

INDUSTRIALIZATION AND ENERGY IN TANZANIA: CHALLENGES AND OPPORTUNITIES

Concept Note for a Roundtable Event

BACKGROUND

Tanzania's GDP has been increasing about 5-7% annually over the past decade, making it one of the fastest growing economies in Africa. However, when adjusted to population growth over the same period, we find that per capita GDP growth has averaged only 2.5–3.5% annually, which is not as outstanding as the initial percentage (Page 2016). Furthermore, that growth' impact on poverty reduction is quite insignificant, and understandably so. "While the highest potential for shared growth that leads to wealth generation and job creation lies in the agricultural and industrial sectors, the contribution of these sectors to the GDP has declined to the less significant rates of 24% and 10% respectively compared to 46% and 9% during the 1990s" (United Republic of Tanzania 2015a, i). The two sectors are quite dependent on each other; while the industrial sector, especially the agro-processing sub-sector, depends on agriculture for raw materials, the agricultural sector cannot advance without the development of the manufacturing sector (Msame and Wangwe 2016). Fortunately, the government of Tanzania has realized this interdependence, and has therefore put industrialization as her main development agenda. Realizing the forward and backward linkages with the agricultural sector, emphasis has been put on resource-based industrialization, with sub-sectors with direct linkage with the agricultural sector, receiving top priorities. According to the integrated industrial development strategy (IIDS), priorities include fertilizer and chemicals industries, agro-processing, textile industries, leather and leather goods, light industry and manufacturing, and iron and steel industry.

One important input in the industrialization process is energy. When looking at cases of developing countries that achieved higher levels of industrialization in the last few decades, we can conclude that energy production and consumption should grow proportionately in concert with industrialization. The newly industrialized economies of Asia were not highly electrified when they embarked on their industrial development paths, but energy problems were addressed so that industrialization was not hindered by energy bottlenecks (Newman et al. 2016). Hence, successful industrial policies needed to be accompanied by reliable energy policies.

CHALLENGES AND OPPORTUNITIES TO ENERGY ACCESS IN TANZANIA

The process of industrialization in Tanzania faces a number of challenges, one major being poor access to adequate and sustainable energy. Being one of the least electrified countries in the world, "manufacturing firms in Tanzania experienced on average almost nine power outages per month, costing about 15.1 per cent of total sales for the firms affected" (Newman et al. 2016, 16). The energy access situation report of 2016 shows that, "of all households in Tanzania Mainland, 32.8 percent were electrified with any form of electricity. Of the electrified households, 74.9 percent receiving electricity supplied through grid, 24.7 percent electrified by solar power and 0.3 percent...using electricity generated from private entity/individual owned sources (excluding solar)" (URT 2017, xvi). Thus far, the report reveals the rural/urban divide in terms of access to energy with a mere 34.5% of rural households against 96.4% of urban

households. With such low rural electrification, initiating non-farm activities (agro-processing and others) becomes a major challenge. Nonetheless, the report shows that already an appreciable number of agro-processing and light industries use electricity in rural areas, with grain grinding/milling being the most common, followed by carpentry workshops. If more electricity reaches rural areas we should expect more agro-processing taking place.

Tanzania's environment remains crucial for its economy, given the role played by natural resources and forestry in driving agriculture, nature-based tourism in its globally famous national parks, and the importance of the environment in the health of the country's human capital. Amidst the growing impact of climate change, Tanzania cannot afford to address the energy-for-industrialization problem without being conscious of the net-impact of carbon-based energy sources on the entire national development agenda. Along with the challenge of deforestation through the biomass energy production, the hydropower systems are also vulnerable to climate change and rainfall fluctuations. A balance is required; some sort of big picture cost-benefit analysis. When carbon-based energy sources are used, energy efficiency measures must be consulted. Tanzania is not alone in this predicament as most of Africa is. Therefore, sustainable, low-carbon energy generation options are important for the big picture, yet the big picture includes broad options necessary for industrialization.

The 2017 EWURA's Regulatory Performance Report on Electricity Sub-Sector revealed a total installed power capacity of 1,457.16MW, including 1,366.60MW for main grid and 90.56MW for isolated mini-grids. The recently discovered natural gas reserve is now contributing a 43.94%, of the national grid mix, against 39.34% from hydropower, 15.92% liquid fuel (HFO/IDO/GO) and biomass 0.80%. The liberalization process of the 2008 Electricity Act removed control of electricity production and distribution from the Tanzania Electric Supply Company (TANESCO). Such regulatory changes illustrate the concerted efforts by the government to allow multiple actors' participation in electrifying Tanzania. Some detailed studies are emerging that generally commend the trend of changing the energy regulation and production scene (Moner-Girona et al. 2016). In addition to the Feed-in Tariff policy (for hydropower and biomass energy generation), and policies for tendering and unsolicited proposals for energy production plants, several other innovative approaches to diversify the Tanzanian energy sector through non-state actors' engagement has been developed. Such approaches include the Net-metering framework.

Net-metering is a newly introduced framework in Tanzania (rules effective 2018) that adds to strategies where private individuals or entities can establish energy production projects. In net-metering, projects that can produce up to One Megawatt of renewable energy can be connected to the national grid (through a distribution network operator, or DNO) on a two-way connection, as both supplier and consumer. When over-producing for their own electricity consumption, the producer adds electricity to the grid, and when consuming more than producing, the producer gets the additional power from the grid. Net-metering works as a win-win basic agreement between the producer and the DNO in a way that works well for Tanzania's conditions and its seasonal dependence on hydropower—"the DNO can benefit from Net-Metered [renewable energy producers] that send excess electricity to the grid during dry seasons when most generation comes from expensive thermal plants, which helps the DNO avoid costs and better serve customers. Then, the DNO can apply the credit for such customers during the rainy season

when solar PV is not producing as much but when most generation in the country comes from cheaper hydropower.” (EWURA 2017, par. 8). This approach may work for many small-to-medium sized industries as it allows reliable in-house energy generation and connection to the grid at the same time. Being a new policy in Tanzania, net-metering needs to be promoted and understood by stakeholders in order to make it effective.

General sustainable energy projects will have to increase and diversify as well, to meet industrial, commercial and domestic demands while keeping undesired impacts on the environment at minimum rates. All sources of energy must be taken into account, assessed for their potential and net-impacts, and pushed to generate more electricity. In that processes we cannot afford to bypass serious evaluation of existing trends and whether they deserve support of correction. For example, while there have been a recent flux of renewable energy enterprises that operate in East Africa overall, providing small-scale power solutions, mostly to domestic users (and sometimes small businesses), the way in which such businesses operate, and their true overall impact, need re-examination, and perhaps restructuring, in order to be genuinely in-line with Tanzania’s industrialization and “business unusual” agenda (Gordon 2018; Pradhan 2018).

POLICY AND ACTORS

A sound energy policy is a required companion for an effective industrial policy. Policies can make or break successful stories of industrialization as well as electrification. “Comparative results from [Africa and Asia] case studies suggest that policy choices are largely responsible for the differences in industrialization outcomes” (Newman et al. 2016, 20). Given the high stakes, evidence-informed policy (making, implementation and evaluation) is of utmost importance—generally and especially as regards to science, technology and innovation (STIPRO 2010; Sheikheldin 2018). When we focus on the policy agenda of energy-for-industrialization, we realize the importance of having a wide spectrum of stakeholders on-board in thinking and acting in consortium with a view to maximize the generation of energy and optimize its use for both the agricultural and manufacturing sectors.

It is in that spirit that STIPRO, a local think tank that conducts policy research and capacity building, in Tanzania, East Africa, and Africa-wide, with a view to inform policy and enhance environments of evidence-informed policy in the areas of STI, is organizing a roundtable event on challenges and opportunities of industrialization and energy in Tanzania. The main objective of the roundtable is to discuss challenges and opportunities of access to reliable energy for industrialization—addressing the information gap and charting the way forward. We invite key stakeholders to participate and enrich the content and consequent outputs of this activity. Drawing from our long-standing experience in multi-stakeholder engagements and coordination the national level policy dialogues, STIPRO brings together the key stakeholders on the energy and industrial development sectors for this roundtable. Invited participants for the roundtable represent the policy and regulatory bodies from relevant government ministries and departments, energy and manufacturing investors, industry associations, international development agencies, academia and think tanks on energy and industrial sectors, and the press. Aside from the selected informed expert presentations, participants will be able to share their experiences and network.

PRESENTATIONS

The Following presentation topics will guide the round table:

1. The current energy problems/challenges for industrialization in Tanzania.
2. Net-metering: a new approach for engaging non-state actors in electrifying Tanzania.
3. Third-sector experiences in diffusing off-grid renewable energy solutions in Tanzania: the case of KAKUTE.
4. Low-carbon Energy for Industrial Development in Tanzania: the case of biomass power production by the Tanganyika Planting Company Limited
5. VICINAQUA Technology on wastewater treatment and own renewable energy supply: the environmental impact.

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