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POWER AND THE PRIVATE SECTOR IN TANZANIA: PROSPECTS FOR THE AFDB's HIGH FIVES STRATEGY

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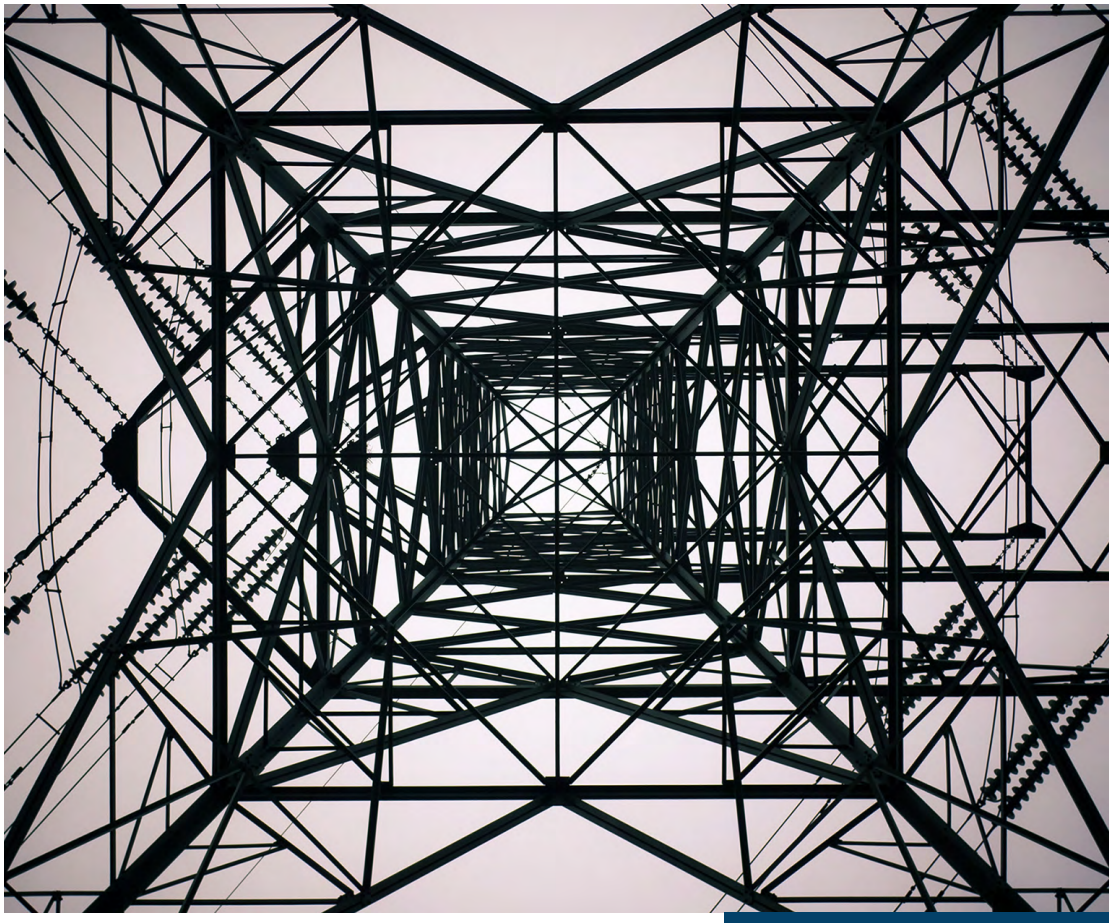

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ABSTRACT

A stable, affordable energy supply underpins economic development by enabling infrastructure development and investment, and ultimately increases industrialisation and enhances competitiveness. Ensuring electricity security is therefore vital for all countries. Over the past two decades Tanzania has been struggling to achieve electricity supply security owing to erratic droughts; over-reliance on expensive hydrocarbon generation sources; a lack of ongoing investment in and maintenance of generation, transmission and distribution infrastructure; and significant financial difficulties at the national energy utility. Electricity security is a key development priority not only for countries but also for development partners focusing on developing countries. The African Development Bank's (AfDB) programmatic and development finance focus is a key example of this concern, highlighted in its 'High Fives' initiative focusing on five key themes: 'Light up and power Africa', 'Feed Africa', 'Industrialise Africa', 'Integrate Africa' and 'Improve the quality of life for the people of Africa'. It has also developed the New Deal on Energy for Africa, with the ambitious goal of ensuring universal access to electricity on the continent by 2025. This paper examines this ambition within the context of Tanzania's electricity environment and prospects for broader coverage. Attracting investors to the energy sector to address its supply gap has been a key objective of Tanzania's national development policies. However, major challenges remain that are likely to hinder greater participation by investors. These include institutional, regulatory and legal barriers, knowledge and capacity limitations, and economic and financial constraints. The paper explores the complementarity of domestic and AfDB efforts to support greater private sector investment in Tanzania's electricity sector. Throughout the paper, specific reference is made to the renewable energy sector, an area that has attracted significant private sector and government interest, given its far-reaching socio-economic benefits.

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ABBREVIATIONS AND ACRONYMS

ADB	African Development Bank (non-concessional window)
ADF	African Development Fund
AfDB	African Development Bank (institution)
BRN	Big Results Now
DFID	UK Department for International Development
EAC	East African Community
EAPP	Eastern African Power Pool
EPP	emergency energy producer
EWURA	Energy and Water Utilities Regulatory Authority
FDI	foreign direct investment
FIT	feed-in tariff
GERD	Grand Ethiopian Renaissance Dam
GWh	gigawatt hours
IPP	independent power producer
kWh	kilowatt hour
MDAs	ministries, departments and agencies
MDB	multilateral development bank
MEM	Ministry of Energy and Minerals
NDP	National Development Plan
NEP	National Energy Policy
NGO	non-governmental organisation
PSMP	Power Sector Master Plan
PSRGSP	Power Sector Reform and Governance Support Programme
REA	Rural Energy Agency
REF	Rural Energy Fund
REIF	Renewable Energy Investment Facility
REVC	renewable energy value chain
SAP	structural adjustment programme
SAPP	Southern African Power Pool
SEFA	Sustainable Energy Fund for Africa
Sida	Swedish International Development Cooperation Agency
SOE	state-owned enterprise
SPP	small power producer
SPPA	small power producer agreement
TANESCO	Tanzania Electric Supply Company Limited
USAID	US Agency for International Development

INTRODUCTION

In Tanzania less than 16% of the population had access to electricity in 2014. This is low compared to most of its East African Community (EAC) counterparts – in Kenya 36% of the population has access to power, in Uganda 20.4% and in Rwanda 19.8%. Only Burundi has lower levels of electricity access, at 7% of the population.[1] While 41.2% of urban areas in Tanzania are connected to the power grid, in rural areas a mere 4% of the population has access to electricity.[2] The connectivity challenges in Tanzania are largely a result of its low population density and large geographical area. It is neither feasible nor efficient to connect certain parts of the country to the main electricity grid. Instead, a number of mini-grids and off-grid solutions are employed as more cost-effective measures to extend electricity access. There are presently 20 diesel-based and 13 small-scale hydro-based mini-grids providing electricity to remote communities. Not all of these grids are operated by the government; some are operated by non-governmental organisations (NGOs), faith-based institutions or development partners.[3]

Tanzania has made some progress in rolling out energy access – in 2000 less than 10% of the population (of an estimated total population of 53.5 million in 2015)[4] had access to electricity. This improvement can be attributed to the implementation of the 'Big Results Now' (BRN) initiative, a novel public service delivery programme that focused on six development priorities, namely agriculture, education, energy, resource mobilisation, transport and water. In addition, government initiatives such as using a petrol levy to finance the Rural Energy Fund (REF), government subsidies and an improvement in technology have contributed to this process.[5] A number of development partner initiatives have also played a role, such as the US' Power Africa initiative. Other development partners include the World Bank and the African Development Bank (AfDB).

The AfDB is focusing on five priorities that are crucial for accelerating Africa's economic transformation – the 'High Fives':

- 'Light up and power Africa';
- 'Feed Africa';
- 'Industrialise Africa';
- 'Integrate Africa', and
- 'Improve the quality of life for the people of Africa'.

1 World Bank, 'World Development Indicators', http://databank.worldbank.org/data/reports.aspx?source=2&series=EG.ELC.ACCS.ZS&country=TZA, accessed 23 May 2017.

2 *Ibid.*

3 United Republic of Tanzania, 'Scaling up Renewable Energy Programme: Investment Plan for Tanzania', May 2013, https://www.climateinvestmentfunds.org/sites/default/files/meeting-documents/srep_tanzania_investment_plan_design.pdf, accessed 10 October 2017.

4 World Bank, *op. cit.*

5 Climate Scope 2016, 'Tanzania', http://global-climatescope.org/en/country/tanzania/#/details, accessed 6 January 2017.

Tanzania's experience has shown how difficult it can be to expand access to electricity when geography and demography are problematic and state-owned utilities inefficient and when renewable energy sources seem the obvious choice, but are not promoted

About 640 million Africans still live without electricity, and demand for energy is rising rapidly.[6] Through its 'New Deal on Energy for Africa' the AfDB is working to consolidate efforts to achieve universal access to energy. Its new energy strategy aims to increase energy production and access, and improve affordability, reliability and efficiency.

Expanding electricity access across the African continent is a daunting task. Tanzania's experience has shown how difficult it can be to expand access to electricity when geography and demography are problematic and state-owned utilities inefficient; when energy sources are adversely affected by climatic events; when coal, oil and gas are viable options but need significant investments; and when renewable energy sources seem the obvious choice, but are not promoted because their contribution remains relatively small. In addition, one has to distinguish between electricity access for household use, which holds tremendous socio-economic benefits, and energy access to support manufacturing, which could accelerate the country's industrialisation trajectory and create jobs.

Large-scale investment in energy would thus not only benefit the end users but could also bring a number of additional benefits: job opportunities, transfer of skills and expertise, establishment of manufacturing plants and the potential to export the hardware required for electricity generation to neighbouring countries.

How friendly is the investment environment in Tanzania broadly and specifically in the electricity sector to facilitate such investments? How prepared is Tanzania to take up this challenge and benefit across the broader electricity value chain from renewed investment in energy? This paper examines these questions by taking a look at the AfDB's High Fives strategy and its implications for and early impact on Tanzania, alongside the country's own national development priorities. It explores the energy environment in Tanzania, the key actors shaping this environment, the current generation methods, and options for diversification. The paper also takes a look at the private sector and the investment climate in Tanzania to establish to what extent the country attracts large-scale private sector participation and expansion, as envisaged by the country's National Development Plan (NDP) and the AfDB's strategy. Finally, it considers the renewable energy sector and makes some conclusions on the likelihood of its succeeding in Tanzania.

TANZANIA'S DEVELOPMENT PRIORITIES AND THE AFDB'S NEW DEAL ON ENERGY FOR AFRICA

Tanzania's electricity policy is largely informed by the Tanzania National Development Vision 2025, currently in its second iteration, as captured in the NDP 2016/17–2020/21 and its National Energy Policy (NEP) 2015. The NDP's key objective is 'nurturing industrialisation for economic transformation and human development',[7] ultimately

6 AfDB (African Development Bank), *Light Up and Power Africa – A New Deal on Energy for Africa*, https://www.afdb.org/en/the-high-5/light-up-and-power-africa-%E2%80%93-a-new-deal-on-energy-for-africa/, accessed 23 May 2017.

7 United Republic of Tanzania, 'National Five Year Development Plan 2016/17–2020/21', www.mof.go.tz/mofdocs/msemaji/Five%202016_17_2020_21.pdf, accessed 26 March 2017.

creating a middle-income semi-industrialised country by 2025. Building infrastructure to support this objective is a cross-cutting theme.

In line with the objectives laid out in the NDP, the NEP looks to 'deliver adequate, reliable and affordable modern energy to all Tanzanians'.[8] Private sector investment is a clear priority, with the NEP noting that 'the Ministry shall continue to improve the investment environment to encourage more involvement of the private sector'.[9] Specific objectives of the NEP can be categorised as follows:[10]

- providing a reliable and affordable electricity supply in a sustainable manner;
- promoting private sector participation in the energy sector;
- increasing regional energy cooperation;
- harnessing the benefits of electricity to promote socio-economic growth, especially in rural areas; and
- promoting research, development and capacity of the energy sector.

Development partners such as the AfDB have a key role to play in Tanzania's national development priorities. Of the estimated TZS[11] 107 trillion ($480 billion) required to implement the NDP 2016/17–2020/21, the government's contribution is estimated at TZS 59 trillion ($264 billion), with the balance to be sourced from private funds and development partners.[12]

Of the estimated $480 billion required to implement the NDP 2016/17–2020/21, the government's contribution is estimated at $264 billion, with the balance to be sourced from private funds and development partners

'Light up and power Africa' is a key focus of the AfDB and its High Fives strategy. The AfDB's 'New Deal on Energy for Africa' sets out this vision for achieving universal access to electricity in Africa by 2025. The highly ambitious objective is broken down into five elements:[13]

- raising aspirations to solve Africa's energy challenges;
- establishing a transformative partnership on energy for Africa;
- mobilising domestic and international capital for innovative financing in Africa's energy sector;
- supporting African countries in strengthening their energy policy, regulation and sector governance; and
- increasing the AfDB's investments in energy and climate financing.

8 United Republic of Tanzania, Ministry of Finance and Planning, 'National Energy Policy, 2015', https://mem.go.tz/wp-content/uploads/2014/02/National-Energy-Policy_December-2015.pdf, accessed 26 March 2017.

9 *Ibid.*

10 *Ibid.*

11 Currency code for the Tanzanian shilling.

12 United Republic of Tanzania, Ministry of Finance and Planning, *op. cit.*

13 AfDB, 'The New Deal on Energy for Africa', High-Level Panel discussion, https://www.afdb.org/fileadmin/uploads/afdb/Documents/Events/COP21/Abstracts/01_Dec_2015_-_The_New_Deal_on_Energy_for_Africa.pdf, accessed 19 September 2017.

The New Deal identifies seven strategic themes under which flagship programmes will be launched:[14]

- setting up the right enabling environment;
- enabling utility companies to succeed;
- dramatically increasing the number of bankable projects;
- enlarging the funding pool to deliver new projects;
- funding 'bottom of the pyramid' energy access programmes;
- accelerating major regional projects driving integration; and
- rolling out waves of countrywide energy 'turnarounds'.

TABLE 1 AFDB LOAN AND GRANT APPROVALS TO TANZANIA BY SECTOR ($ MILLION)

	ADB					ADF				
Sector	2013	2014	2015	1967–2015		2013	2014	2015	1974–2015	
				Total	% of total approvals				Total	% of total approvals
Agriculture & rural development		90		96,7	14.1%				298,5	10.4%
Infrastructure			508	566,7	82.5%			170	1488,4	52.1%
Transport			366	375,8	54.7%			75	873,9	30.6%
Communications				13,9	2.0%				25,6	0.9%
Water supply & sanitation			142	165,9	24.2%			25	339,7	11.9%
Energy				11,1	1.6%			70	249,3	8.7%
Industry, mining & quarrying				5,0	0.7%				67,2	2.4%
Finance				17,7	2.6%				55,6	1.9%
Social							47		256,8	9.0%
Urban development									0,0	
Environment									0,0	
Multi-sector				0,5	0.1%	53			691,4	24.2%
Total loan & grant approvals by sector	5	90	508	686,6					2857,8	

Source: AfDB, 'AfDB Compendium of Statistics 2016', https://www.afdb.org/fileadmin/uploads/afdb/Documents/Publications/COMPENDIUM_OF_STATISTICS_2016.pdf , accessed 9 October 2016

14 *Ibid.*

There are clear correspondences between Tanzania's national energy priorities and the AfDB's New Deal on Energy, especially in terms of improving the business environment of the electricity sector, generating electricity in a sustainable manner, and increasing access to electricity. In the past AfDB loans and grants to the energy sector in Tanzania have been limited, with less than 1.6% of approvals from the bank's non-concessional window, the African Development Bank (ADB), and 8.7% from its concessional window, the African Development Fund (ADF), being geared towards the energy sector (see Table 1). It is hoped that the synergy between Tanzania's NDP and the AfDB's energy plan will increase financing in this sector.

Two AfDB-funded energy-related projects are already being implemented in Tanzania – the Iringa–Shinyanga Transmission Line, a project that was due for completion in 2016 and operationalisation by 2018, and the Kenya–Tanzania Power Interconnection Project. The first project aims to extend grid coverage to the area around Arusha and the second to stabilise the energy supply in both Arusha and Nairobi by connecting two sub-stations in the respective countries.

In November 2016 the AfDB, via the Sustainable Energy Fund for Africa (SEFA), launched an $870,000 preparation grant for Tanzania's Rural Energy Agency (REA) to structure its Renewable Energy Investment Facility (REIF). This facility will extend affordable finance to private sector-funded, clean energy projects in rural communities. The SEFA grant will include advisory support, development of operational guidelines, a risk mitigation framework, fund manager identification, technical and institutional support for the REA towards the establishment of the REIF, and capacity building for relevant public sector institutions/agencies and private sector project developers.[15]

To locate and analyse the AfDB's efforts under the High Fives and New Deal on Energy for Africa, this paper examines the current situation in Tanzania. Given Tanzania's slow roll-out of electricity access since 2000, efforts will need to be scaled up significantly in order to assure full access across the country. To place this effort in context, the following sections look at the energy sector, current coverage, the potential for additional generation and distribution, and the likely success of the AfDB's support in Tanzania.

ENERGY SECTOR

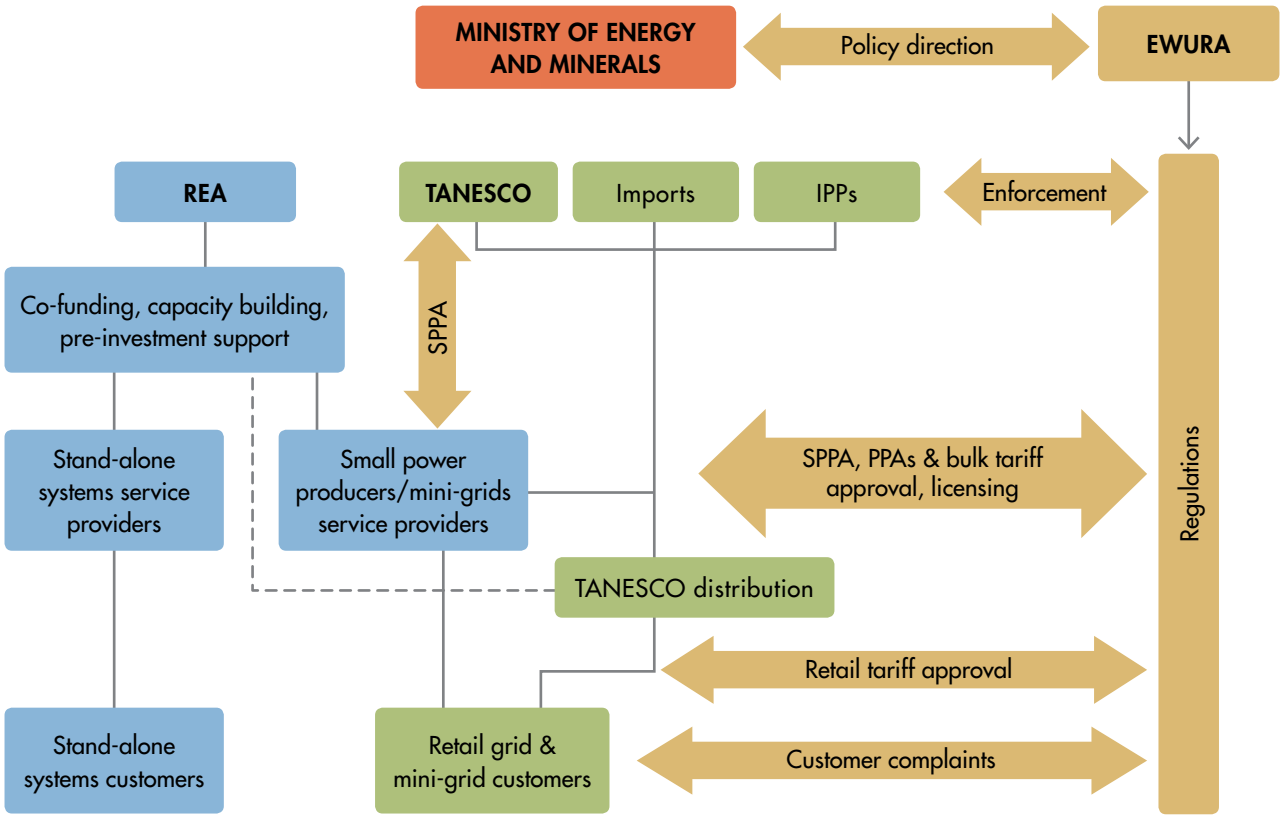
Actors

There are a number of key stakeholders in the energy sector in Tanzania, with the Tanzania Electric Supply Company Limited (TANESCO) – the national electricity utility – the most prominent in generating, transmitting and supplying electricity. Since 2007 it has been assisted in this task by the REA, which seeks to improve access to electricity in rural

15 AfDB, 'SEFA to support Tanzania in establishing a Renewable Energy Investment Facility to finance rural energy access projects', 5 January 2017, https://www.afdb.org/en/news-and-events/article/sefa-to-support-tanzania-in-establishing-a-renewable-energy-investment-facility-to-finance-rural-energy-access-projects-16613/, accessed 23 February 2017.

areas. Other key actors include the Ministry of Energy and Minerals (MEM), the Energy and Water Utilities Regulatory Authority (EWURA) and Tanzania's development partners (see Figure 1).

FIGURE 1 INSTITUTIONAL FRAMEWORK AND MARKET STRUCTURE OF THE TANZANIAN ELECTRICITY SECTOR



Note: IPP independent power producer
SPPA small power producer agreement
PPA power purchasing agreement

Source: Government of Tanzania, 'Scaling-up Renewal Energy Programme'. Dar es Salaam: Ministry of Energy and Minerals, 2013

Ministry of Energy and Minerals

The main ministry overseeing the power sector is the MEM, which is tasked with developing energy and mineral resources. This involves, among others, formulating policies that create an enabling environment for both public and private power

producers.[16] Tanzania also established EWURA in 2006. EWURA promotes competition and efficiency in the electricity, gas, water and petroleum sectors, promotes and protects consumer interests, and regulates services in these sectors.[17]

It is important to understand the underlying political context and drivers in the energy sector. For example, the exceptionally high turnover of staff at the MEM (because of political interference, at both ministerial and permanent secretary level) has resulted in frequent policy changes and inconsistencies in Tanzania's energy policy. Equally, the personalities, personal preferences and influence of certain high-level politicians or appointees have shaped the decision to prioritise coal over renewable energy. For example, former president Benjamin Mkapa owned a coal mine, and Sospeter Muhongo, the minister of energy and minerals from 2012–2015 and a geologist by training, favoured the exploitation of natural resources (gas and coal) over renewable energy. These preferences and historical background continue to frame Tanzania's energy policy.

TANESCO

TANESCO has been mired in controversy for decades. While the parastatal operated fairly efficiently until the 1980s, it has since experienced significant financial difficulties. Various attempts have been made to restructure and privatise it to achieve greater efficiency and financial viability. For example, between 2002 and 2006 a private firm was contracted to make the company profitable. This was not without controversy – the procurement process and fees paid to the service provider were questioned and limited results were achieved.[18] TANESCO's procurement of emergency power from the privately owned 100MW Richmond/Downas plant resulted in allegations of political meddling that eventually led to the resignation of the prime minister and a cabinet minister.[19]

More recently, TANESCO's financial woes have been the result of neglected infrastructure and inadequate investment, leading to serious transmission and distribution losses (in 2012 up to 17.8% of electricity was lost during transmission and distribution).[20] The negative impact of recurring droughts (in 1992, 1994, 1997, 2000, 2003, 2005 and 2009, among others) on its ability to supply hydropower, combined with electricity tariffs that are not cost-reflective, ultimately also resulted in losses for the utility.[21] Currently, TANESCO generates only 60% of the country's electricity supply, down from almost 100% in the early 2000s.[22]

16 United Republic of Tanzania, May 2013, *op. cit.*, p. 37.
17 AfDB, *Renewable Energy in Africa: Tanzania Country Profile*. Abidjan: AfDB, 2015a, p. 23.
18 Eberhard A & J Kapika, *Power-Sector Reform and Regulation in Africa*. Cape Town: HSRC Press, 2013.
19 *Ibid.*
20 United Republic of Tanzania, May 2013, *op. cit.*, p. 32.
21 *Ibid.*, p. 31.
22 *Ibid.*, p. 37.

Decentralisation in SOEs in Tanzania and elsewhere on the continent has faced stiff opposition, as SOEs typically jealously guard their monopolies, driven by clear disincentives to dissolve power and relinquish related benefits

The institutional restructuring of TANESCO – decoupling the generation, transmission and distribution functions of the institution – has been mooted and attempted for decades, starting with structural adjustment programmes in the 1980s. Similar efforts are underway at the moment. The creation of the REA has already revolutionised the rural energy sector, ensuring greater access to electricity in areas where it is unfeasible for TANESCO to provide services. Decoupling is also advocated by the AfDB. Yet, over the decades, decentralisation in state-owned enterprises (SOEs) in Tanzania and elsewhere on the continent has faced stiff opposition, as SOEs typically jealously guard their monopolies, driven by clear disincentives to dissolve power and relinquish related benefits.

It is important to note that multilateral development banks (MDBs) can offer support by providing financing and technical advice both on hard infrastructure (such as generation capacity and transmission lines) and on soft infrastructure (looking at the broader enabling environment, including the restructuring of TANESCO). The AfDB has been assisting with this restructuring process since 2013 through financing the development of the Electricity Supply Industry Reform Strategy and Roadmap. Additional institutional strengthening aimed at government departments and SOEs in the area of public financial management was also undertaken through the Institutional Support Projects for Good Governance I and II. These projects strengthened important public financial management functions such as auditing, procurement and accountability.[23]

In December 2016 the AfDB underlined its support for institutional reform through the Tanzania Power Sector Reform and Governance Support Programme (PSRGSP) with a $70 million ADF loan. The loan is complemented by a $300 million loan from the World Bank and $90 million and $115 million grants from the EU and the UK's Department for International Development (DFID), respectively. The PSRGSP is a three-year programme, offering specific support to reform TANESCO to mitigate fiscal risks associated with the weak institution, as well as broader support to allow for a more enabling environment that welcomes private sector participation. Although the AfDB's financial contribution to the programme is relatively small compared to that of the other development partners, its key value add is its 'solid expertise, knowledge transfer and best practices [from engaging with similar issues on the rest of the continent] to support the government's reform agenda'.[24] The AfDB's continued support in the energy sector, along with the collaboration with other development partners, is encouraging. Cooperation on soft infrastructure will also hopefully lead to greater financing for hard infrastructure to support Tanzania's objective of electricity security.

23 AfDB, 'AfDB approves US $70.5 million budget support operation for Tanzania energy sector', 21 May 2015b, https://www.afdb.org/en/news-and-events/afdb-approves-us-70-5-million-budget-support-operation-for-tanzania-energy-sector-14243/, accessed 23 May 2017.

24 African Development Fund & United Republic of Tanzania, *Appraisal Report: Power Sector Reform and Governance Support Programme (PSRGSP)*, https://www.afdb.org/fileadmin/uploads/afdb/Documents/Boards-Documents/Tanzania_AR-_Power_Sector_Reform_and_Governance_Support_Programme__PSRGSP_.pdf, accessed 23 May 2017.

Development partners and NGOs

Other development partners have also played a significant role, contributing nearly $100 million to the sector in 2014.[25] Key contributions came from EU institutions[26] (with funding of $35 million), followed by Finland and Norway – traditionally key development partners in the energy sector – with both contributing roughly $12 million each. Assistance from the Republic of Korea[27] and Japan[28] has largely been geared towards transmission and distribution infrastructure, research and policy development and technical assistance.

The US Agency for International Development's (USAID) Power Africa programme has contributed by providing technical assistance to priority generation projects, easing private sector constraints, and embedding advisors in key institutions such as TANESCO, the REA and EWURA. Table 2 gives an overview of the main Power Africa initiatives.

TABLE 2 HIGHLIGHTED TRANSACTIONS FROM USAID'S POWER AFRICA INITIATIVE IN TANZANIA

Name	Kinyerezi	NextGe/Kigoma
MW	150	5
Type of transaction	Gas generation	Solar
Value ($ million)	$183	$7.6
Timeline	Construction 2014; operational October 2015	Project planned to be operational by late 2017
Power Africa support	Technical assistance to price natural gas delivered to the plant	Facilitate financing; Assist TANESCO and EWURA to develop second generation SPPA Overseas Private Investment Corporation investment
Government actions	Possible sovereign guarantee from Ministry of Finance; prioritised TANESCO payments	TANESCO & the REA to support actions that allow EWURA to resolve SPPA issue

Source: USAID, 'Power Africa Fact Sheet: Tanzania', https://www.usaid.gov/powerafrica/tanzania, accessed 26 March 2017

25 OECD (Organisation for Economic Co-operation and Development), Compare Your Country, 'Gross disbursements of official development assistance (ODA) in 2015', http://www2.compareyourcountry.org/aid-statistics?cr=230&lg=en&page=32, accessed 31 July 2016.

26 Including the European Investment Bank and the European Development Fund.

27 Open Aid Data, 'Energy: Tanzania', http://www.openaiddata.org/purpose/282/230/742/, accessed 20 September 2017.

28 *Ibid.*

DFID's contribution has gone towards a multi-sector project running from 2013–2018, supporting Tanzania's BRN initiative through a $50 million grant. In the energy sector, objectives include reducing Tanzania's reliance on expensive emergency power producers (EPPs) and extending electricity access to 5 million Tanzanians. The mid-term review of this programme, however, has indicated that inadequate progress has been made overall, and less than anticipated in the energy sector specifically. This is largely owing to institutional constraints in the Tanzanian government, including slow disbursements of funds from key public institutions to other ministries, departments and agencies (MDAs) and staffing constraints.[29]

In addition to Tanzania's development partners, a host of NGOs are also involved. These include organisations promoting sustainable and renewable energy and faith-based organisations (often providing electricity to local communities). Many ordinary citizens also rely on solar-driven household systems.[30]

Overall, donor support has focussed largely on institutional strengthening, rural electrification and the renewable energy sector. It appears that the government, MDAs and SOEs have jealously guarded their mandate over large-scale hydro and hydrocarbon generation, transmission and distribution, hence the focus of development partners on other sectors to address the gaps.

Energy sources

Tanzania has an abundance of natural resources. More than 40% of the country's top 10 exports in 2016 were minerals, including gold, diamonds, iron, coal, nickel, tanzanite and uranium.[31] Some of these resources are used domestically in manufacturing and electricity generation. In recent decades the discovery of natural gas deposits has spurred significant interest from domestic and foreign investors, with investment in this sector increasing from $24 million in 2008 to more than $1 billion in 2013.[32] It is likely to influence the energy environment in Tanzania significantly going forward.

Power generation in Tanzania depends on biomass, hydro and carbon-based sources. Biomass in particular is employed by households that rely heavily on wood and charcoal (estimated at 60% of final household energy consumption).[33] Hydro-generation is

29 DFID (Department for International Development), Development Tracker, *Annual Review: Big Results Now Delivery Programme Phase II (May 2016)*, https://devtracker.dfid.gov.uk/projects/GB-1-204010/documents, accessed 23 May 2017.

30 United Republic of Tanzania, 2015a, *op. cit.*, p. 38.

31 ITC TradeMap, 'Trade Database', http://www.trademap.org/, accessed 23 May 2017.

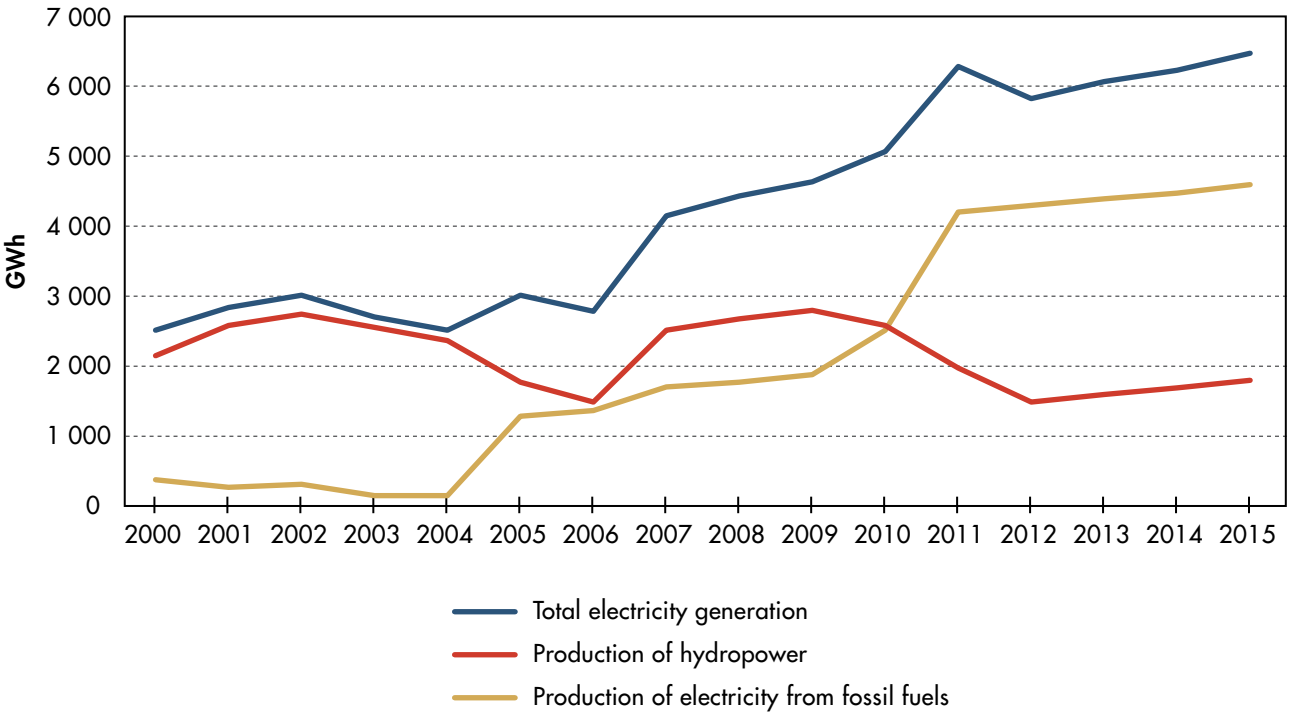
32 TIC (Tanzania Investment Centre), *Tanzania Investment Report 2014*. Dar es Salaam: TIC, 2015.

33 UNIDO (UN Industrial Development Organization), 'SADC Renewable Energy and Energy Efficiency: Status Report', 2015, https://www.unido.org/fileadmin/user_media_upgrade/What_we_do/Topics/Resource-efficient__low-carbon_production/UNIDO-REN21-SADC_RE_and_EE_Status_Report.pdf, accessed 2 October 2017.

responsible for baseload energy, while carbon-based resources (oil and gas) are used increasingly as a stop-gap measure, because of recurring droughts affecting the baseload.

As of 2015, Tanzania has 6 450 gigawatt hours (GWh) installed generation capacity (see Figure 2). This is more than that of regional counterparts such as Burundi (195GWh), Rwanda (1 076GWh) and Uganda (3 207GWh), but less than that of Kenya (10 109GWh) and South Africa (295 389GWh), respectively the biggest electricity-generating countries in East and Southern Africa.[34]

FIGURE 2 TANZANIA'S ELECTRICITY GENERATION CAPACITY



Source: AfDB, 'AfDB socio economic database 1960–2016', http://dataportal.opendataforafrica.org/xedzxdg/afdb-socio-economic-database-1960-2016, accessed 23 May 2017

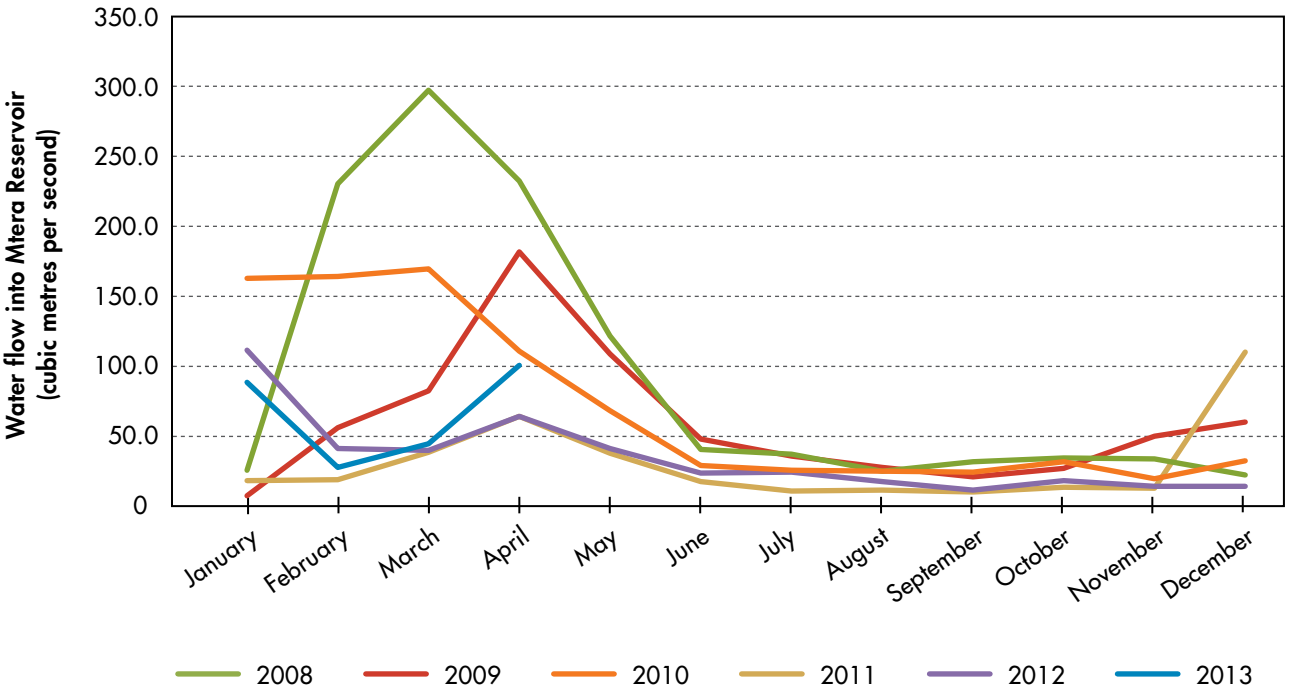
TANESCO generates just under 60% of Tanzania's total power output, and the balance is supplied by commercial providers that mostly use hydrocarbon sources (oil and gas). Hydropower accounts for 27.2% of the total generation capacity in the country and

34 AfDB, 'AfDB socio economic database, 1960–2016', http://dataportal.opendataforafrica.org/xedzxdg/afdb-socio-economic-database-1960-2016, accessed 23 May 2017.

hydrocarbon for 71.7%, with the balance of just below 2% comprising other sources such as non-hydro renewable energy (see Figure 2).

Tanzania has experienced recurring droughts since the early 2000s. Their detrimental effect on electricity supply is significant. Figure 3 illustrates the major variations in water flow to Tanzania's largest source of hydropower, the Mtera Reservoir, highlighting this challenge. Between 2004 and 2006 the share of hydro-generated electricity in total generation capacity dropped from around 95.1% to 51.7%. In 2015 it contributed only 27.1% of total generation capacity.[35] Although the country's available generation capacity has nearly tripled since 2000 (from 2 479GWh in 2000 to 6 450GWh in 2015), additional capacity has largely been as a result of emergency hydrocarbon generation, which increased from 334GWh in 2000 to 4 583GWh in 2015.

FIGURE 3 VARIATIONS IN MTERA RESERVOIR FLOWS, 2008–2013



Source: Government of Tanzania, *Scaling-up Renewal Energy Programme*. Dar es Salaam: Ministry of Energy and Minerals, 2013

35 Government of Tanzania, *Scaling-up Renewal Energy Programme*. Dar es Salaam: Ministry of Energy and Minerals, 2013.

The Mtera Reservoir forms part of the Kidatu Dam hydropower complex. Kidatu Dam was constructed during the 1970s and has undergone a number of upgrades and extensions to now include the Mtera Reservoir. Between 1993 and 1994 the motors were rehabilitated, financed by both TANESCO and the Swedish International Development Cooperation Agency (Sida). Between 1999 and 2003 an upkeep and upgrade project was implemented at Kidatu, which included the computerisation of the system. This project was funded by Sida, the Norwegian Agency for Development and Cooperation and TANESCO with a budget of around $12 million.[36] The AfDB considers the Kidatu hydro plant a good example of cost-efficient power generation, considering that it operates at optimal capacity for a plant its size.[37] Kidatu illustrates the importance of continuous upkeep of and upgrades to existing infrastructure to ensure optimal efficiency, as well as the need for governments to adequately budget for such reoccurring costs rather than relying on grant financing from development partners. As is often the case,[38] experience from Kidatu also suggests that refurbishing and upgrading large-scale infrastructure projects is more cost efficient than building new ones.

The effects of the drought have resulted in extensive load-shedding, which TANESCO has sought to overcome by drawing on thermal generation (produced internally) and procurement from EPPs.[39] This has been a costly solution, as both rely on the use of petrol generators.[40] TANESCO uses oil-based alternatives to supplement its hydropower generation, but this is a recurring, high-cost solution given that both hydro and oil-based generation are vulnerable to supply shocks such as droughts and oil-price hikes.

While Tanzania is part of both the Southern African Power Pool (SAPP)[41] and the Eastern African Power Pool (EAPP), its electricity imports from other countries in the region are largely constrained because of the lack of a supportive transmission infrastructure. Such imports remain marginal, with only 15MW of electricity imported in 2015 from Zambia and Ethiopia (representing less than 1% of total capacity in 2015).[42]

While Tanzania is part of both the Southern African Power Pool (SAPP) and the Eastern African Power Pool (EAPP), its electricity imports from other countries in the region are largely constrained because of the lack of a supportive transmission infrastructure

36 TANESCO (Tanzania Electricity Supply Company), 'Kidatu Hydro Power Plant', http://www.tanesco.co.tz/index.php/kidatu, accessed 23 May 2017.

37 AfDB, *The New Deal on Energy for Africa*, http://www.au-pida.org/sites/default/files/pdf/docs/The%20New%20Deal%20on%20Energy%20for%20Africa%20-%20A%20Rugamba-%20AfDB.pdf, accessed 23 May 2017.

38 Shaik M, Presentation delivered at the Finance and Development Conference, Johannesburg, 10 May 2017, http://www.saiia.org.za/events/finance-and-development-experiences-in-south-south-collaboration-from-africa-asia-and-latin-america, accessed 10 October 2017.

39 EPPs are independent power producers that were meant to be short-term suppliers to alleviate electricity supply constraints following a significant reduction in generation capacity from hydro resources. Generation capacity from EPPs is generally expensive considering they rely on thermal resources for generation, making them an unsustainable solution in the long term.

40 AfDB, 2015a, *op. cit., p. 24.*

41 While Tanzania is part of the SAPP, there is no interconnector yet linking the country to the SAPP.

42 Peng D & R Poudineh, *Sustainable Electricity Pricing for Tanzania*, OIES (Oxford Institute for Energy Studies) Paper, EL20, July 2016, https://www.oxfordenergy.org/wpcms/wp-content/uploads/2016/07/Sustainable-electricity-pricing-for-Tanzania-EL-20.pdf, accessed 23 May 2017.

Regional power pools connect the electricity grids of various power producers, both through physical means across borders and through interchange agreements governing energy cooperation and trade. The ultimate aim of such agreements is to increase efficiency and electricity supply by creating economies of scale, diversifying generation sources and ensuring more efficient use of electricity (given that electricity cannot be stored cost effectively, it makes sense to rather sell it to other utilities that require it). Tanzania's electricity trade with the EAPP is limited by the relatively small interconnectors (132kV) that connect it with these broader grids, and it is yet to be connected to the SAPP. New interconnectors are being planned (220kV between Tanzania, Burundi, Rwanda and Uganda, as well as 400kV between Tanzania and Kenya), which should give Tanzania access to additional sources of electricity.[43]

This objective falls squarely within the AfDB's objective to accelerate major regional projects that focus on regional interconnections. Linking Tanzania to the SAPP and EAPP should become a priority project for the AfDB. Energy imports (and hence interconnectors between countries) will become increasingly important throughout East Africa as especially Ethiopia scales up its generation capacity, looking to become a regional powerhouse in this sector (see Box 1).

This regional initiative needs to be implemented as soon as possible, as Tanzania's economic development trajectory (eg, growing mining operations, liquid petroleum gas plants and industry) is expected to lead to increased demand for electricity. The Tanzanian Power Sector Master Plan (PSMP) estimates that the country's electricity needs will more than double over the next two decades, requiring over 7 500MW of installed capacity by 2035.[44] The increased demand is also linked to its fast-growing population and the goal to connect more people to the main grid, which the PSMP projects will cover at least 78% of the population by 2035.[45] This target seems ambitious given the challenges facing the country, including the financial instability of TANESCO, the low population density and limited financial and technical capacity domestically. Currently, less than 16% of the population has access to electricity, with wide access disparities between urban and rural areas.[46] Set against the AfDB target of universal access by 2025, it does seem as though the AfDB's ambition is unrealistic, especially given that its strategy is focused on the entire continent.

43 Wright JG, 'Developing an Integrated Energy Model for the Eastern African Power Pool (EAPP)', paper presented at East African Power Industry Convention, Nairobi, 3–4 September 2014.

44 Government of Tanzania, 'The Executive Summary of Power System Master Plan 2012 Update', www.tanesco.co.tz/index.php/investments/investment-report/23-the-executive-summary-of-power-system-master-plan-2012-update/file, accessed 10 October 2017.

45 *Ibid.*

46 AfDB, 2015a, *op. cit.*, p. 23.

BOX 1 ETHIOPIA AS A REGIONAL POWERHOUSE

Ethiopia is rich in energy-generation resources, notably renewable energy (hydroelectric, wind, solar and geothermal), which has an estimated generation capacity of 60 000MW. However, these resources have largely remained undeveloped.

The country is hoping to develop available resources to become the powerhouse of East Africa; accelerating its economic growth by raising revenues from electricity exports. Its current installed capacity of 2 300MW is expected to increase fivefold by 2018, with the Gibe III and Grand Ethiopian Renaissance Dam (GERD) hydropower plants coming online.

Ethiopia's regional energy ambitions are not without controversy. Egypt, which has long held the status of 'regional powerhouse', is jealously guarding its territory. At the same time, the construction of the GERD on the Nile has had significant downstream effects on Egypt, leading to water and electricity security concerns and fears for the country's agriculture sector and fisheries.

It is in Tanzania's interest to diversify its generation capacity with power imports, especially considering the likely low-cost renewable energy offered by Ethiopia. Nevertheless, it should not ignore the associated tensions.

Source: Anderson M & N Norbrook, 'Ethiopia: Regional powerhouse', *The Africa Report*, 22 May 2017, http://www.theafricareport.com/East-Horn-Africa/ethiopia-regional-powerhouse.html, accessed 23 May 2017.

While the focus is on large-scale initiatives to increase electricity production, Tanzania should not neglect the potential of small-scale and off-grid operations, especially considering the geographical and socio-economic challenges it faces. Extending the main electricity grid in Tanzania will be costly. At the same time, evidence suggests that the poor spend up to 35% of their disposable income on energy, while higher-income earners spend as little as 14%. Lack of access to electricity may mean that many rural poor will remain trapped in a cycle of poverty.[47] Various products and innovations have been introduced and successfully applied in Tanzania and other developing countries (see Box 2). However, low-income households face capital constraints that prevent them from making use of such innovations, while firms often require concessional financing to ensure the sustainability of their business model.[48]

47 Support2develop, 'Mission', http://www.s2dev.org/mission/, accessed 2 October 2017.

48 Bauner D *et al.*, *Sustainable Energy Markets in Tanzania: Report 1*, SEI (Stockholm Environment Institute) & renetech (renewable energy technologies), September 2012, http://www.renetech.net/wp-content/uploads/2013/03/Sustainable_Energy_Markets_in_Tanzania_I_final_.pdf, accessed 23 May 2017.

BOX 2 MOBISOL: PROVIDING AFFORDABLE OFF-GRID ELECTRICITY

Mobisol, a German firm, provides affordable renewable energy to customers across East Africa by offering small solar grid systems with affordable payment plans. Its flexible home solar systems can be adapted to the needs of customers and it offers a number of products, including batteries, solar panels and inverters to power phones, laptops, lights, fridges, radios and televisions. Local entrepreneurs also use the systems to earn an income through offering, for example, a cell phone charging service. Micro-finance loans are provided to customers, with payments via mobile technologies and pay-as-you-go instalments over 36 months. These monthly instalments are equivalent to what customers would typically spend on other energy sources such as kerosene, candles or batteries.

Since 2012 Mobisol has electrified more than 67 000 households across Tanzania and Rwanda, providing clean energy to over 330 000 people. It also employs more than 300 people, 90% of whom are based in Tanzania and Rwanda.

Initial seed capital came from an investor, but development partners were instrumental in further product development and scaling up the operation. In December 2016 the International Finance Corporation and the Dutch government invested $6 million and $10.3 million respectively.

Source: GNESD Energy Access Knowledge Base, 'Mobisol Smart Solar Solutions for Africa', http://energy-access.gnesd.org/cases/49-mobisol-smart-solar-solutions-for-africa.html, accessed 23 May 2017; Sibanda Z & E Markoglou, 'IFC and FMO investment in Mobisol helps deliver decentralized solar energy to East Africa', IFC (International Finance Corporation), 12 December 2016, https://ifcextapps.ifc.org/ifcext/pressroom/ifcpressroom.nsf/0/13D792D670B9CB768525808700362B80, accessed 23 May 2017.

Diversification

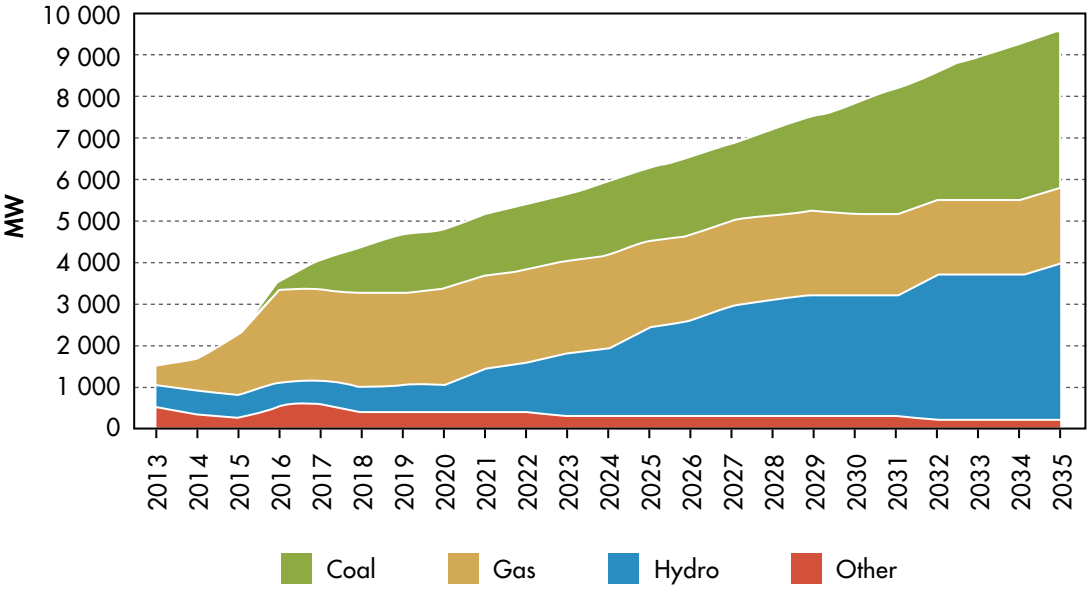
There has been a concerted effort to diversify Tanzania's power generation mix, given the adverse effects of climatic conditions. A number of options have been considered. The Tanzania PSMP forecast indicates that by 2035 the country's energy mix will largely consist of hydro, coal and gas (see Figure 4).[49] However, the country has significant potential to exploit renewable resources.

The prioritisation of coal in Tanzania's electricity generation is a concern, especially considering the global move away from hydrocarbons

The prioritisation of coal in Tanzania's electricity generation is a concern, especially considering the global move away from hydrocarbons. Like other developing countries, the Tanzanian government believes it should be allowed to exploit this relatively cheap resource. However, there are reasons why coal is a less viable option. Firstly, the sector is, in Tanzania, fairly undeveloped and the technical skills base domestically is inadequate. Secondly, the cost of renewable energy has dropped significantly over the last decade, making coal's future financial viability uncertain. Thirdly, financing for coal operations is

49 AfDB, 2015a, *op. cit.*, p. 60.

FIGURE 4 CHANGES IN GRID-CONNECTED ELECTRICITY PRODUCTION SOURCES



Source: AfDB, 'Tanzania Country Profile', https://www.afdb.org/fileadmin/uploads/afdb/Documents/Generic-Documents/Renewable_Energy_in_Africa_-_Tanzania.pdf, accessed 10 October 2017

increasingly difficult to mobilise. For example, a recent policy decision by Organisation for Economic Co-operation and Development members to cut financing for coal projects will result in an 85% reduction in funding for such projects.[50]

At the same time, renewable energy is no longer viewed only in terms of its environmental sustainability. Increasingly, it is also seen to contribute to socio-economic development by furthering employment opportunities and incomes, while also contributing to industrial development and improved trade balances. Additional welfare benefits are accrued by increasing access to electricity; facilitating, for example, better healthcare and education. Human development and industrialisation are two central pillars of Tanzania's NDP (the third being implementation effectiveness).[51] With the massive energy demand that could be created via the AfDB's High Fives strategy, developing a renewable energy sector can contribute to achieving the NDP's goals by establishing a competitive industry and regional value chains.

50 Bloomberg & Agence France-Presse, 'OECD to cut financing for coal-fired power plants', *The Straits Times Online*, 31 July 2016, http://www.straitstimes.com/world/oecd-to-cut-financing-for-coal-fired-power-plants, accessed 10 October 2017.

51 United Republic of Tanzania, June 2016, *op. cit.*

Renewable energy (non-hydro)

Apart from hydro, other renewable options include geothermal energy (electricity generated from the earth's mostly underground heat sources, eg, hot springs), wind, solar and biomass. The estimated generation potential of geothermal in Tanzania is 650MW. More than 50 sites have been identified for possible exploitation. While there has been considerable interest from the private sector,[52] geothermal exploration and development is expensive.[53] It has not been considered in the PSMP due to the cost uncertainties.

Solar and wind resources are generally more mainstream and the cost of exploring these resources has dropped. A number of sites have been identified in Tanzania where wind generation would be viable, with various companies expressing interest in developing these sites. Yet a lack of knowledge regarding the risks of wind generation investments has made uptake slow.[54] There has been more interest in solar energy. Solar resources in Tanzania are currently being exploited for both on-grid and off-grid power solutions. Theoretically, Tanzania's total required electricity supply could be met through solar generation with solar fields covering less than 0.02% of Tanzania's total land mass. The government has supported these initiatives through, for example, eliminating value-added tax and import duties on key solar components such as panels, batteries, inverters and regulators.[55]

Biomass, specifically agro-forestry waste, could also be employed to generate electricity in a more sustainable manner.[56] Given the size of Tanzania's agricultural industry (sugar, sisal, coffee and rice), animal waste and agricultural and forestry residues could be used to generate electricity.[57] However, generation is often tied to harvesting seasons, which limits year-round generation and risks exposure to climatic conditions such as droughts.

Value chain development in the renewable energy sector

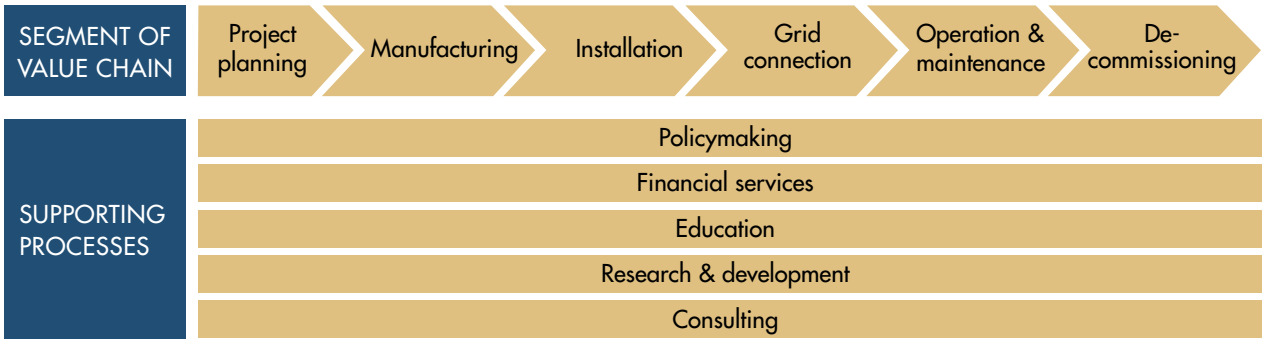
The AfDB strategy speaks of doubling existing efforts at electrification across the continent, arguing that providing electricity access to the remaining 640 million people in Africa would require an additional 162GW – roughly four times South Africa's generation capacity. Such an expansion necessitates the development of a renewable energy value chain (REVC). Regrettably, this key component is missing from the AfDB's New Deal on Energy. This is a missed opportunity that would have tied in well with a common theme in NDPs across the continent – industrialisation and local beneficiation – as well as the High Five priority of industrialising African countries. Arguably, few countries have a renewable

52 ESI, 'Tanzania looks into geothermal energy', https://www.esi-africa.com/news/tanzania-looks-into-geothermal-energy/, accessed 26 March 2017.
53 United Republic of Tanzania, May 2013, *op. cit.*, p. 44.
54 AfDB, 2015a, *op. cit.*, p. 64.
55 United Republic of Tanzania, May 2013, *op. cit.*, p. 45.
56 More traditional biomass sources such as wood and charcoal result in an estimated loss of up to 125 000ha of forest in Tanzania annually.
57 AFDB, 2015a, *op. cit.*, p. 35.

energy industrial base to start from. However, as the following section will show, even countries such as Tanzania have a basis from which renewable energy can be developed and expanded. The addition of continental REVC development would have been an ideal value add to the AfDB's programme, complementing the bank's regional mandate as well.

An REVC has a large number of different components, ranging from project planning through to manufacturing, construction and installation, operation and maintenance, and eventually, the decommissioning of plants. Other avenues where value could be created include support services such as logistics, financial, legal, education and research, and development (see Figure 5).

FIGURE 5 TYPICAL SEGMENTS OF A RENEWABLE ENERGY VALUE CHAIN



Source: Irena (International Renewable Energy Agency) & CEM (Clean Energy Ministerial), 'The Socio-economic Benefits of Solar and Wind Energy', May 2014, http://www.irena.org/DocumentDownloads/Publications/Socioeconomic_benefits_solar_wind.pdf, accessed 6 January 2017

The ability of domestic actors to engage in activities on this spectrum naturally depends on existing capacities.[58] Tanzania fortunately has the potential to contribute to domestic value addition in certain renewable energy industries. In the 2016 Climatescope Survey,[59] comparing 58 developing economies' domestic capacity to provide services to the renewable energy industry, Tanzania was ranked 19th overall. Among the economies evaluated, China, India and South Africa were placed in the top three positions, respectively. Table 3

58 Irena (International Renewable Energy Agency) & CEM (Clean Energy Ministerial), 'The Socio-economic Benefits of Solar and Wind Energy', May 2014, http://www.irena.org/DocumentDownloads/Publications/Socioeconomic_benefits_solar_wind.pdf, accessed 6 January 2017.

59 An annual survey supported by DFID and USAID and undertaken by Bloomberg Climatescope, 'Global Climatescope 2016', http://global-climatescope.org/en/, accessed 26 March 2017.

summarises available capacity in various REVC activities for different sources of renewable energy in Tanzania.

TABLE 3 DOMESTIC VALUE CHAIN RESOURCES AVAILABLE TO FACILITATE CLEAN ENERGY DEPLOYMENT

Generation source	Available	Unavailable
Biomass	Feedstock supply Operation and maintenance (O&M) Project development	Engineering Equipment manufacturing
Geothermal	Project development Resource development	Balance of plant[a] Engineering O&M Turbines
Small hydro	Balance of plant Engineering O&M Project development	Turbines
Solar	Engineering O&M Project development	Balance of plant Cells Inverters Modules Polysilicon/ingots Wafers
Wind	Project development	Balance of plant Blades Engineering Gearboxes O&M Towers Turbines

a 'Balance of plant' refers to the supporting components and auxiliary systems required by a power plant to deliver energy. Typically, this will include items such as transformers, inverters or battery storage systems.

Source: Climate Scope 2016, 'Tanzania', http://global-climatescope.org/en/country/tanzania/#/details, accessed 6 January 2017

The survey shows that Tanzania's historical involvement in hydropower generation has created the domestic capacity to engage with this generation method, including providing supporting services such as project development, engineering, and operation and

management. The more complex activity of manufacturing turbines remains outsourced to other countries. Tanzania has been able to leverage its expertise to support project development across other generation sources.

A greater effort should be made to engage in manufacturing processes, starting with simpler elements, which would support the country's development priorities. This could be achieved quicker if more attention were focussed on the renewable energy sector. Given the limited role envisioned for small-scale hydro in the PSMP, the country will struggle to fully capitalise on benefits from this sector. Nevertheless, as Tanzania's renewable energy industry grows and economies of scale allow for more efficient operations, more processes across the value chain should be able to be delivered locally, maximising the socio-economic benefits.

The different levels of complexity of activities across the value chain dictate the degree to which domestic value addition can be achieved. For example, while the project planning stage often requires specialised services such as resource assessments, feasibility studies, project design and legal activities, the manufacturing process includes component manufacturing and assembly, which is more suitable to labour-intensive economies. The installation phase is also suited to labour-intensive economies, involving civil engineering and the assembly of wind or solar plants. This typically allows domestic engineering and construction companies to enter the value chain, contributing to domestic value creation. During the installation phase domestic logistics firms can capitalise on their local expertise, networks and infrastructure.[60] This is particularly important in a country as vast as Tanzania, where distance is often a stumbling block to project development.

During the grid connection phase, and despite the sophisticated skills required for some activities, significant opportunities exist for domestic firms to lay cables connecting power plants to main grids, or install supporting infrastructure. Given the lifespan of renewable energy plants (eg, solar plants remain in use for roughly 25 years), local employees rather than expatriates are typically trained to carry out the operation and maintenance of such facilities. When these plants are decommissioned, local recycling industries stand to benefit.[61]

At the outset of creating a renewable energy industry, there are typically areas where emerging countries such as Tanzania have some capability to engage in the process, even if existing capacities are low (see Table 4).

There are thus many opportunities for countries to take advantage of existing capacities to unlock the socio-economic and environmental benefits of the renewable energy industry. However, it is critical that the private sector becomes the key driver of this process.

At the outset of creating a renewable energy industry, there are typically areas where emerging countries such as Tanzania have some capability to engage in the process, even if existing capacities are low

60 Irena, *op. cit.*

61 *Ibid.*

TABLE 4 POTENTIAL FOR DOMESTIC VALUE ADD IN REVC

Potential for domestic value creation	Beginning of wind & solar energy development	First projects realised, local industries suitable for participating	Many projects realised, national wind/solar industry developing
Lifestyle phase			
Project planning	Low	Medium	High
Manufacturing	Low	Medium	Medium/high
Installation	Low	Medium	High
Grid connection	High	High	High
Operation & maintenance	Medium	High	High
Decommissioning	Low	Low	Medium
Supporting processes			
Policymaking	High	High	High
Financial services	Low/medium	Medium	High
Education & training	Low/medium	Medium	Medium/high
Research & development	Low	Low/medium	Medium
Consulting	Low	Low	Medium

Source: Irena & CEM, 'The Socio-economic Benefits of Solar and Wind Energy', May 2014, http://www.irena.org/documentdownloads/publications/socioeconomic_benefits_solar_wind.pdf, accessed 6 January 2017

Privatisation

Privatisation in the energy sector is not a new phenomenon in Tanzania, unlike many other countries in Southern Africa. Independent power producers (IPPs) have been allowed to participate in the energy sector in Tanzania since the 1990s. The move towards private sector participation was largely driven by the World Bank and the International Monetary Fund via their structural adjustment programmes (SAPs). While there was initially strong interest, reform initiatives and uptake from the private sector were slow. SAPs were often seen as externally imposed conditions and found little public or high-level political support.

However, the most recent promotion of private sector participation has seen strong domestic support. A number of policies have been adopted, including the Public–Private Partnership Act 2010 and the Private Partnership Regulations, passed in 2011 to promote private sector participation in the energy sector.[62] In 2015 six IPPs and EPPs were

62 USAID, 'Power Africa: Tanzania Fact Sheet', https://www.usaid.gov/powerafrica/tanzania, accessed 25 April 2016.

operating, as well as three small power producers (SPPs), and an additional eight had signed SPP agreements with TANESCO.

This has also given rise to a fairly unique system in Tanzania, namely the Small Power Producer's Programme. EWURA established a system of regulations, standardised contracts and fixed feed-in tariffs (FITs, the rate paid for pushing generation into electricity grids) for power producers with a generation capacity of less than 10MW. SPP agreements also guarantee offtake by TANESCO of all electricity produced for at least 15 years. These producers supply TANESCO with generation capacity and, in certain cases, also supply electricity directly to customers.[63] By creating a system that is transparent, predictable and light on bureaucracy, Tanzania has attracted significant investment interest. To date, more than 11 SPP agreements have been signed between domestic and foreign investors and TANESCO.

INVESTMENT ENVIRONMENT AND KEY CHALLENGES

Tanzania is aware of the need for foreign direct investment (FDI) and the importance of creating an environment that attracts investors. Towards this end, a number of key reforms have been undertaken and incentives offered. One of the key actions has been the establishment of a One Stop Investment Centre, centralising engagement with all government agencies to streamline the investment process. All foreign investors are guaranteed free imports and foreign exchange conversion, as well as the unconditional transferability of funds. All foreign investments in Tanzania are protected against nationalisation and expropriation. In addition, Tanzania has been a member of the World Bank's Multilateral Investment Guarantee Agency and the International Centre for Settlement of Investment Disputes since 1992, which further boosts investor confidence.[64] Various bilateral investment treaties and double taxation agreements have been signed.[65]

Tanzania is aware of the need for foreign direct investment (FDI) and the importance of creating an environment that attracts investors. Towards this end, a number of key reforms have been undertaken and incentives offered

General overview

FDI into Tanzania was low in the post-colonial era. A marked increase in investment was only noted from 1995 onwards, after Tanzania's first democratic elections (see Figure 6). In 2013 foreign private investments in Tanzania totalled nearly $16 billion, of which total stocks accounted for 93.1%, portfolio investments for 0.1% and other investments for 6.8%.[66]

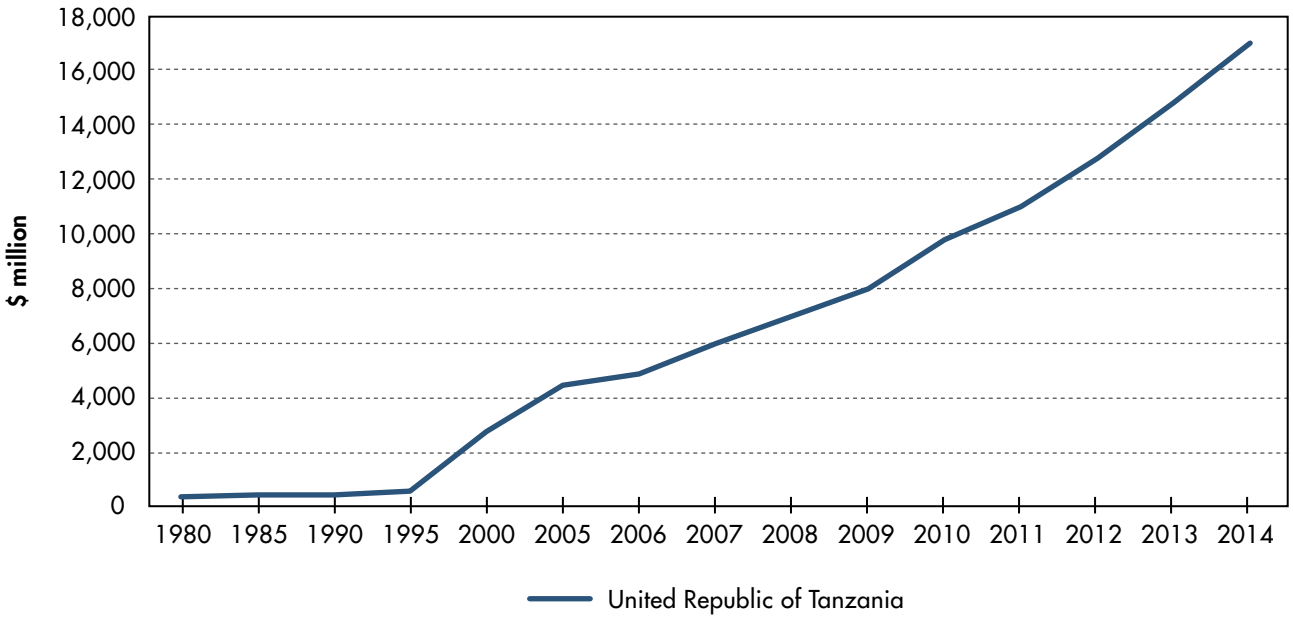
63 World Bank, The *Design and Sustainability of Renewable Energy Incentives*. Washington: World Bank, 2015, p. 175.

64 USAID, *op. cit.*

65 TIC, *op. cit.*

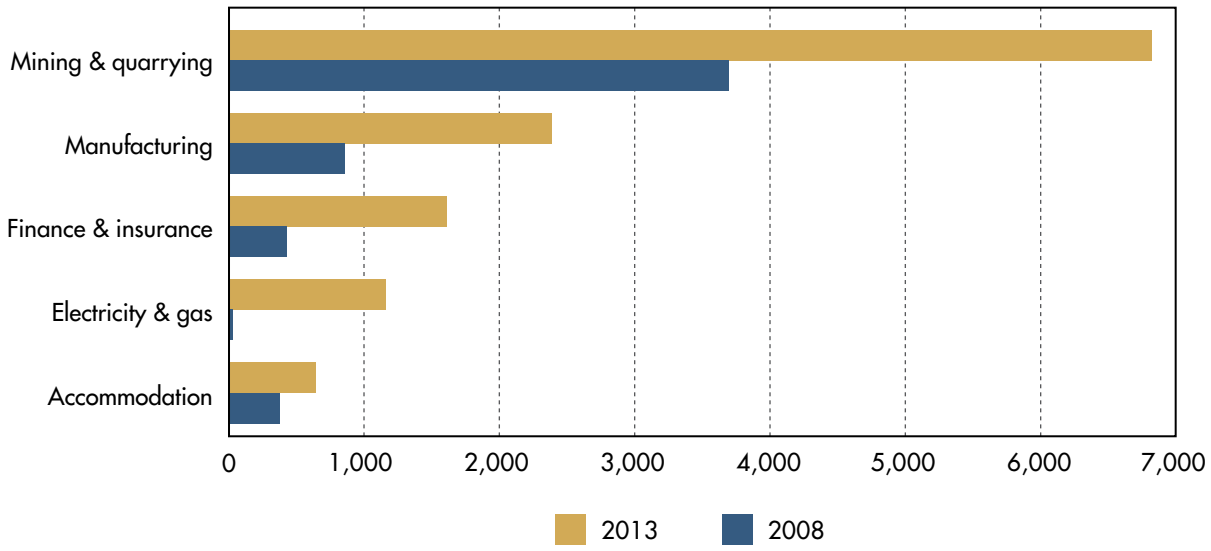
66 *Ibid.*

FIGURE 6 TANZANIA FDI STOCK (1980–2014)



Source: UNCTAD, 'UNCTADstat database', unctadstat.unctad.org/, accessed 25 April 2016

FIGURE 7 TANZANIA: TOP 5 FDI STOCK BY ACTIVITY (2008 & 2013, $ MILLION)

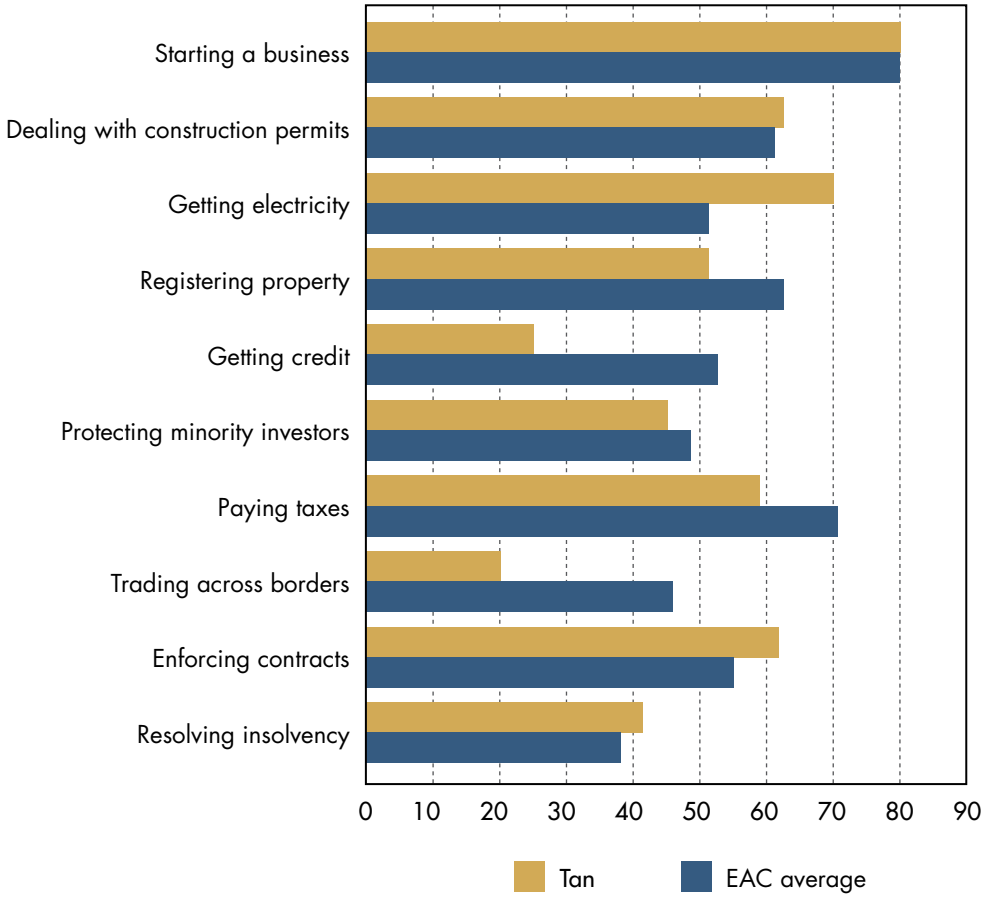


Source: TIC (Tanzania Investment Centre), *Tanzania Investment Report 2014*. Dar es Salaam: TIC, 2015

A sectoral breakdown of FDI in 2013 indicated that the sectors that attracted the most FDI were mining and quarrying ($6.8 billion), manufacturing ($2.4 billion) and electricity and gas ($1.1 billion). The impact of the discovery of natural gas deposits and the ensuing interest from international companies become apparent when comparing the 2013 figure with that for 2008, which was $24 million (see Figure 7).

The government of Tanzania has signalled a clear commitment to attracting FDI and has facilitated policies towards this goal. However, key domestic challenges remain that negatively affect the country's attractiveness as an FDI destination. According to the World Bank's Doing Business Indicators (which measure business regulations and their enforcement), Tanzania ranks 139th out of 189 countries. Despite some areas where the country outperforms other EAC members – ie, 'getting electricity' and 'enforcing contracts' – its overall performance is on par or below the EAC's average scores (see Figure 8).

FIGURE 8 WORLD BANK DOING BUSINESS INDICATORS (2016)



Source: World Bank, 'Doing Business', http://www.doingbusiness.org/, accessed 25 April 2017

John Magufuli's election as president in November 2015 generated significant optimism, which has affected the investment environment positively. This phenomenon has been attributed to Magufuli's position as an 'outsider' among the traditional ruling elite, his stance on corruption and nepotism, his no-nonsense, results-driven approach, and his focus on private sector-driven growth, among others. However, caution is needed. Firstly, the president's hard-line stance on many issues could act as a barrier to government operations. As one stakeholder noted, while previously policymakers were never around to make decisions, their fear of losing their positions under Magufuli now means that no decisions are being made at all, at various levels of government.[67] Equally, the investment environment is not shaped by rhetoric alone. Instead, it is often constrained by institutions and the institutionalisation of practices, which is more difficult to overcome.

Investment in the energy sector

Attracting foreign investment to support the energy sector has been a key objective of Tanzania's national development policies, as well as sectoral policies such as the PSMP. As highlighted above, the government's commitment to the liberalisation of the energy industry was driven by various external factors in the past, but since 2008 there has been a renewed commitment to its privatisation from domestic political stakeholders, signified by the signing of the Electricity Act.[68] Between 2000 and 2011 Tanzania attracted FDI of nearly $850 million into the energy sector (11 projects in total).[69] While this has focused exclusively on thermal generation (gas), FDI is also expected in the renewable energy sector.

The following section highlights key successes and challenges in attracting private sector participation and FDI into the energy sector in Tanzania.

Successes

- **Institutional/regulatory and legal policies**
  Significant progress has been made with policy reforms to enable even greater private sector participation. As noted earlier, while the changes in the 1990s appeared to be imposed by external actors, such as the SAPs, rather than being driven by domestic demand, renewed efforts now appear to have public and political support. Table 6 identifies and briefly summarises a number of key policies orientated towards creating a more enabling environment within the renewable energy sector.

  Plans are currently underway to make energy generation, transmission and distribution more efficient through significant structural changes at TANESCO, including the unbundling (separating generation, transmission and distribution) of these services. This has already revolutionised the rural energy sector, ensuring access to electricity in areas where it is unfeasible for TANESCO to provide services. In addition, the

67 Personal interview, Dar es Salaam, May 2016.
68 Eberhard A & J Kapika, *op. cit.*
69 TIC, *op. cit.*

government's investment planning, procurement and contract management services are being strengthened to facilitate greater competition among public and private generators.[70]

TABLE 6 KEY GOVERNMENT POLICIES IN THE RENEWABLE ENERGY SECTOR

Policy	Year	Description
Tanzania Sustainable Energy Action Agenda	2015	Contains a range of targets towards reducing non-renewable energy usage, such as for household consumption. Outlines various activities, including rural electrification, adoption of biomass energy strategy, biomass technology and a vendor database.
Tanzania 2030 Emissions Reduction Target	2015	Outlines a number of measures to achieve Tanzania's greenhouse gas emission reduction targets, as noted in the country's Intended Nationally Determined Contribution submitted to the UN Framework Convention on Climate Change. The policy estimates that Tanzania requires $0.5–1 billion annually to implement its adaptation activities, and another $60 billion to achieve its mitigation efforts.
Tanzania Value Added Tax Exemption	2014	In order to stimulate the solar energy industry, the government has exempted the following inputs from value added tax: solar panels, modules, solar charger controllers, solar inverters, solar lights, vacuum tube solar collectors and solar batteries.
EAC Import Duty Exemption	2009	The EAC has a common agreement to waive import duties on products related to photovoltaic cells and modules.
Tanzania Small Power Producers Framework	2009	Framework of regulations, standardised contracts and fixed FITs for power producers with generation capacity of less than 10MW. SPP agreements also guarantee offtake by TANESCO of all electricity produced for at least 15 years.
Tanzania Rural Energy Fund	2005	The REF subsidises rural energy projects to increase the uptake of electricity in rural areas. This is done through grants and loans to public and private institutions to develop and implement electricity projects. It is funded through contributions from development partners and government resources.

Source: Climate Scope 2016, 'Tanzania', http://global-climatescope.org/en/country/tanzania/#/details, accessed 6 January 2017

70 AfDB, 2015a, *op. cit.*, p. 40.

As part of the process to make TANESCO more financially viable, EWURA approved electricity tariff increases of 40% in 2012 and a further increase of 39% in 2014. Although the development impact of this is significant (especially on the poor), this has been done in an attempt to bring the cost of electricity services in line with production costs.

- **Renewable energy potential**

  As highlighted earlier, Tanzania has significant natural resources that could be exploited for power generation. The estimated untapped potential includes large-scale (4 000MW) and small-scale hydro (480MW), geothermal (650MW), wind and solar (theoretically unlimited) and biomass. Increasingly, the government and key (public) energy stakeholders are looking to move away from expensive thermal-based generation (notably oil) towards more sustainable and cost-effective resources. This has the added benefit of diversifying the energy mix, limiting the risks posed by external shocks. While coal (significant domestic deposits exist) is currently not exploited extensively to generate electricity for the grid, it has been prioritised as a future generation resource (eg, in the PSMP).

  Studies suggest that numerous renewable energy generation sources could be competitive in Tanzania, especially off-grid or mini-grid solutions that have already proved feasible. While expanding the main grid remains a critical priority for most countries, off-grid energy solutions could provide rural areas with electricity in a cost-effective manner. Prices of solar panels and lithium batteries are falling sharply. Mobile 'pay-as-you-use' systems allow companies to provide customised services and technologies for poor households.[71] These options are often not feasible for industrial usage, but they could significantly improve the welfare of poor, rural households. The prospects for especially renewable energy to become cheaper than other generation sources are positive, considering the significant technological strides that have been made and that are likely to continue.[72] In addition, while no incentives were offered before 2008 for renewable energy electricity generation, specific incentives have since been announced, especially for SPPs.[73]

- **Knowledge and capacity**

  Tanzania already has the technical and human capacity to engage in various stages of REVCs. If the right policies and strategies are put in place, existing capacity can be leveraged to ensure greater capitalisation of the socio-economic benefits of the renewable energy sector.

71 Watkins K, 'DfID's new Energy Africa campaign is right to look to off-grid solar power', ODI (Overseas Development Institute), 29 October 2015, http://www.odi.org/comment/10039-dfid-energy-africa-solar-power-electricity-access, accessed 9 November 2016.

72 AfDB, 2015a, *op. cit.*, p. 57.

73 World Bank, 2015, *op. cit.*, p. 175.

Challenges

Consultations with the private sector during the course of this study highlighted a number of cross-cutting issues that deter, or at the very least hinder, further private sector participation.

- **Institutional/regulatory and legal policies**

  Key challenges faced by the private sector include unclear policies and planning on the part of the government and related MDAs, in particular for larger-scale projects. For example, the lack of clarity around the future transmission and distribution infrastructure from TANESCO could have a significant impact on firms' decision to invest in power generation, especially those considering investing in mini- or off-grid projects. In 2012, the FIT for producers connected to the main grid was $10.05 cents/kilowatt hour (kWh), while for off-grid it was $31.66 cents/kWh.[74] If a project were suddenly connected to the grid, it could severely affect the viability of that project. In the past there have also been delays in announcing the FITs for SPP agreements, resulting in unpredictability for SPPs with regard to financial planning.[75]

  While the SPP agreements have managed to limit red tape for SPPs, this remains a constraint for larger developers and projects. Bureaucratic measures, often linked to the preparation and approval of projects, result in lengthy delays. In addition, while the SPP agreements have eased the burden for SPPs, larger producers still face uncertainties around FITs as no clear and predictable measures have been established for FITs and other incentives, notably for renewable energy projects.

- **Knowledge and capacity**

  The government's main power sector plan, the PSMP, envisions a relatively small role for renewable sources other than large hydro. As a result, fewer resources are allocated to alternative renewable energies, ultimately hampering the exploration of these resources and knowledge building in these sub-sectors (see the case of geothermal exploration noted earlier). This also limits the incentives for domestic actors to engage in REVCs, limiting this sector's potential socio-economic impact on Tanzania's development. The country faces technical capacity constraints in terms of undertaking feasibility studies, design or construction, and in areas related to investment, such as negotiating public–private partnerships. This challenge is more pronounced in rural areas, as few skilled staff are willing to work in remote areas. Ultimately, the lack of adequate domestic technical capacity increases the cost of projects.

  As Tanzania's energy sector gears up for greater participation by more actors, more capacity (manpower) is required to deal with the growing industry. There already appears to be a lack of capacity in the MEM and REA to handle the increased workload.

  After years of lobbying by the private sector and related organisations, the government agreed to eliminate import tariffs on inputs for solar systems (photovoltaic panels,

74 *Ibid.*, p. 177.

75 *Ibid.*

batteries, inverters, etc.) to stimulate the domestic uptake of such technologies. However, because of the lack of implementation of these measures by customs authorities, import duties are often still charged. In addition, owing to inadequate monitoring by customs/standards authorities fake or sub-standard products (eg, solar lights/radios) are imported, ultimately hurting competition in the renewable energy sector and causing people to become 'disillusioned' with renewable energy products.

- **Economic and financial issues**

Two key risks faced by power project developers are payment risk and currency risk. Owing to TANESCO's dire financial situation, private power producers face the risk of late payment (as has been the case in the past) or even non-payment for electricity sold to the utility. As the most recent (2016) International Monetary Fund Policy Support Instrument for Tanzania noted:[76]

> The financial sustainability of the public electricity utility, TANESCO, has not been achieved yet, affecting its credibility as an energy purchaser. TANESCO still has a large amount of arrears to gas and electricity suppliers (0.7 percent of GDP [gross domestic product] in early 2016). A large independent electricity producer (SONGAS) recently decided to shut down partially its operations as a result of TANESCO's inability to clear its arrears; other investment decisions could also be affected.

While the government can provide guarantees for TANESCO, current legislation only allows it to do so for a project in which it owns the majority stake. This is not a practical mitigation measure for most private sector investments.[77] In addition, given the low economic status of many consumers, traditional billing methods (eg, monthly billing) may not be suitable. Currency risk, for example, could become an issue if loan repayments are in US dollar but PPAs are in Tanzanian shilling.[78]

Lack of affordable financing options for both project preparation and project financing has also been flagged as an issue. Project preparation costs could be as high as 10% of project costs, with funds 'lost' if a project is found unviable. Some private sector stakeholders have also suggested that the FIT offers for renewable energy projects, especially in the initial phases of operation, make it difficult for these firms to meet their cash flow requirements.[79] An additional challenge in the development of projects is their often-remote location – additional financial burdens are involved because of

76 tralac, 'IMF Executive board completes Fourth PSI Review for Tanzania and concludes 2016 Article IV Consultation', 28 July 2016, http://www.tralac.org/news/article/10184-imf-executive-board-completes-fourth-psi-review-for-tanzania-and-concludes-2016-article-iv-consultation.html?utm_source=Daily++News&utm_campaign=77c735ed61-Daily_News_20160728&utm_medium=email&utm_term=0_b86cd910ac-77c735ed61-311095201, accessed 10 October 2017.

77 Norton Rose Fulbright, 'Tanzania: Energy Sector Overview', http://www.nortonrosefulbright.com/knowledge/publications/79377/tanzania-energy-sector-overview, accessed 24 April 2015.

78 United Republic of Tanzania, May 2013, *op. cit.*, p. 50.

79 World Bank, 2015, *op. cit.*, p. 178.

the long distances that inputs (equipment, construction material, etc.) have to be transported.[80]

POLICY RECOMMENDATIONS

A secure electricity supply is vital for continued and sustainable economic growth, given its cross-cutting nature. Tanzania has made significant strides towards securing its electricity supply, key of which has been the inclusion of the private sector. There are also clear socio-economic benefits to greater engagement in electricity generation, especially in Tanzania in the nascent renewable energy sector. Various policies have ensured a more enabling environment for IPPs, including strengthening TANESCO (inevitably tied to the enabling environment) and recognising the need for diversifying the energy mix. These measures, coupled with its significant domestic resource potential and the declining cost of technologies, allowing for cheaper generation options, are positive steps by Tanzania.

Nevertheless, key constraints still need to be overcome if Tanzania wants a truly flourishing energy sector. Key among these are institutional challenges (such as the ongoing financial instability of TANESCO), knowledge and capacity constraints (human and technical) and financial constraints facing potential investors in the sector. There are a number of policy options on which Tanzania can draw to build on its successes and address some of the challenges.

- **Institutional and technical**
  - » Continued reform of TANESCO: while reforms have been undertaken for more than two decades the utility is still not financially viable, which has a significant and detrimental effect on the entire sector.
  - » Continued improvement of data tools and better monitoring will allow for better planning.
  - » Continued capacity building and expansion of manpower in energy-related MDAs will allow Tanzania to deal better with a promising sector.
  - » Equally, investment in relevant skills (eg, feasibility studies, design or construction) will reduce costs for the investors (both state and non-state, domestic and foreign) and contribute to greater domestic value addition in the electricity sector.

- **Regulatory and policy**
  - » Mega power generation projects are not the only way to ensure a stable electricity supply. Instead, a network of small projects could be equally successful, as illustrated by the case of South Africa, which managed to procure more than 6 000MW of renewable energy from 44 IPP projects over a period of five years.
  - » The renewable energy sector should be prioritised if Tanzania wants to grow in a sustainable manner – not only environmentally but also in terms of the associated socio-economic benefits. This would include diversifying the energy mix to

80 *Ibid.*, p. 183.

meaningfully include renewable energy in future plans. More incentives could be provided to encourage renewable energy projects.
  - » Policy certainty, timely procurement and an internationally competitive bidding process, together with the development of negotiation skills, will assist the government and related energy stakeholders to manage private sector participation more effectively.
  - » The government must continue its support for private sector participation, as TANESCO cannot drive this initiative on its own (eg, in South Africa, once the electricity crisis was over and enough generation capacity was secured by ESKOM, the utility suggested that no further PPAs should be signed).
  - » Ensuring strong, unbiased institutions that are not subject to undue political influence or corruption will improve the investment environment.

Development partners already contribute significantly to Tanzania's energy sector. These partners should look to build on their efforts in three key areas: financial, technical and advocacy support.

- **Financial**
  - » MDBs should continue leveraging their concessional financing windows to provide affordable finance to Tanzania. This is especially pertinent given the already high costs of infrastructure development, owing to geographical factors.
  - » MDBs have historically shown a bias towards supporting large-scale infrastructure projects. But it is increasingly evident that larger numbers of small-scale, decentralised infrastructure projects are both feasible and viable.
  - » Development partners that have the capacity to offer grants (rather than loans) should look to support project preparation and getting projects to a bankable stage, as this is often a key bottleneck to infrastructure development.

- **Technical**
  - » Through, for example, the PSRGSP, development partners have indicated their willingness to coordinate efforts and collectively address soft infrastructure issues. This is encouraging. Yet this case study also illustrates the continued need for technical support on 'enabling environment' issues.
  - » Regional approaches to infrastructure development remain vital. A collective approach to infrastructure development can enhance the integration of economies, consolidate small and fragmented markets, scale up trade among countries, and leverage economies of scale to bring down infrastructure costs. Yet regional infrastructure financing and development is hindered by inadequate harmonisation and integration of regulatory and legislative frameworks, the legal and political complexity of multinational projects and inadequate technical capacity to navigate these – earlier examples regarding cross-border transmission lines in East Africa alluded to this. Development partners such as the AfDB, operating in multiple countries simultaneously, are well placed to address such issues.

- **Engagement**
  - » While change driven by NGOs, including development partners, faith-based organisations and civil society organisations, has been incremental and slow, these

actors' engagement should be continued, to ensure alternative views are being considered by the government and, where appropriate, necessary pressure is exerted to effect change.

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