

Extractives and Energy Transition in East Africa:
Considerations for Strengthening Youth Participation



EXTRACTIVES AND ENERGY TRANSITION IN EAST AFRICA: CONSIDERATIONS FOR STRENGTHENING YOUTH PARTICIPATION

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Table of Contents

1	Context.....	4
1.1	Introduction.....	4
2	East Africa Context of Extractives (Oil, Gas and Mining) and Energy Transition.....	4
2.1	Kenya.....	5
2.2	Uganda.....	6
2.3.	Tanzania.....	7
4	Why youth Participation in the Extractives and Energy Transition Matters.....	9
4.1	Youth Participation in the Extractives Sector.....	9
4.2.2	Opportunities and Skills Demand in Renewable Value Chain.....	10
5	Common Barriers and Considerations for Improving Youth Participation.....	13
5.1.	Enabling Policy Framework.....	13
5.2.	Information Asymmetry.....	13
5.3.	Skills and Capacity Challenges.....	14
	Bibliography.....	15

1 Context

1.1 Introduction

Kenya, Uganda and Tanzania have made tremendous progress in their efforts towards energy transition amidst their emerging oil and gas sectors. Discoveries of commercially viable fossil fuel deposits have resulted in heightened expectations among the populace because of the direct and indirect opportunities compared to the renewable energy sector. This situation has an implication on the successful energy transition. Correspondingly, citizens in these countries have taken advantage of the growing extractives sector to build their skills and business capacities to take up opportunities in the sector. Notably, there has been a rise in the number of youths taking up courses in technical areas like engineering, geology, plumbing, welding among others. A number of programs have been initiated to support micro, small and medium enterprises (MSMEs) to develop the required standards and competitive edge to take up opportunities in the sector. More importantly, there have been efforts by governments to put in place local content policies and regulatory frameworks to support local participation. Equally, private sector players, including extractive companies, have put in place training programmes in the form of scholarships and partnerships with local training institutions to build the necessary skills for local citizens especially the youth. This has also been reflected in the enterprise related programmes to support local businesses.

Renewable energy has drawn much attention globally. This has seen a shift in funding by financiers towards projects that are climate friendly. As such, developing countries like Kenya, Uganda and Tanzania have put in more effort towards supporting the renewable energy sector to help supplement their energy needs while at the same time reducing carbon emissions. While the governments are focused on fully transitioning to clean energy, the most pertinent question is what opportunities the renewable energy sector provides for local populations in terms of business and jobs either directly or induced. At the core of this is how the sector provides opportunities for the youthful population in the region who are largely unemployed and without the matching skills.

2 East Africa Context of Extractives (Oil, Gas and Mining) and Energy Transition

Energy remains an essential component of development, both in domestic and industrial use, in the East Africa region. The impending challenge is availability and access to sufficient, reliable and affordable energy. While energy remains a catalyst for investment and increased productivity, its potential remains largely untapped and underdeveloped in the region. The energy sector in these countries is mostly inaccessible to majority of the population characterized by a heavy reliance on biomass both for domestic and industrial use. One of the

contributing factors is the huge cost of being connected to the main grid. Electricity and petroleum remain heavily used for commercial purposes although there is a combination of biomass for some industries like the cottage industry.¹

The petroleum sector in the three countries is at its nascent stage especially with discoveries of oil in Kenya and Uganda as well as gas in Tanzania. The mining sector on the other hand is slightly at an advanced stage with Tanzania having made great strides followed by Kenya with the largest investment being the Titanium project in Kwale. Notably, the countries have continued to expand their mining, oil and gas sectors as well as increasing renewable energy coverage. The extractives and energy sectors play an integral part in contributing to the gross domestic product (GDP), although these contributions vary from one country to the other.

2.1 Kenya

The extractives sector efforts in Kenya date back to the 1930s mainly in the mining of minerals and the 1950s in the exploration for oil and gas. The sector has seen a number of exploration efforts under different regimes with the sole aim of increasing their contribution to the GDP and significantly supporting development of the country's economy. The contribution of the sector to the GDP still remains low, with the mining sector specifically contributing a mere 0.7% GDP in 2019.² It has been estimated that large scale mining operations in Kenya employ around 9,000 workers and about 146,000 people are engaged in the ASM sector.³ There have been efforts to promote the participation of locals in the extractives sector largely through such regulations as the Mining (Use of Local Goods and Services) Regulations, 2017, Mining (Employment and Training) Regulations, 2017 as well as local content provisions in the Mining Act 2016 and Petroleum Act 2019.

The energy sector in Kenya has made impressive progress with the push towards clean energy while at the same time making contribution to the national grid. Notably, Kenya has a good energy mix comprising geothermal, hydro, wind and solar, among others. Geothermal development in Kenya dates back to the 1950s and currently the country has five power stations with a combined generation capacity of 713.13 MW⁴ making geothermal the major source of electricity in Kenya. As a result, geothermal accounts for 45 per cent of total electricity generation.⁵ Other sources of energy in the renewable energy sector like wind and solar, performed impressively in 2019, while hydro and thermal had a drop in the same year. In 2019,

¹Energy sector in East Africa (Energypedia) <https://energypedia.info/wiki/East_Africa:_Overview_of_Regional_Energy_Resources> Accessed 24 November 2021.

² Kenya National Bureau of Statistics, *Economic Survey* (Nairobi, 2020).

³ Kerecha G O, *Strengthening Youth Participation in the Extractives Sector: Considerations in Light of Covid-19* (Extractives Baraza, 2020).

⁴ Geothermal development in Kenya <<https://www.kengen.co.ke/index.php/business/power-generation/geothermal.html>> accessed 24 November 2021.

⁵ Kenya National Bureau of Statistics, *Economic Survey* (Nairobi, 2020).

wind generation reached 1,562.7 GWh making it the third largest source of electricity generation. In the same year, solar generation reached 92.3 GWh boosted by the commissioning of the Garissa Solar Power Plant. Hydro and thermal generation dropped to 3,205.3 GWh and 1,313.3 GWh, respectively, in the same year.⁶ This performance by the different sources shows the significant contribution of the sector to the economy and more importantly creation of job and business opportunities for the youthful population.

2.2 Uganda

The oil and gas exploration in Uganda has largely been in the Albertine region and dates back to 1920s with commercial discoveries in 2006. To ensure that the local population benefits, the government has put in place local content requirements in its legal and regulatory framework governing the oil and gas sector. The mining sector is still lagging behind in spite of its potential. In the 1950s and 1960s the mining sector contributed 30% of Uganda's export earnings.⁷ This potential needs to be harnessed to provide more opportunities to the locals especially the youth to eradicate poverty and stir up development in the country. The largest portion of national production is from the artisanal and small-scale mining which employs almost 200,000 Ugandans.⁸ The sector has been estimated to employ about 26.5% of Ugandans directly or through induced opportunities.⁹

Uganda is equally endowed with many energy resources, notably hydropower, biomass, solar, geothermal, peat and fossil fuels with

Local content mechanisms in the petroleum and mining sector

The Petroleum (Exploration, Development & Production) Act 2013, and the Petroleum (Refining, Conversion, Transmission and Midstream Storage) (National Content) Regulations, 2016, require oil companies including their subcontractors, to give preference to Ugandan citizens and entities in the provision of goods and services.

National Local Content Bill, 2019, (National Local Content Act or Act) currently awaiting presidential assent.

The National Oil and Gas Talent Register (NOGTR) and a National Suppliers Database (NSD) lists persons involved in petroleum activities in Uganda and prohibits any entity from providing goods, works or services for oil and gas activities unless they are registered on the Database.

Mining Act, 2003 provides for preference to Ugandan products and employment of Ugandan citizens to the maximum extent possible.

⁶ Ibid.

⁷ Uganda Investment Authority, *Uganda mining sector profile*, Undated.

⁸ 'Developing Uganda's Mining Sector' (2013) <<https://www.worldbank.org/en/results/2013/03/19/developing-uganda-s-mining-sector>> accessed 24 November 2021.

⁹ Ministry of Finance (Uganda), *Uganda's Mineral and Mining Sub-Sector: What can be done to harness its full potential?* BMAU Briefing Paper (12/19) May 2019.

a combined potential of 5,300 MW.¹⁰ This potential has largely remained untapped and characterised by snail pace progress in the renewable energy sector. Biomass remains the vastly depended upon source of energy especially wood fuel, charcoal and other residues. Biomass, hydro and solar contributed about a quarter of Uganda's energy generation in 2018.¹¹ Hydropower remains the backbone of energy supply in Uganda with a potential of 2,00MW. Presently, the country has an installed capacity of 1,252MW attributed to the Karuma (600MW) and Isimba (183MW) hydropower dams.¹² To realize this potential, Uganda has put in place a Hydropower Development Master Plan. Uganda targets the generation of 5,000MW of solar energy by 2040 which will make about 12% of the country's net generation capacity. By end of 2019, solar energy had reached generation capacity of 50.8MW. Over 300,000 homes are using the stand-alone solar home systems to address basic electricity needs.¹³ Measurements conducted show Uganda has low quality wind resources which are only suitable for applications in small -scale electricity generation and water pumping.¹⁴ This situation has seen low investment in wind energy in the country. Geothermal energy has seen on-going exploration dating back to 1921 in Ugandan hot springs. Available data shows that geothermal generation capacity is 450MW with a target of achieving generation of 1,500MW from Geothermal by 2040. By end of 2019, the country had achieved 96.2MW which is about 6% of its targeted output.¹⁵

2.3. Tanzania

Compared to Kenya and Uganda, the mining sector in Tanzania makes a significant contribution of up to 3.0% to the country's annual GDP.¹⁶ Gold mining contributed 5.2% to the GDP in 2019 and 6.4% between January and September of 2020. This has been a steady increase over the years especially from 2014.¹⁷ The mining sector has largely continued to grow over the years attributed to the raft of changes made in the legal and regulatory frameworks as well as strengthened governance of the sector. The mining and quarrying sector directly employs 332,468 people making it among the top five sectors providing direct employment among all sectors of the economy.¹⁸ While this is the case, the sector is rapidly growing but there is a

¹⁰ UNREEEA, Overview of Uganda's Renewable Energy Potential <https://unreeea.org/resource-center/overview-of-the-ugandan-energy-sector/> accessed 24 November 2021.

¹¹ Get-invest, Uganda energy sector investment overview <<https://www.get-invest.eu/market-information/uganda/energy-sector/>> accessed 24 November 2021.

¹² Van der Ven, M J, *working paper: An overview of recent developments and the current state of the Ugandan energy sector*, E-20046-UGA-1, June 2020.

¹³ Ibid.

¹⁴ Energypedia, wind, <https://unreeea.org/resource-center/overview-of-the-ugandan-energy-sector/> accessed on 24 November 2021.

¹⁵ Van der Ven, M J, *working paper: An overview of recent developments and the current state of the Ugandan energy sector*, E-20046-UGA-1, June 2020

¹⁶<<https://opentoexport.com/article/mining-sector-in-tanzania-1/>> accessed 24 November 2021.

¹⁷ NRGI, *Resource Governance Index: Tanzania* (2021)

¹⁸ Tanzania Extractive Industries Transparency Initiative, *The 11th TEITI Report for the Period July 1 2018 to June 30*

shortage of skilled labour. Certain skills are sought outside Tanzania although there are continued efforts between government and the mining companies to train locals to take up these opportunities.

Tanzania is also endowed with huge deposits of natural gas reserves estimated at 57 trillion cubic feet with a total annual production of 110 billion cubic feet from three fields.¹⁹ Currently, the gas is being used for power generation to serve the local market. In the period ending April 2020 there were 500 domestic and 48 industrial customers connected to the natural gas infrastructure. The preceding year saw 400 vehicles consume 11.1 million cubic feet compared to 1.9 million cubic feet of natural gas used in 2018.²⁰

Energy transition in Tanzania

has gained momentum largely due to its impressive energy resources including hydropower, natural gas, wind, geothermal, biomass, solar, tidal, and waves.²¹ The country has an installed generation capacity of 1,513 MW or 0.033 kW per capita.²² Tanzania has a history of relying on hydropower for electricity generation. There has however been a shift to natural gas which is currently providing over 20% of the total energy generation in the country. Notably, Tanzania has continued its investment in hydropower with a current installed capacity of 562 MW and a target of additional 4.7GW. The geothermal sector on the other hand has carried out exploration studies in several locations. The studies have established an estimated potential of about 600 MWe. There are also efforts to develop about 200 MW over the next four years.²³

Local content efforts in Tanzania

Tanzania enacted the Local Content Policy of Tanzania for Oil and Gas Industry, 2014 and the Petroleum (Local Content) Regulations, 2017. The policy establishes guidance for realizing participation and transformation of Tanzanians. The regulations on the other hand govern local content matters related to petroleum upstream, midstream and downstream activities in Tanzanian Mainland. Importantly, one of the key focus areas is on capacity building and technology transfer which is central to helping Tanzanians develop the required capacity to plug into the sector. Other efforts have been through training programs in collaboration with IOCs and local TVETs to equip locals with diverse skills critical for the sector. The extractives sector as a whole contributed to increased employment as well as procurement of goods and services in 2018/2019. The Tanzania Extractives Industries Transparency Initiative (TEITI) reported that extractives and service companies employed 526 foreigners and 5,848 Tanzanians in this period.

2019, June 2021.

¹⁹ < <https://www.tanzaniainvest.com/gas>> accessed 25 November 2021.

²⁰ Tanzania Extractive Industries Transparency Initiative, *The 11th TEITI Report for the Period July 1 2018 to June 30 2019*, June 2021.

²¹ <<https://www.tanzaniainvest.com/energy>> accessed 25 November 2021.

²² < <https://www.trade.gov/country-commercial-guides/tanzania-energy>> accessed 25 November 2021.

²³ < <https://www.thinkgeoenergy.com/tanzanias-tgdc-plans-up-to-200-mw-geothermal-development-by-2025/>> accessed 25 November 2021.

The solar energy has performed impressively compared to geothermal and wind. Solar energy is being developed both for off-grid and grid connected solutions. The sector has experienced an impressive uptake of solar energy especially for off-grid use to power homes and small businesses. About 24.7% of households in Tanzania in 2018 were powered using

Initiatives on skills building for extractives

Equipping the youth with technical skills is key in preparing them to take up opportunities in the sector as well as meeting the present and future skills needs beyond the extractives sectors. Some of these initiatives include among others the Skills for Oil and Gas (SOGA) by GIZ, Youth in Extractives Programme by Extractives Baraza to build youth capacity and competence to plug into the sector. Other efforts have been spearheaded by governments towards strengthening vocational skills through the existing training institutions and ensuring that they match the industry requirements. These efforts have been replicated across the three countries especially for technical skills like welding, electrical and plumbing.

solar. To achieve a wider coverage and uptake of solar power, the government has removed value added tax (VAT) and import tax for main solar components such as panels, batteries, inverters, and regulators.²⁴ These efforts are key to creating more business and job opportunities for the citizens especially the youth. Wind and bioenergy efforts are also underway and it is anticipated that they will have significant injection into the energy needs in Tanzania. Importantly, the ripple is anticipated to be on access to affordable and efficient energy that enables creation of jobs and business opportunities for majority of the citizens especially the youth.

4 Why youth Participation in the Extractives and Energy Transition Matters

Youth involvement has been at the heart of the efforts to decarbonize the energy sector through a push for cleaner and more efficient forms of energy. There have also been similar efforts for youth participation in the extractives sector globally and Africa in particular. Youth form a larger portion of the world population. It has been estimated that the world will have about 1.3 billion youth by 2030. In Sub-Saharan Africa, youth make 20% of the total population, a situation that is expected to remain the same for the next 20 years.²⁵ Therefore, youth form a sizeable portion of the global population making them an important cluster that need to be involved when addressing issues related to sustainable development in the context of extractives and energy transition.

4.1 Youth Participation in the Extractives Sector

The extractives sector in East Africa presents a number of opportunities for the youth along the extractives value chain. Considering that the extractives sector is a highly specialized and

²⁴ Bishoge O K, Zhang L and Mushi W L, *The Potential Renewable Energy for Sustainable Development in Tanzania: A Review*, (MDPI 30, July 2018).

²⁵ United Nations, *The World Youth Report: Youth and the 2030 Agenda for Sustainable Development* (Department of Economic and Social Affairs, 2018).

complex sector, youth can take up the available opportunities if they are well prepared through training to have the desired skills and standards.²⁶ While only a small number of youths are and can be employed, massive opportunities are in the supply of goods and services as well as in the development phase. In Uganda for instance, findings show that development projects will generate thousands of direct jobs with a peak of 13,000 workers in the construction phase and of 3,000 people in the operation phase. Out of the total manpower required, 15 per cent are engineers and managers, 60 per cent are technicians and craftsmen and 25 per cent are people without any educational background ('unskilled').²⁷ The challenge for most youth in the East African region however is that they do not have the skills that match or meet the industry standards and requirements, a situation that has tended to lock out majority of the youth.

Other opportunities for youth to plug into the sector are through innovations. A number of innovative initiatives, like the Uvumbuzi Hub by the Extractives Baraza, continue to provide a platform for youth to participate in the sector. Youth are able to come up with innovations to address diverse industry needs including those around environment, safety and health which are at the heart of the industry operations. While there have been projections that the direct (employment) and indirect (business) opportunities are available along the value chain especially the midstream and downstream phases, the current situation speaks differently. There seems to be a mismatch between the projections and the reality on the ground with a majority of the youth not being able to secure the available opportunities. As the energy transition push gathers momentum, there are opportunities in the mining sector linked to the increased demand for strategic minerals critical in supporting energy transition efforts into energy sources like wind and solar. This means that with good policies, East African countries are able to strengthen their mining sectors and put in place policies that prioritize local citizens and especially the youth through direct and indirect opportunities in the mining sector.

4.2.2 Opportunities and Skills Demand in Renewable Energy Value Chain

Energy access in East Africa remains low with less than a quarter of the region's population having access to electricity.²⁸ With the energy sector rapidly changing globally, East Africa has experienced rise in demand for alternative sources of energy like solar energy mainly for lighting homes and businesses. Important to note is the opportunities that these alternative sources are creating for youth through direct jobs as well as businesses (supply of goods and services). The renewable energy sector created 11.5 million direct and indirect jobs globally in 2019. Majority of these jobs have been in the solar, bioenergy, hydropower and

²⁶ Kerecha G O, *Strengthening Youth Participation in the Extractives Sector: Considerations in Light of Covid-19* (Extractives Baraza, 2020).

²⁷ A Langer, U Ukiwo & P Mbabazi (eds)., *Oil Wealth and Development in Uganda and Beyond: Prospects Opportunities and Challenges*, (Leuven, Leuven University Press, 2020).

²⁸ Gordon E, *The Politics of Renewable Energy in East Africa*, (Oxford Institute for Energy Studies, 2018).

wind power.²⁹ This indeed shows the potential of the sector to create the much-needed jobs and businesses for the youth.

Solar energy: statistics indicate that through Solar PV, the region is able to contribute up to 65% of total jobs in the global energy sector by 2050.³⁰ The ripple effect of this is that, more access to solar power generates more opportunities for the population especially for youth who are able to have lighting to study as well as light their businesses. Apart from indirect and direct job opportunities, other opportunities for youth participation involve innovation. There have been a number of initiatives supporting youth innovation in the energy and extractives sector in East Africa. There is therefore need for more support towards local innovators through training and financing of their innovations.

Wind energy: globally, wind power creates about 1.2 million jobs through onshore and offshore projects.³¹ This potential has been reflected in the wind projects in Africa like the Lake Turkana Wind power (LTWP) through direct and indirect jobs. These opportunities are generally present during the development and installation phase. For instance, 2,500 people including expatriates were employed during construction of the LTWP project.³² The wind power projects also present other opportunities through supportive infrastructures like roads which in most instances are constructed and improved to access project sites. In Uganda for instance, the wind energy is expected to create reliable jobs along the value chain.³³ Importantly, there are skills required in the sector especially at the equipment manufacture and distribution, construction and installation, operation maintenance and cross-cutting skills like training, health and safety as well as communication and finance. This has created a demand for new skills as well as strengthening existing skills that can be used across several sectors.

Hydropower: Hydropower remains one of the most reliable forms of renewable energy around the world. The sector created over 2 million direct jobs globally in 2018 with most of the jobs, up to 70%, being in operations and maintenance.³⁴ This can be attributed to longevity of hydropower facilities which require continuous operation and maintenance which also tends to provide secure and permanent employment.³⁵ Employment data on hydropower related projects globally and more so in Africa remains scanty. For youth interested in the hydropower sector, there are opportunities to engage at hydropower value chain from manufacture to operation and maintenance. The main employment opportunities remain at the project development and construction, manufacturing and installation phases. While the operational and maintenance phase provides jobs on the long-term, these jobs tend to be few

²⁹ Ferroukhi R et al., *Renewable Energy and Jobs – Annual Review 2020*, (International Renewable Energy Agency, Abu Dhabi, 2020).

³⁰ Heffron, R J, *Inclusive Energy Transition, Commonwealth Sustainable Energy Transition Series 2021/01*, (Commonwealth Secretariat, London, 2021).

³¹ IRENA, *Job creation* < <https://www.irena.org/benefits/Job-Creation> > accessed 11 November 2021.

³² Finfund, *Socio-economic Impact of Lake Turkana Wind Power in Marsabit* (April, 2020).

³³ Wabukala B et al, *Assessing wind energy development in Uganda: Opportunities and challenges* (Wind Engineering, 2021).

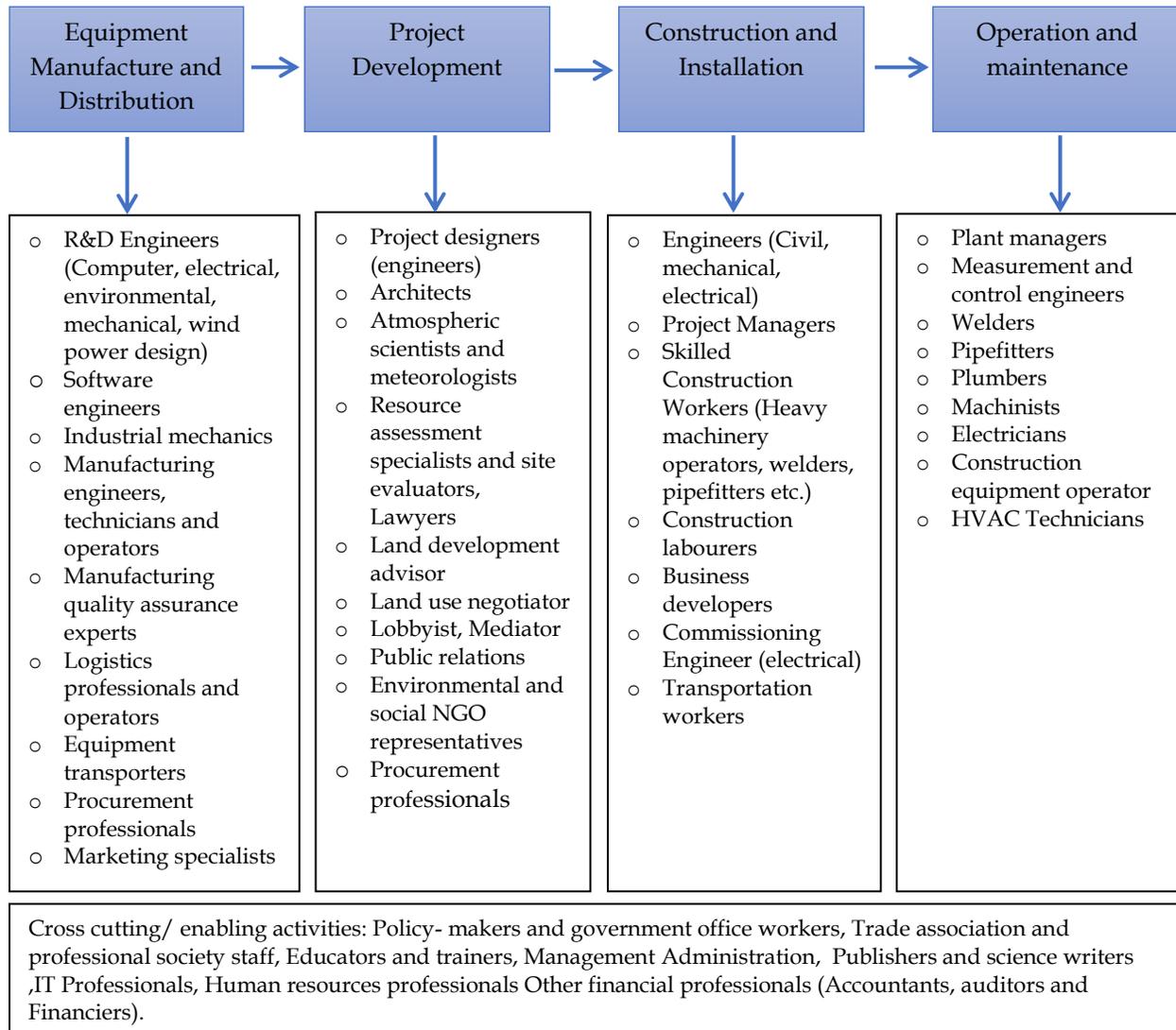
³⁴ Renner M, García-Baños C & Khalid A, *Renewable Energy and Jobs Annual Review*, (IRENA, 2019).

³⁵ International Labour Organization, *Skills and Occupational Needs in Renewable Energy*, 2011.

considering labour intensity tend to decrease at this phase and in the long run. Notably, skills from hydropower can be transferrable to other sectors and projects over time. Beyond technicians, the sector also provides opportunities for those with skills ranging from plumbing, electrical, logistics operators, construction engineers as well as those with experience in drilling.

Renewable Energy Value Chain: Skills and Employment Needs

Source: ILO, Skills and Occupational Needs in Renewable Energy, 2011



5 Common Barriers and Considerations for Improving Youth Participation

Energy transition is gaining traction globally as well as in Africa especially in the strengthening of existing (geothermal and hydropower) and emerging sectors like wind, solar and biofuels. This situation while presenting many opportunities for youth, also presents a number of challenges that act as barriers particularly in East Africa. This situation varies from country to county with some being ahead while others are in the nascent stages in the different sectors. Other challenges are around enabling policy frameworks which in most instances do not factor in youth and the necessary supportive infrastructure.

5.1. Enabling Policy Framework

The current policy frameworks have largely focused on propelling the East Africa region into a renewable powerhouse through various incentives largely around tax exemptions on key technologies and equipment. Majority of these policies have not focused on building local skills and capacities to match and supply the sector needs but have tended to benefit large investors. This is despite the East Africa Community (EAC) considering youth as an asset both in the present and future. Although the EAC policy on youth requires governments to prepare youth not only as leaders but entrepreneurs because of their vital contribution to socio-economic development in the region,³⁶ this remains untapped largely in the renewables sector.

Recommendation: Government to develop a renewables local content policy and plan to spearhead local skills development and strengthening. This policy should build on the efforts made in the extractives sector and create an enabling environment for supporting skills upgrading and development for the different sectors in renewables.

5.2. Information Asymmetry

The transition to a low carbon economy and the opportunities associated with the renewables remain complex and scanty in some cases. This manifests itself in the low participation of youth in direct and induced opportunities in the sector. For instance, information on job opportunities in the renewable energy sector is generally lacking in the region. As result, there is need to ensure that youth have access to information and understanding about the energy transition into renewables and the benefits associated with. This information needs to include the benefits that the sector presents and how youth can prepare and take advantage of direct and induced opportunities.

Recommendations:

1. Conduct in-depth research to establish available renewables opportunities locally. Systematically collect both quantitative and qualitative data of the sector. The collected

³⁶ East Africa Community, *EAC Youth Policy*, 2013.

data should be disaggregated for the different renewable energy sectors as well as opportunities available for men, women and youth with different skill sets.

2. Create a national renewables database that is regularly updated with the latest data on the opportunities, employment trends and new projects. Such a database should be publicly available to all citizens.

5.3. Skills and Capacity Challenges

The efforts to transition to clean energy in East Africa, has had its share of challenges when it comes to the skills required in the renewable energy sector. While there have been policy efforts to support establishment of plants and scaling up of most of these projects, there has been minimal focus on building local skills to meet the skills demand in the sector. Due to the diverse nature of the renewables energy sector including the attendant technologies, a wide range of skills and occupations are required.³⁷ While this situation presents many opportunities it also poses a challenge for many youths. There is a general problem of majority of the youth not having skills that match with the renewable energy sector needs. A huge number of the youths are not taking advantage of the opportunities available to learn the required skills. Documented data shows that there is widespread skills shortage of technical skills like engineers and technicians in all renewables energy sector in developed and developing countries. This shortage is also present in the non-technical skills including legal, sales, and economics. Notably, there is demand for qualified design engineers with relevant knowledge and experience in renewable technologies. The wind energy sector for instance needs engineers as well as specialized wind turbine technicians. The hydropower and the bioenergy suffer from lack of qualified engineers and appropriately trained technicians largely in the emerging countries.³⁸

Recommendations:

1. Local technical, vocational and university academic institutions to promote skills around different specializations like electrical and mechanical engineering, plumbing, sociology, environmental, legal etc. as critical specializations on demand in the renewable energy sector and other related sectors of the economy.
2. Tailor courses and specializations to the renewable energy sector and match the course to the ever-changing landscape and needs in the sector. This will ensure that the skills churned out meet the sector needs and standards.
3. Monitor labour market dynamics as well as projections of likely skills needs. This can be achieved through a strengthened coordination between the renewable energy sector and educational institutions in developing renewable energy curricula, integrating

³⁷ IRENA, The European Commission and ILO *Accelerating SDG7 Achievement Policy Brief 13: Interlink ages Between Energy and Jobs*, (United Nations Department of Economic and Social Affairs, Undated).

³⁸ Malamatienos C, *Renewable Energy Sources: Jobs Created, Skills Required (and Identified Gaps)*, Education and Training, (EDP Sciences, 2016).

renewables modules into vocational training courses, supporting apprenticeships, and establishing common quality standards.³⁹

4. Upgrade and strengthen existing skills from other sectors of the economy that can be applied in the renewable energy sector. This is applicable largely for technical and engineering skills as well as those on information technology.

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³⁹ Ibid.

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