

MAKING NATURAL GAS GUARANTEE SUSTAINABLE DEVELOPMENT

Plans and Progress by VETA to Prepare Tanzanians to
Engage in the Natural Gas Value Chain Process

By Enock Kibendela

ESRF DISCUSSION PAPER No. 50



The Economic and Social Research Foundation (ESRF)

2013

www.esrftz.org

MAKING NATURAL GAS GUARANTEE SUSTAINABLE DEVELOPMENT

**Plans and Progress by VETA to Prepare Tanzanians to
Engage in the Natural Gas Value Chain Process**

By
Enock Kibendela

ESRF Discussion Paper No. 50

Published By: Economic and Social Research Foundation
51 Uporoto Street (Off. Ali Hassan Mwinyi Rd.) Ursino Estate
P.O. Box 31226, Da es Salaam
Tel: (+255) 22 2760260,
Mobile: (+255) 754280133
Fax: (+255) 22 2760062
Email: esrf@esrf.or.tz
Website: www.esrftz.org

ISBN: 978-9987-610-83-9

@ 2013 Economic and Social Research Foundation

TABLE OF CONTENTS

1.0	Introduction.....	1
2.0	Skills Requirements for Supporting Development of the Tanzania Gas Industry.....	2
2.1	Brief Overview of the Natural Gas Industry in Tanzania.....	2
2.2	Major activities in the gas industry.....	3
2.3	Value chain of the Tanzania gas industry.....	4
2.4	Skills Rrequirements.....	4
3.0	Preparedness of VETA to Support Development of the Tanzanian Gas Industry.....	8
3.1	Skills Gaps – Global Overview.....	8
3.2	Current and Future Skills Gaps in the Tanzania Gas Industry.....	8
3.3	VETA's Opportunities Strengths and Challenges in Supporting Development of the Gas Industry in Tanzania.....	9
3.4	VETA's Strategy for Addressing Current and Future Skills Gaps in the Gas Industry.....	10
4.0	4.0 Conclusion.....	13
5.0	References.....	14

1.0 INTRODUCTION

After more than half a century of oil and gas exploration, Tanzania has at last found natural gas reserves, estimated to be 43 Trillion Cubic Feet (TCF) valued at US\$ 430 billion (Neureiter, 2012). More discoveries are expected. Apparently, the established reserves are equivalent to 0.64% of total world reserves of natural gas, estimated at 6,707 TCF (International Energy Statistics). The estimated value of Tanzania reserves is equal to 1567% of the 2012 national GDP, which was pegged at US\$27.5 billion (TZS 47,718 billion) according to the Tanzania sources.

Based on the results of the 2012 population census, Tanzania has close to 45 million people. This implies that the value of the reserves translates to around US\$ 9500 per person (National Bureau of Statistics, 2013). For a country with per capita GDP of US\$ 630 and considered to be one of the poorest in the world, the discovery of such huge quantities of natural gas presents a golden opportunity for expediting the country's economic growth. However, the lack of experience in managing a gas industry, inadequate infrastructure, low capacity local human capital and unpreparedness of relevant institutions, all stand as major factors that might prevent the nation from capitalising on this golden opportunity. If these challenges are not addressed immediately and properly, our country might find itself falling into the category of developing countries in Africa with huge reserves of oil and gas that have failed to raise the standard of living of their people even after more than three decades of production.

Experience from countries that have achieved good results from exploring their natural gas reserves, such as Norway and Russia, shows that existence of the right quality and quantity of skilled labour plays a very important role in ensuring success. One of the challenges facing the gas industry in Tanzania is the lack of human capital at various levels. This paper looks at the level of preparedness of the Vocational Education and Training Authority in Tanzania (VETA) in supporting establishment of a sustainable gas industry in Tanzania through provision of demand-driven training services that will lead to development of local skilled workforce for the industry.

This paper has four sections. Section one provides an Introduction to this paper, while section two looks at the Skills Requirements for developing the Tanzania gas industry. Preparedness of the VETA to support development of the Tanzania gas industry is addressed in section three. Section four Concludes the discussions in the paper.

2.0 SKILLS REQUIREMENTS FOR SUPPORTING DEVELOPMENT OF THE TANZANIA GAS INDUSTRY

Skilled human capital is one of the most important assets of any industry, as it provides a competitive advantage in both short and long terms. With relevant skilled human capital, the natural gas industry in Tanzania will be able to not only contribute significantly to the national GDP, but also to improve the standard of living of Tanzanians through direct, indirect and induced employment. This section explores skills requirement for supporting development of a sustainable gas industry in Tanzania.

2.1 Brief Overview of the Natural Gas Industry in Tanzania

Tanzania's exploration for oil and gas has been going on for more than half a century now. In 1974, natural gas was discovered in Songo Songo Island in Lindi region, followed by another discovery in Mnazi Bay in Mtwara region in 1982.

Exploration activities are currently taking place onshore and in shallow waters, deep offshore and on inland rift basins. Up to June 2012, there were 26 Production Sharing Agreements signed with 18 oil exploration companies. Over 100,000 km of 2D seismic data has been acquired onshore, shelf, offshore as well as inland rift basins.

Recently, over 17,000 square kilometres of 3D seismic data have been acquired in the deep sea (Ministry of Energy and Minerals, 2012). A total of 62 wells for both exploration and development have been drilled between 1952 and 2012, of which 53 wells are in onshore basins and 9 in offshore basins (MEM, 2012).

Commercial production of natural gas in Songo Songo Island and Mnazi Bay started in 2004 and 2006, respectively. Since commercialization of the natural gas, Tanzania has witnessed further exploration and discoveries of large quantities of natural gas in both onshore and offshore operational areas. These discoveries estimated at 43 Trillion Cubic Feet (TCF) and valued at \$430 billion raise the potential of the gas industry in Tanzania to become the biggest industry in terms of value as well as a powerhouse for employment for thousands of men and women. In addition to creating jobs, the industry will also provide a reliable energy resource that underpins economic growth.

On the other hand, looking at the experience of some other developing countries with vast natural resources, these developments pose more challenges to Tanzania in the way the way the country is likely to manage the fast growing natural gas industry. At the moment the country is still less prepared and has limited capacity to effectively handle the consequences of huge gas reserves.

In view of the above, the Government of Tanzania (GOT) initiated a draft Natural Gas Policy (MEM, 2012). It has highlighted key challenges associated with management of this valuable resource, including: policy, legal and institutional frameworks to facilitate more effective management of the industry. It covers the aspects of human resources with the

requisite skills and knowledge for the industry; natural gas infrastructure; development of the domestic market and managing the export market; revenue management; how to meet public expectations; and how to respond to the needs of health, safety and environment protection (MEM 2012).

Unless these challenges start being addressed seriously and immediately, the industry will not be able to develop to its full potential. The country's ambition for a faster pace of economic development and better standard of living for Tanzanians will otherwise be difficult to achieve. In this regard, the objective of this paper is to demonstrate VETA's preparedness to contribute to the nation's capacity in overcoming the challenge of the requirement of skilled human resources in the gas industry.

A number of areas are surveyed, such as the range of activities entailed in the gas industry in both upstream and down stream ends of the industry, without forgetting the midstream facilities. These constitute the value chain spectrum of the industry. The subject of human resources, precisely skills need and supply, is a running thread across the whole chain.

2.2 Major activities in the gas industry

The activities in the gas industry can be grouped into three main categories: they include upstream, midstream and downstream activities.

1.1.1 Upstream activities

Upstream activities refer to all activities associated with searching for potential underground or underwater gas fields, drilling of exploratory wells, and subsequently drilling and operating the wells that recover and bring the raw natural gas to the surface.

1.1.2 Midstream activities

Midstream activities refer to the gathering, compression and processing functions required between the wellhead and the transmission system. Midstream facilities and activities are found at any location where natural gas is produced, transported, or sold.

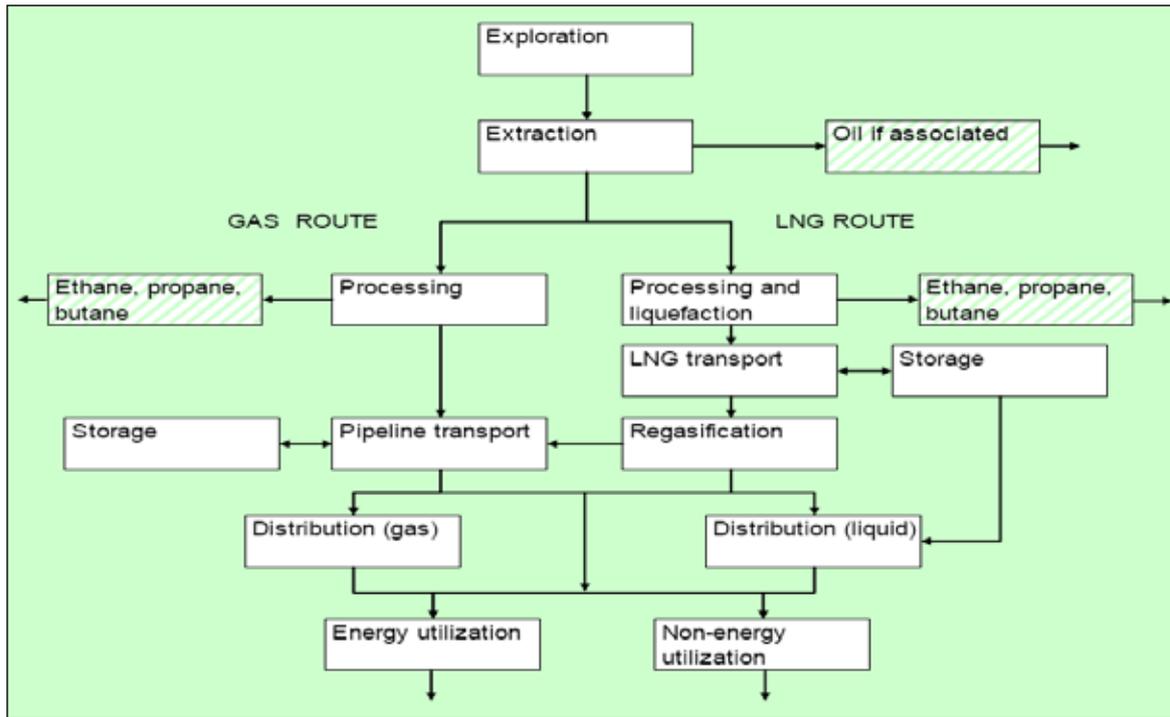
1.1.3 Downstream activities

Downstream activities entail marketing and distribution of the gas and products derived from natural gas. Such products include Liquefied Natural Gas (LNG), plastics, fertilizers, pesticides and pharmaceuticals produced from the gas as raw material.

2.3 Value chain of the Tanzania gas industry

The following main stages characterize the value chain of the Tanzanian natural gas industry: exploration, extraction, processing (treatment), transportation, storage, distribution and utilisation. An overview of the value chain is given in Figure 1, with a mention of potential co-products at several steps in the chain.

Figure 1: Overview of the Gas Industry Value Chain



Source: M. N. (Maartje) Sevenster, H. J. (Harry) Croezen: The Natural Gas Chain: Towards a global life cycle assessment, Delft, CE, (2006)

It is important to note that all phases of the natural gas value chain are associated with direct, indirect and induced jobs that require different types of skills. Direct jobs are those associated with exploration, extraction, processing, transportation, storage and utilisation of natural gas. This type of jobs can either be offered by a gas company or contractors engaged to work on behalf of the company in any stage of the gas activities. On the other hand, indirect jobs constitute those in firms providing support services to the gas industry, such as catering, transportation, etc. Otherwise known as induced jobs, they are generated in entities whose existence depends on the operation of the gas industry. Typical cases here include jobs in shops, hotels, and farms, just to mention a few.

Success in each phase of the natural gas value chain depends not only on the quality of skills deployed by job holders (direct, indirect and induced) in the particular phase, but also those in the preceding stages. To this end, it is, therefore, important to ensure the level of skills deployed in each phase by all those in direct, indirect and induced employment matches with the best practices in the world.

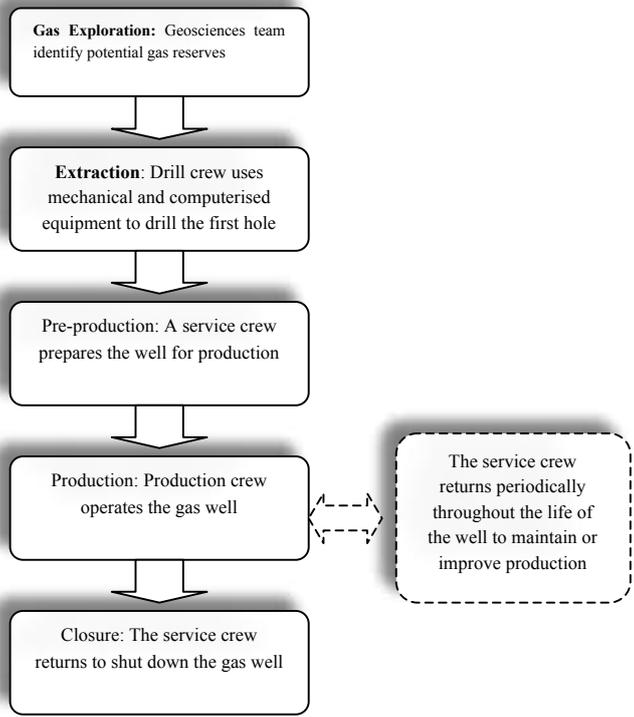
2.4 Skills Requirements

Due to the absence of an official nationwide Skills Needs Assessment (SNA) in the Tanzanian gas industry, skills requirements in the industry are in this paper discussed from the perspective of the successive activities of the natural gas industry and the types of jobs involved in each stage of the cycle.

As stated earlier in this paper, effective and efficient functioning of the gas industry in Tanzania will rely very much on the available quality and quantity of skilled labour force. Figure 2

shows involvement of skilled labour force in all major stages of a natural gas production cycle. Key stages of this cycle are: Gas Exploration, Gas Extraction, Gas Processing, and Gas Transportation. The cycle also contains cross-cutting activities like in Safety Health and Environment (SHE).

Figure 2: Skilled Labour Involvement in the Natural Gas Production Cycle



Source: the Author

Majority of the jobs associated with the process mentioned in Figure 2 require skills that are not common in Tanzania as the industry is new to the country and no preparations have been made to ensure their availability in the immediate future. Major types of skills that will be required in the production cycle of natural gas include those mentioned in Table-1.

Table 1: Key Skills/Competencies Required in the Life Cycle of a Natural Gas Well

Occupation/Trade	Skills/Competencies Required
Cementing operators	Set up, operate, or tend machines to mix or blend materials
Control and Valve Installers and Repairers	Install, repair, and maintain mechanical regulating and controlling devices, such as electronic meters, gas regulators, thermostats, safety and flow valves, and other mechanical governors
Crew Chief	Operates equipment to increase gas flow from producing wells or remove stuck pipe casing, tools or other obstructions from drilling wells
Derrick Worker	Rig derrick equipment and operate pumps to circulate mud through drilling hole
Drillers	Operate a variety of drills - such as rotary, churn, and pneumatic to remove natural gas from the ground

Occupation/Trade	Skills/Competencies Required
Electrical and Electronics Repairers	Repair, test, adjust, or install electronic equipment, such as industrial controls, transmitters, and antennas
Gas plant operator	Distribute or process gas for utility companies and others by controlling compression to maintain specified pressure on main pipelines
Helpers	Helping drillers by supplying equipment or cleaning work area
Industrial Machinery Mechanics	Repair, install, adjust or maintain industrial production and processing machinery or refinery and pipeline distribution systems
Maintenance and Repair Workers, General	Perform work involving the skills of two or more maintenance or craft occupations to keep machines, mechanical equipment, or the structure of an establishment in repair. Duties may involve pipe fitting; boiler making; insulating; welding' machining' carpentry; repairing electrical or mechanical equipment; installing, aligning, and balancing new equipment; and repairing buildings, floors, or stairs
Maintenance Workers, Machinery	Lubricate machinery, change parts, or perform other routine machinery maintenance
Mobile Heavy Equipment Mechanics	Diagnose, adjust, repair, or overhaul mobile mechanical, hydraulic, and pneumatic equipment, such as cranes, bulldozers, graders, and conveyors
Roustabouts	Assemble or repair gas field equipment using hand and power tools
Wellhead pumpers	Operate power pumps and auxiliary equipment to produce flow of gas from wells in gas fields

Source: the Author

Together with the hard skills mentioned in Table-1, people looking for employment in the gas industry are also expected to demonstrate command of basic skills that are prerequisite for success in the industry. Basic skills required include the following:

- Basic education: at least secondary education
- Fundamental study areas include:
 - ◆ Mathematics and Science skills
 - ◆ Mechanical aptitude
 - ◆ Computer literacy
 - ◆ Planning and organizational skills
 - ◆ Use of documentation skills (plans, directions, maps, etc.)
- Communication (Proficient in the Kiswahili and English languages - reading, writing, speaking and listening/comprehension)
- Use of documentation skills (plans, directions, maps, etc.)
- Cross cutting/Life skills
 - ◆ Personal and interpersonal skills

- ◆ Good listening skills
- ◆ Problem solving and decision making skills
- ◆ Entrepreneurship

Additionally, job seekers must demonstrate capability of observing and championing the following common industry values for success:

- Good work ethics and devotion to working hard
- Motivation to succeed
- Positive attitude
- Teamwork and collaboration
- Desire to learn and grow
- Entrepreneurial skills
- High level of adaptability and flexibility

In its operations, the gas industry also relies heavily on semi-skilled labour. Typical examples here are floor hand, lease hand, tool pusher, and floor man. Skills for these jobs can be acquired during the operations provided that the respective person has technical basics such as mechanical, electrical, and civil trades.

Despite the fact that no official statistics are available about employment potential in the gas industry in Tanzania, it is widely expected to generate thousands of direct, indirect and induced jobs of various skills in the next twenty and above years based on experience from similar industries across the world. However, most of the skills required for jobs in the gas industry will be new to the local labour market as the industry is still in its infancy stage. The few local people with skills relevant to the gas industry are employed by the Tanzania Petroleum Development Corporation (TPDC) in various capacities. It is also believed that there are people with experiences and skills similar to those required in the gas industry in private oil companies but no official statistics are structurally available on this issue.

As revealed in the analysis of the skills requirements for the gas industry in Tanzania, there are a number of skills that are new to the country but are required for its effective and efficient functioning in the immediate future. In order for the industry to operate progressively and competitively, a huge investment in human capital development is imperative. To this end, stakeholders need to collaborate to develop and implement a national capacity building strategy for the gas industry in Tanzania.

3.0 PREPAREDNESS OF VETA TO SUPPORT DEVELOPMENT OF THE TANZANIAN GAS INDUSTRY

3.1 Skills Gaps – Global Overview

The skills shortage in the gas industry is a global problem which is compounded by the increasing industry expansion and production, coupled with ageing of the existing workforce and slow pace of capacity building initiatives in various countries. The gas industry across the world is experiencing a wide range of skilled occupations shortage including technical, managerial, finance, marketing and leadership (Energy Institute, Deloitte and Norman Broadbent, 2008).

A study conducted by Offshore Petroleum Industry Training Organisation (OPITO) and Engineering Construction Industry Training Board (ECITB) shows that over 50% of oil and gas companies consider the skills shortage their number one challenge (“Skills shortages could halt North Sea oil & gas boom”, - Berkhamsted -2011). The skills shortage challenge is further revealed by results of a survey by OPITO and ECITB which shows that there is a skills shortage in operators and contractors in the oil and gas industry (Jee, 2009).

In another survey conducted by the Boston Consulting Group, entitled *Turning the challenge of an older workforce into a managed opportunity*, it was established that by 2050 the global population aged 60 and over will exceed the number of people aged 15 and under for the first time in history (International Gas Union, 2012). According to the survey, most countries will be faced with labour shortage issues, as even countries with large numbers of young people will not be immune because their workforce might migrate.

Skills shortage presents two major business challenges to the gas industry across the world. First is the reduction of production caused by supply shortages of skilled workers. Second is the reduction of productivity due to high turnover of workers caused by ageing and replacement of skilled workforce. In order to address the challenge of skills shortages in the gas industry, various approaches have been deployed across the globe. For example in Nigeria, Mobil and Shell offer vocational education and training to workers as part of their employee training programme. In addition, the companies offer training curricula to improve non-technical competencies (Aggour, 2009). Another example is BP which is implementing a US\$50 million five-year programme with a range of technology, education and culture projects, designed to bolster research and skills in the oil and gas industry in the Russian Federation (BP, 2011).

3.2 Current and Future Skills Gaps in the Tanzania Gas Industry

In the absence of an official and comprehensive SNA of the gas industry in Tanzania, the discussion in this section will be limited to general skills gaps, instead of the specifics. Despite this limitation, it is anticipated that results of the discussion incited by the current paper will shed more light into the existing skills challenges in the industry in Tanzania.

As established earlier in this paper, most of the skills required for an effective and efficient function of a sustainable gas industry in Tanzania are new or very hard to come by due to lack of a national strategy for building capacity in this area. In the immediate future, huge skills deficiencies are expected among drilling, service and production crews, as the industry is new to the country and only a few Tanzanians (if any) have had the opportunity to work in similar industries across the world. Skills deficiencies are also expected in traditional trades such as welding, electrical and civil because the skills required to perform such jobs in the gas industry are specific and people need to be retrained in order to be able to deliver.

In addition to the challenges of hard and soft skills among potential seekers of jobs in the gas industry, the future employers are also expected to face the serious problem of mindset among majority of Tanzanians who will be engaged by the industry. This challenge is attributed mainly to the lack of tradition with such industry and the laid back attitude of many Tanzanians especially among the skilled labour. In order to address this challenge, companies and training institutions need to incorporate attitude changing training in their capacity building programmes.

Due to lack of sufficient local capacity, many of the gas companies are expected to rely heavily on expatriate staff in the first 5 to 10 years of operation in Tanzania. Some of the companies might look into building up local skilled workforces so as to reduce reliance on costly expatriate staff. However, the good intentions of such companies might be hampered by the shortage or simply absence of local skilled workers for most of the jobs in the gas industry.

In order to ensure increasing share of local workforce in the gas industry, the Government must develop strong forward-looking policies and strategies that promote local content in staffing. In this regard, participation of the locals in the gas industry must become a major policy issue from a skills point of view. Such policy should aim at maximising the use of local expertise, goods and services in all aspects of the gas industry value chain as well as developing local capabilities through education, skills and expertise development.

At this juncture, it is important to note that existence of a good policy does not guarantee achievement of a bigger share in local content. A typical case here is Nigeria where there has been only limited success because science and technology teaching in the education system is not yet meeting the quality demands of international oil and gas companies (Neftegaz, 2009). To this end, it is imperative for stakeholders to work together to address this challenge, otherwise heavy reliance on expatriates will lead to high level of unemployment especially among the youth.

3.3 VETA's Opportunities Strengths and Challenges in Supporting Development of the Gas Industry in Tanzania

3.3.1 Opportunities

The discovery of huge reserves of natural gas in Mtwara and Lindi regions presents great opportunities for VETA and vocational education training (VET) as a whole in Tanzania as majority of the skills required for effective and efficient function of the gas industry fall under the vocation category. This means that more VET graduates will be able to benefit from

thousands of direct, indirect and induced jobs that are expected to be available in the near and distant future when companies start to extract the reserves.

VETA also expects strong support from stakeholders of the gas industry in its endeavour to develop skilled human capital for the industry. This expectation is justified by the belief that many investors in the gas industry will opt for a larger share of local content in their businesses instead of relying on costly expatriates. The government is also expected to extend its support to VETA because gains in this area will lead to reduction of unemployment in the country as the youth increasingly qualify for recruitment in the industry.

3.3.2 Strengths

VETA is an institution established under Act of Parliament No. 1 of 1994 and entrusted with the responsibility of regulating, providing, financing, and co-ordinating vocational education and training (VET) in Tanzania. The Authority boasts of a number of strengths which will enable it to effectively and efficiently support development of a skilled workforce for the gas industry in Tanzania. The strengths include: established VET facilities in Mtwara and Lindi regions, strong support from the central and local governments, established networks with stakeholders of VET in Tanzania, and vast experience in running demand-driven skills training for different sectors and industries, just to mention a few.

3.3.3 Challenges

The fact that the gas industry will be a new undertaking in Tanzania presents a number of challenges to institutions entrusted with the responsibility of developing skilled labour, such as VETA. The most crucial challenge is the inadequate capacity within VETA to provide world class skills in this area, which is attributed to a number of factors including lack of a national strategy for developing local content for the gas industry. This problem is compounded by lack of or inadequate capacity among the training staff within VETA and VET to deliver training tailored to the needs of the gas industry. The second critical challenge lies in the extent of the mismatch between the types of skills provided in traditional VET programmes like welding, masonry, etc., and the requirements in the gas industry for similar/same trades. This challenge is compounded by the fact that graduates of the traditional VET programmes are prepared to serve traditional industries and their skills have a very low level of adaptability and flexibility.

3.4 VETA's Strategy for Addressing Current and Future Skills Gaps in the Gas Industry

VETA as an institution has recognised its role in addressing current and future skills requirements for the gas industry in Tanzania. As a demonstration of VETA's commitment in this area, recently the Authority launched a project for Enhancing Employability through Vocational Training (EEVT) in Mtwara. The project is a partnership between VETA, British Gas and Volunteer Service Organisation (VSO). The objective of this project is to improve employability of the local population in Mtwara and Lindi regions and in Tanzania as a whole by improving training standards at VETA Mtwara, with particular focus on the needs of the oil and gas industry and related services. The project is supported by British Gas Tanzania which has provided US\$1m for a period of three years from 2012 (VETA, 2013).

Immediate outputs of the project include: 24 VETA teachers with enhanced capacity in their fields and teaching methodology; 24 vocational teachers with Level 2 International English Language certificate; and 7 VETA teachers from selected trades with degree qualification. The project further includes 280 VETA students with internationally accepted certificates in their trades and more than 50% of them engaged in the oil and gas industry and related services; and 5 members of the administration staff from Mtwara Regional Vocational Training Service Centre (RVTSC) trained in administrative and project management skills.

Key expected outcomes of the project consist of: raised standards for craftsmanship skills in line with internationally recognised in eight areas, namely: Plumbing, Welding, Carpentry, Motor Vehicle Mechanics, Electrical Installation and Maintenance, Food Production, Laboratory Assistant, and English Language. Mtwara RVTSC becomes a centre of excellence for providing vocational training in disciplines relevant to the oil and gas industry and other related services. VETA graduates are employed by oil and gas companies and other related services. The populations in Mtwara and other regions of the country are expected to benefit in terms of increased employability, jobs and income. What is more is that experience from the project will be replicated in other regions via the VETA network and shared internationally.

In providing these skills, VETA will make sure that they are in line with globally accepted standards in order to ensure their transferability across companies and countries. To this end, VETA will be guided by the International Labour Organisation framework (ILO, 2011) for skills development as articulated in the Human Resource Recommendation of 2004 (No 195). The framework advises countries to sustain a virtuous circle by matching training to labour market demands, providing opportunities for lifelong learning and using skills development to drive innovation and, thus, future job growth.

Furthermore, VETA will ensure that deployed strategies prepare the workforce and employers for new opportunities and adopt a forward looking approach when dealing with changes in the industry. It will also be the responsibility of VETA to ensure that supply of skills is matched by current demand as well as to anticipate and deliver the new skills that will be needed in the industry in the near and distant future.

The modality of VETA's support to the gas industry will be as follows (VETA, 2012):

(a) *Skills Needs Assessment and Responce*

VETA in collaboration with stakeholders will undertake a comprehensive nationwide Skills Needs Assessment (SNA) in the gas industry. Based on the established needs, VETA will work with stakeholders to develop training programmes that will focus on building local content for the gas industry.

(b) *Setting of training standards and curriculum development*

Using expertise from existing experts and skilled labour from the industry, VETA will develop training standards and curricula which will be endorsed by users and obtain both local and international accreditations.

(c) *Recruitment of learners*

Engagement of learners for the training programmes will be done jointly with stakeholders in the industry. The training programmes are expected to focus on four types of learners. These are artisans, supervisors, up skilling employees and trainers.

(d) *Training delivery*

A competence based dual system will be used in the delivery of the training programmes under which theoretical and a few practical demonstration sessions will be done by the training institution, while the bulk part of practical training will be done at work place. This approach will allow trainees to learn faster and acquire attitudes/skills in a real gas industry environment.

Trainers from VETA centres and the gas industry will be used to deliver the training. Where necessary and feasible, competent trainers from institutions outside the country will be engaged to provide the training.

(e) *Assessment and Certification*

Learners will be formatively and summatively assessed as per the Competence Based Education and Training approach whereby a learner will be allowed to move to the next stage after successfully passing at the current stage. Assessments will be done both at the work place and training institution and summative assessment will be validated by work place experts.

(f) *Adoption of global/international standards*

The gas industry by its nature subscribes to international or global standards because most of the companies that invest in it are from various countries. As such, it is important that VETA and VET institutions use harmonised curricula with international standards. To achieve this, VETA will link up with established institutions across the world.

(g) *Quality assurance*

In addition to the normal quality assurance procedures implemented by VETA in its training activities, the Authority will establish a quality assurance committee for monitoring programmes for the gas industry. The committee will be composed of members from VETA and the gas industry.

(h) *Training of Trainers*

In order to qualify for the training programmes, VETA trainers will have to undergo training to upgrade and update their skills. Additionally, they will be required to go for industrial attachment in established gas companies for a specified period during which they will have an opportunity to get firsthand experience from experts in the industry in their respective trades.

4.0 CONCLUSION

Tanzania stands to benefit a lot from exploring its natural gas reserves which have been estimated to be worth more than 15 times the national GDP. However, the lack of national capacity for managing a gas industry of such magnitude might prevent the country from reaping the anticipated benefits of a gas industry driven economy. If this challenge goes unaddressed, the country might find itself joining the club of developing countries that have continued to languish in the group of world's poorest countries even after decades of exploring their rich natural resources endowments.

In order to avoid this pitfall, all key stakeholders of the gas industry in Tanzania need to play their parts effectively and efficiently. VETA is an important player among the key stakeholders expected to support the country's endeavour to develop a sustainable gas industry that is beneficial to all people. This paper has presented VETA's strategy and approach in preparing skilled labour in Tanzania that will be equipped with technical knowledge to engage in the gas industry's value chain. Successful implementation of the strategy relies very much on collaboration and the support from the key stakeholders in the undertaking major activities like Skills Needs Assessment and training.

5.0 REFERENCES

“Skills shortages could halt North Sea oil & gas boom”, (2011), in Process Engineering (Berkhamsted), 17 Mar. 2011, <http://processengineering.theengineer.co.uk/skills-shortages-could-halt-north-sea-oil-and-gas-boom/1007892.article> (accessed 12 August 2013).

Aggour, (2009) T.: A multidisciplinary professional on boarding program for E&P new hires. Paper presented at the International Petroleum Technology Conference 2009, Doha, Qatar, 7–9 Dec. 2009

BP, (2011):“BP Russia launches five year investment in technology, education and cultural programmes”, BP Press Release, 20 Dec. 2011.

Energy Institute, Deloitte and Norman Broadbent, (2008): Skills needs in the energy industry: A report on the initial findings of three surveys (Jan. 2008), <http://www.energyinst.org/documents/5> (accessed 12 August 2013).

International Gas Union, (2012) : “Progress reports from the task forces”, in International Gas (London, International Systems and Communications Limited, and Oslo, International Gas Union), Apr.–Sep. 2012 issues

International Labour Organisation, (2010) “A Skilled Workforce for Strong, Sustainable and Balanced Growth, A G20 Training Strategy” http://www.ilo.org/wcmsp5/groups/public/@dgreports/@integration/documents/publication/wcms_151966.pdf (accessed 12 August 2013)

JEE, (2011): “Filling the engineering skills gap: Jee reveals secret to recruitment success” (London and Aberdeen), Nov. 2011, <http://www.jee.co.uk/news/nid-0016/filling-the-engineering-skills-gap-jee-reveals-secret-to-recruitment-success-/> (accessed 12 August 2013).

Ministry of Energy and Minerals, (2012): The Natural Gas Policy of Tanzania (Draft 1, 2012),<http://www.mawallainitiatives.com/Tanzania%20Natural%20Gas%20Policy.pdf> (accessed 13 August 2013)

National Bureau of Statistics, (2013), Tanzania in Figures 2012, Dar es Salaam

Neftegaz, (2009): “Nigeria’s oil industry: Between nationalism and skills gap”, 1 Sep. 2009, <http://neftegaz.ru/en/news/view/89926> (accessed 12 August 2013).

Neureiter, K., (2012), Reserving Judgement on Tanzania’s Natural Gas Discoveries, <http://thinkafricapress.com/tanzania/nascent-gas-industry-potential-or-potentially-dangerous-430billion> (accessed 13 August 2013)

Sevenster, M. N., Croezen,(2006): H. J.: The Natural Gas Chain: Towards a global life cycle assessment, Delft, CE, 2006

United States Energy Information Administration: "International Energy Statistics" <http://www.eia.gov/cfapps/ipdbproject/IEDIndex3.cfm?tid=3&pid=3&aid=6> (accessed 12 August 2013)

Vocational Education and Training Authority, (2012); Report on oil and Petroleum skills in demand (VETA South East Zone) Dar es Salaam, September 2012

Vocational Education and Training Authority, (2013): Enhancing Employability through Vocational Training, Dar es Salaam

ESRF is an independent, non-governmental research institute registered in Tanzania with offices in Dar es Salaam. Its operations began in April 1994 in response to the need for the development of an institutional capacity for policy analysis. The foundation conducts policy-related research, capacity building programmes and policy dialogues that enhance the understanding of policy options within the government, the business community, the donor community, civil society and the growing private sector. It also undertakes demand-driven commissioned studies that conform to its mission.

Vision:

The vision of ESRF is to become a national, regional and international centre of excellence in capacity development for policy analysis, development management and policy research by the year 2015

Mission:

ESRF's mission is to build capacities in economic and social policy analysis and development management.

Objectives:

The foundation's objectives are to build and strengthen human and institutional capabilities in economic and social policy analysis and sustainable development management. ESRF also aims to enhance the understanding of policy options within the government, public sector, business sector, development partners, and in the growing non-governmental sector, mainly in Tanzania and the other East African countries.

The Economic and Social Research Foundation (ESRF)
51 Uporoto Street (Off Ali Hassan Mwinyi Road), Ursino Estate
P.O. Box 31226,
Dar es Salaam, Tanzania.
Tel: (+255) 22 2760260, 2760751/52,
Mobile: (+255) 754 280133,
Fax: (+255) 22 2760062,
Email: esrf@esrf.or.tz

