons mentioned earlier. The JNHPP is a mega project that, upon completion, is expected to generate 2115 MW of hydroelectric power (Harvey 2018). Although the project has the potential to greatly contribute to the nation's power needs, its development is not without controversies. For instance, analysts have shown that the project is costly to Tanzania and that investments in decentralised renewable technologies, such as solar photovoltaic, were more likely to serve Tanzania's long-term development interests than investments in large hydropower (Harvey 2018). Furthermore, its commissioning generated concerns that it would conflict with commitment to conservation goals (Dye & Hartmann 2017). These concerns, however, fell on deaf ears (Dye 2019b). For its part, the Tanzanian Government describes the project as transformational in terms of promoting power supply for industrialisation; employment opportunities; boosting tourism; controlling downstream floods; reinforcing conservation and anti-poaching activities; revenue generation; and changing people's lives within and outside the project area (United Republic of Tanzania 2019).

Intensified efforts to electrify rural Tanzania

In terms of access and connectivity to electricity, Tanzania undertook a major and ambitious rural electrification project. Rural electrification was based on an assumption that widening access and connectivity to electricity in rural areas would ultimately catalyse socio-economic transformation (Ahlborg & Hammar 2014; Kigodi & Poncian 2015; Aevarsdottir, Barton & Bold 2017; Ngowi, Bångens & Ahlgren 2019). This assumption is not baseless; several empirical studies attest to the transformational impact of electrification on the rural socio-economic landscape (United Republic of Tanzania 2017; Groth 2019; Ngowi, Bångens & Ahlgren 2019). The rural electrification project started with the extension of electricity to the district headquarters following which villages and hamlets would be electrified (Ahlborg & Hammar 2014). TANESCO was the key player in this project. Funding for the project came primarily from donors (Ahlborg & Hammar 2014). Apart from grid-based rural electrification, several off-grid and mini-grid

energy projects were undertaken to facilitate rural electrification. Several mini-grid hydro projects as well as off-grid wind and solar energy projects were commissioned for this purpose. Some examples include the Bulongwa mini-grid in Makete district, Njombe region which is owned by the Lutheran Church and that has electrified 80% of Bulongwa village (Ngowi, Bångens & Ahlgren 2019).

In the post-2010 period more efforts were made to scale up rural electrification. These included securing funding from donors for various energy projects, a 2013 parliamentary resolution to provide additional financing to the Rural Energy Fund (REF), and a reduction in connection fees (World Bank 2016; Adebayo, Sovacool & Imperiale 2013). With connection fees, for instance, the Government set a low connection fee for rural electrification; having reduced the fee from 177,000 shillings (about US\$76) charged in 2013/14 to 27,000 Tanzania Shillings (about US\$12) which is the currently price (Anyimike 2021; Muhongo 2013a). These efforts increased the rural electrification rate to 7% in 2016 (World Bank 2016) and increased the number of villages connected to grid from 2018 in 2015 to 10312 villages in 2021 (Wizara ya Nishati 2021).

CONCLUSION

Tanzania manifests dynamic energy politics. Since independence in 1961, the country has continually struggled to achieve energy security by increasing power generation. From the foregoing review, some conclusions can be made here. First, even though the politics dictating energy reforms in Tanzania have been dynamic and Tanzania has introduced several reforms in the sector, it is apparent that the energy sector has remained largely state-centric with TANESCO maintaining a near monopoly over power generation, distribution and supply. This despite the inefficiencies, corruption and ineffectiveness that have and continue to plague the utility. It should, however, be noted that even though TANESCO remains the main energy generator and supplier, the Government has taken measures to promote private sector participation in energy production. Second, even though the Government has made policy and a strategic commitment to diversify its energy mix by exploring non-hydro renewables such as wind and solar, the reality is that these have remained marginal in the country's energy production landscape. Increased investor interest in large wind and solar energy projects has not translated into government adoption of the same. Growing global calls for energy sustainability have not moved Tanzania to actively pursue an energy production agenda that would see non-hydro renewables prioritised. It is apparent that fossil fuels and hydroelectric power sources continue to be the main sources in the country. The share of hydroelectric power has been declining in the recent past and is expected to be surpassed by coal and natural gas come 2045. With Tanzania envisaging an industrialised economy by 2025, power generation has become a necessity, a reason why the state has maintained a strong interest in the sector. It remains startling, however, that whereas fossil fuels increase their contribution to energy generation, renewables continue to occupy a lower rank in

terms of prioritised sources of energy. This raises the question of why the Government has not done much to promote cleaner energy production by, among others, increasing and/or attracting investments into the renewable energy sources such as solar and wind. It also raises questions about the sustainability of developing countries' commitments to global sustainability initiatives, particularly those requiring a reduction in fossil fuel-based energy production and use.

Third, until recently with the adoption of rural electrification energy production in Tanzania since independence has been biased towards promoting the country's economic transformation and industrialisation agenda without necessarily promoting equitable access to energy by all. Finally, the fact that Tanzania has continued to emphasise large-scale energy projects such as large hydro dams and the proposed LNG project raises political economic questions: why do developing countries find it attractive to invest their limited resources in expensive energy projects instead of relatively cheaper and sustainable renewable energy sources? What political factors influence much of the current energy choice decisions? To what extent are factors such as national pride and prestige that were common in much of the 1960s and 1970s energy decisions in Africa still relevant in today's energy choice decisions?

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