



Needs Assessment of the TVET System in Ghana as it relates to the Skill Gaps that Exist in the Extractive Sector

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Executive Summary

This needs assessment is the result of data collected in February 2016 mainly through discussions with Government regulators, Council for Technical and Vocational Education and Training (COTVET), vocational schools, funding agencies, and industries each of whom are stakeholders within the Extractive Industries in Ghana. Through this information gathered, it is clear that there are serious challenges with the Technical and Vocational Education and Training (TVET) sector in Ghana in its present form. Overcoming them requires cooperation from all stakeholders. It is only by cooperation and mutual engagement that any permanent and sustainable solutions will be realized. In order to ensure lasting success, a strategy that addresses both short-term and long-term needs appears to be the best way forward.

The key challenges identified are well understood by all of the stakeholders and many have been identified previously. They are as follows:

- Lack of modern equipment at most institutions
- Lack of modern curriculum that is not fully relevant to the needs of the Extractive Industry
- Inexperienced instructors many of whom who have almost no practical Industry experience and/or who are not teaching sufficient practical content
- Extreme shortage of consumables to allow necessary practical learning
- Lack of recognized standards appropriate for the Extractive Industries and no independent accreditation/assessment of graduating students' skills
- Lack of Government coordination in involving all stakeholders (Government Regulators, Skills Training Institutions, and Industry) needed to effect change
- Lack of Government funding in support of the TVET system both in terms of direct funding to the institutions and in funding to Council for Technical and Vocational Education and Training (COTVET) for them to fulfill their mandate
- Low levels of female enrollment in vocational education, in particular in trades related to the extractive industries.

Lack of Modern Equipment

Many schools and training institutions lack modern equipment and tools as well as good quality classrooms to promote effective teaching and learning for the production of high-quality skills for the economy. Industry requires employees that are able to work and operate modern equipment. The lack of appropriate and sustainable funding for equipment for TVET is required for modernization and long-term growth of the system. Recent donations to vocational institutions for equipment and infrastructure have been welcome, and additional upgrades are needed, but these are only part of the solution. Updated curriculum, improved instructor competencies, and significantly more consumable materials are the areas of greatest need. It was also noted that some of the technical institutes and polytechnics have received significant donations of equipment. However, from the Extractive Industry's perspective, this may not be the best use of capital in that they would likely see better benefit in enhanced funding to the to all areas of TVET.

Lack of Modern Industry-Driven Curriculum

Within the TVET system in Ghana there is a poor linkage between skills training and Industry, resulting in a significant skills mismatch. This is primarily the result of training curriculum developed with no input from Industry. The development of modern Industry-driven curriculum, international standards, and independent accreditation of graduating students must be instituted as soon as possible. Curriculum must reflect both the needs of Industry and enable students by providing them with relevant skills necessary for employment. This should also include skills related to safety training and environmental considerations. Government regulators certainly see the need for this and they have a mandate to improve these areas. Industry supports this as well and has been very clear in their desire to take a lead role. However, Industry has been disappointed with the effectiveness of Government driven initiatives in the past. Industry will likely need to see real engagement by Government before they become a true partner. However, their participation in curriculum development and validation is essential if true reform of Ghana's TVET sector is to be realized.

Lack of Industry Trained Instructors

The lack of skilled instructors at vocational institutions is a serious concern for Industry. Similar to Canada, TVET institutes cannot compete with Industry wages, therefore it is difficult to attract and retain instructors with up-to date relevant skills. Further, there are limited opportunities for instructors to receive training within Industry to maintain and upgrade their skills. This appeared to be only partly acknowledged by COTVET and the institutions themselves. Bringing the qualifications of instructors up to a level that is needed to deliver the programs that Industry can actually make use of is a major challenge. Opportunities for instructors to increase their instruction competencies in (possibly through direct participation in) Industry -relevant sectors is imperative. Some Companies expressed a willingness to assist in this regard by making some of their qualified personnel available to the vocational institutions. This concept requires additional development through ongoing discussions between all stakeholders. A more effective strategy would be for key instructors at vocational institutions to receive upgraded skills training that they in turn could then teach to their students.

With respect to female instructors, in 2012 female instructors represented less than 18 percent of the instructors in publicly funded schools. During site visits, no female instructors were observed and only a few female administrative personnel were observed. Gender equity in TVET, especially female participation in non-traditional trades is challenge worldwide. However, training more female instructors in these fields is one effective strategy in fulfilling gender equity goals.

Lack of Consumables Required for Training

The extreme lack of consumables and materials observed at all of the vocational institutions is another significant barrier to developing a skilled trades' workforce, the situation was exemplified particularly in the welding trade. Lack of consumables/curriculum materials provides a situation where there is a significant difference in what the curriculum specifies that

students should learn, what teachers teach, and what students actually learn. Further, this affects the opportunity for practical learning because consumables and materials are not readily and consistently available. This appears to be purely a function of funding as consumables were in very good supply at DANEST Engineering, a private training centre in Takoradi. It is worth noting that the tuition at DANEST is considerably higher than the public Polytechnics, and most of these higher costs are allocated to pay for consumables. However, the costs of such private programs are unaffordable for most Ghanaians. Many companies interviewed appeared willing to help with in-kind contributions of surplus materials although the majority had not been contacted by the institutions in this regard.

In addition, at most institutions, cost-plus training programs or other fund raising activities are absent. These programs and activities could provide much needed revenues, which could be allocated to consumables' budgets. While such Industry contributions and increased business development initiatives by institutions would help, it will require a significant increase in direct Government funding to address this problem in the long-term.

Lack of Industry-Validated Standards

The standards that are in currently in place in Ghana do not meet the needs of the Extractive Industries. The standards required demand higher-level skills than are currently being taught at the vocational institutions. The Extractive Industries tend to use sophisticated technologies in their day-to-day operations, which involve installation, commissioning, maintenance, and repair of various equipment and systems. Development of Industry-recognized standards would in turn, allow for the development of appropriate curriculum to meet Industry's needs. Within Ghana, there is a push to develop a Competency-Based Training (CBT) system. The purpose is to enhance relevance of technical vocational education, and ensure that training is guided by competencies endorsed by Industry so that TVET graduates would acquire skills that meet the needs and specific standards of Industry. The development of CBT curriculum must be undertaken with recognized standards in mind.

Lack of Government coordination and communication involving all stakeholders

Due to constrained timelines of the project, an in depth assessment on the layers of the TVET system was not feasible. Nonetheless, the coordination issues were cited as a major impediment to TVET reform in Ghana. As noted in the World Bank Report, "One of the most serious nonmarket imperfections regarding TVET is that of coordination of providers, qualifications, strategies, policies, legislation, and development partner support."¹ TVET in Ghana is delivered by a number of different bodies including ministries, non-for profits, for profits, NGOs, and informal apprenticeships. As outlined in the Work Bank Report, we concur with the following recommendations to address the coordination issue:

¹ P.Davars & R. Palmar (2013) "Demand and Supply of Skills in Ghana" [Online]. Available: <http://elibrary.worldbank.org/doi/abs/10.1596/978-1-4648-0280-5> [March 2016].

- The coordination of TVET to supply to labor market demands for skills (Industry Engagement)
- Government strategies and development plans that relate to TVET in whole or in part, as well as development partner support. Though not specific to gender, one of COTVET's mandates indicates that they are to take measures to ensure the quality in delivery of equity in access to technical and vocational education and training.
- TVET qualifications and quality assurance
- The coordination of TVET-related committees, which exist under various ministries, with the new COTVET board and committees
- The legal framework for TVET

High-level reforms are required to reform the TVET system. There is a common desire between the stakeholders to address these challenges immediately and there is evidence that COTVET and the Institutions have been working together in addressing them. However, there appears to be a distinct lack of Industry participation in this process. It is clear Industry not only needs to be engaged by the other stakeholders but must also take a lead role in providing input to the discussion. As Industry is the eventual client of the vocational system, their involvement is crucial.

Lack of Government Funding

The lack of adequate resource funding the TVET sector persists and this has resulted in weakness in the system. As noted above, obsolete and inadequate training equipment and tools, lack of training materials, inadequate number of qualified instructors with requisite Industrial practical experience, lack of linkage between training institutions and Industry, and lack of relevance of institutional training to the needs of Industry are all a result of inadequate funding to the system. Without a serious reform to TVET financing mechanisms and incentive to pursue revenue generation at the school level, TVET reforms will be difficult to implement and sustain.

The Extractive Industry currently requires short-term solutions to meet its immediate needs. In most cases this involves bringing key members of their staff up to a level that makes them job capable as soon as possible. However, Industry does not appear to have confidence in the existing TVET system and therefore has resorted to expensive in-house training. In certain cases, some companies have been able to sponsor joint training programs amongst their workforces. These may have been successful for immediate needs but is not a sustainable long-term solution.

Many of the systems and processes necessary for successful intervention appear to be in place within the existing TVET system. However, significant effort is required to bring all of the pieces together for lasting success. A lasting solution is one that addresses both the short-term needs of Industry and the long-term requirement of building a sustainable TVET system that will serve both Industry and the people of Ghana in the future.

Low Levels of Female Enrollment in TVET in Non-Traditional Occupations

According to the Institute of Statistical, Social and Economic Research (ISSER) of the University of Ghana, an estimated 250,000 young people enter the labour market every year and women make up 53% of Ghana's workforce.² Participation of women in the workforce is high because of the prevalence of women in low-skilled work, and women hold less than 2% of the highly skilled jobs in the workforce.³ Further, according to 2013 data from www.AfricanEconomicOutlook.org, literacy rate for women was 65%; or 13% lower than that for men. Gender parity in education is further exemplified through educational levels. For instance, the Gender Parity Index ("GPI") values for primary, secondary and tertiary education in 2013 were 0.98, 0.92 and 0.63 respectively.⁴

There are tremendous opportunities for women to contribute to the skilled workforce in Ghana. There was a willingness to hire competent women in most of the companies interviewed. However, cultural practices, gender biases, and lack of access to highly trained women hinder Industries' ability to employ more women.

In Ghana, education policies (1992 Constitution of Ghana [Article 28] and Children's Act of 1998 [Act 560] are in place to ensure that, boys and girls, men and women are all entitled to equal educational opportunities. Despite the policies in place, Ghana's education and particularly TVET system offers women limited opportunities and tends to be focused on traditional female occupations versus highly skilled occupations. A number of barriers for gender parity in TVET were observed; they include but are not limited to the following:

- Lack of female instructors/trainers
- Poor quality of learning and teaching resources
- Financial constraints
- Cultural and social perceptions of women's roles within the home and economy.

Within in TVET there are a number of models and best practices that can be adopted and implemented to improve gender parity in Ghana's TVET system. However, they must be integrated within the overall TVET system, rather than piecemeal in their approach and design. Women can play a significant role in addressing the skills shortage in the Extractive Industries in Ghana, and there is an appetite amongst Industry to provide employment opportunities for women. For this to be achieved specific changes must be implemented: training more female instructors and trainers, development of gender sensitive curriculum, learning resources and materials; introduction of new gender sensitive teaching methodologies; and, engagement of Industry to increase opportunities for women through work placements; and educational promotion campaigns.

² Ghana Statistical Service (GSS), (2005). Population Data Analysis Report Vol. 1: Socio-economic and Demographic Trends Analysis, Ghana Statistical Service: Accra.

³ G. Morgan. (2013). "Women in TVET: Input into Ghana's COTVET Gender Strategy Dialogue". [Online] Available: https://www.academia.edu/4351797/Women_in_TVET_Input_into_Ghana_s_COTVET_Gender_Strategy_Dialogue [March 2016

⁴www.AfricanEconomicOutlook.org: http://www.africaneconomicoutlook.org/fileadmin/uploads/aeo/2015/CN_data/CN_Long_EN/Ghana_GB_2015.pdf

Recommendations

To address the problems identified in this assessment, Saskatchewan Polytechnic proposes three recommendations, which would establish tested and endorsed models for TVET reform in Ghana. The outcomes of each recommendation, whether implemented as a stand-alone recommendation or together, can provide a model for TVET reform. The recommendations are based on international best practices, but would be designed within a Ghanaian framework in order to establish sustainable reform of the TVET system. The implementation of these recommendations would require engagement of Government, Industry, and Institutions (the stakeholders) with the aim of demonstrating the strategy as applied to the welding trade. Once proven successful, the model could be replicated to other trades.

The three recommendations are as follows:

- **Recommendation One: National Standards Development (One Trade)**
In partnership with COTVET, the Ministry of Education, a sample of partner vocational schools, Canadian experts, Industry representatives, technical specialists (welding, mining, oil & gas, gender) develop and validate National Standards for Welding based on international best practices and needs of Extractive Industries. The framework will establish a roadmap for future standards development.
- **Recommendation Two: Industry Driven Program Development for One Trade Area**
In partnership with COTVET, the Ministry of Education, a sample of partner vocational schools, Canadian experts, Industry representatives, and technical specialists (welding, mining, oil & gas, gender) develop, deliver and test Industry-relevant and gender-sensitive welding curriculum. Upgrade the skills of instructors to develop and deliver new curriculum. The process will establish a framework for curriculum development in other trade related areas.
- **Recommendation Three: Demonstration Project for Women in the Trades**
Establish a welding trade program for women only. New gender sensitive Industry driven welding curriculum would be developed, as outlined in the process in Recommendation Two. Female-friendly facilities would be established to accommodate female learners, instructors would be provided and engage Industry to provide female focused Industry Attachments and employment opportunities.

Welding is the recommended trade due to the more modern related equipment available at the schools visited and the fact that welding is important throughout many aspects of the Extractive Industries. In a study performed by the World Bank in 2014, they cited pipefitting, welding, and material joining as key gaps within the workforce in Ghana.⁵ Further, high level advanced welding appears to be the trade that is in most demand within the Extractive

⁵ P.Davars & R. Palmar (2013) "Demand and Supply of Skills in Ghana" [Online]. Available: <http://elibrary.worldbank.org/doi/abs/10.1596/978-1-4648-0280-5> [March 2016].

Industries visited. Industry is investing considerable resources into welding upgrader programs due to the deficiency in the skills of Ghanaian employees. It is however important to recognize that the recommendations are scalable. While the recommendations focus on the welding trade to prove success among the stakeholders, the scope of each recommendation could easily be expanded to additional trades in multiple locations throughout the country.

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Acronyms

ATTC	Accra Technical Training Centre
CBT	Competency Based Training
CIDA	Canadian international Development Agency
COLTEK	College of Technical Education Kumasi
COTVET	Council for Technical and Vocational Education and Training
DFATD	Department of Foreign Affairs, Trade and Development (now Global Affairs Canada)
GEU	Girl's Education Unit
GIZ	German Development Corporation/ Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) GmbH
GPI	Gender Parity Index
GRSCDP	Gender Responsive Skills and Community Development Project
ICCES	Integrated Community Centers for Employable Skills
ITAC	Industry Training Advisory Council
JTTC	Jubilee Technical Training Centre
KTI	Kumasi Technical Institute
MoE	Ministry of Education
MoELR	Ministry of Employment and Labor Relations
NGO	Non-Governmental Organization
NVTI	National Vocational Training Institutes
PCG	Petroleum Commission of Ghana
PPE	Personal Protective Equipment
PPP	Public Private Partnership

RMU	Regional Maritime University
SME	Subject Matter Expert
TVET	Technical Vocation Education Training
TTI	Takoradi Technical Institute
WITED	Women in Technical Education Department
WRCF	Western Regional Coastal Foundation

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The Council for Technical and Vocational Education and Training (COTVET) assisted by arranging visits and meetings with a number of Technical Institutes, Polytechnics, and Universities throughout Ghana. They also provided valuable information and background on the structure of the Technical and Vocational Education and Training (TVET) systems in Ghana by outlining the challenges and issues they face in making necessary improvements in TVET in order to better meet the needs of the Extractive Industries.

All vocational institutions visited in Ghana were extremely accommodating in granting access to their key staff and by providing tours of their facilities. In some cases, this was completed on short notice. Representatives from each of the schools supplied valuable information on the challenges that they face in the delivery of TVET programs. They were forthright in outlining their concerns in the areas that require attention as well as making recommendations for improvement.

The Government regulatory agencies and Non-Governmental Organizations (NGO's) visited were helpful by presenting other perspectives. The NGOs outlined the initiatives they were involved in aimed at increasing the capacity of local providers (businesses, agriculture, facilitation, educational institutions, entrepreneurs etc.). A special thank you is extended to the German Development Corporation (Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) GmbH) who also provided transportation services in Ghana for team members during part of their trip.

Appreciation is also extended to Wayne Dunn and Associates who provided contact information that was invaluable in scheduling meetings with participants in Ghana.

The companies visited throughout Ghana offered excellent insights into the challenges that Industry faces in hiring local employees that possess the specialized skills and experience that their businesses require. Companies were generous with their time and provided critical input from the perspective of the end-customers of the TVET system.

Background

For the past 15 years, Ghana has experienced unprecedented economic growth. Developing and improving the skills training sector is a priority for the country for continued growth, competitiveness and economic prosperity. Ghana's economic growth is primarily linked with Extractive Industries, which unfortunately account for a relatively low share of employment for Ghanaians. The Extractive Industries in Ghana require specialized skills (trades, exploration, drilling, and production) that the current system cannot provide.

It is proven that a skilled workforce is a basic requirement for driving industrial and economic growth, and Technical and Vocational Education Training (TVET) holds the key to building this type of workforce. A report produced by the World Bank, "Demand and Supply of Skills in Ghana"⁶, describes the technical and vocational skills development system as a system with an adverse cycle of high costs, inadequate quality of supply and low demand, leading to further declines in financing, supply and demand. If Ghana is to capitalize on the employment and economic opportunities that are associated with the Extractive Industries, there needs to be improvement in the skills training sector and a direct correlation between the needs of Industry and relevance and quality of training provided by the TVET sector.

Saskatchewan Polytechnic was contracted by Global Affairs Canada to conduct a detailed analysis of the needs, skills and employment requirements of the Extractive Industries operating in Ghana. The needs assessment provides analysis of the Ghana's TVET sector and its relevance to the needs of the Extractive Industries operating in the country. Through meetings with various stakeholder within the skills training sector: Government, Industry, NGOs, public and private skills training Institutions and international donors, the project completed a detailed analysis of the needs, skills and employment requirements of the Extractive Industries operating in Ghana. In conjunction, the project conducted an analysis of the current TVET system, in Ghana, both public and private, and assessed the capacity, quality of resources, instructor availability and capacity, standard curriculum used and available, student benchmarking and infrastructure. The analysis reveals the gaps that exist in the current TVET system, and identifies where interventions can be made to improve and make the system more relevant to the needs of Industry, while contributing to the economic prosperity of Ghanaians.

Saskatchewan Polytechnic

Saskatchewan Polytechnic ([website](#)) based in Saskatoon, Saskatchewan, Canada, serves 26,000 distinct students through applied learning opportunities at four campuses and through extensive distance education opportunities programs that serve every economic and public service sector. As a polytechnic, the organization provides the depth of learning relevant to employer and student need, including certificate, diploma and degree programs, and apprenticeship training. Saskatchewan Polytechnic delivers 185 programs in Business,

⁶ P.Davars & R. Palmar (2013) "Demand and Supply of Skills in Ghana" [Online]. Available: <http://elibrary.worldbank.org/doi/abs/10.1596/978-1-4648-0280-5> [March 2016].

Engineering, Trades, Mining, Nursing, Non Formal Education and Training, Basic Education, Health, Environmental Studies and International Services. Using a variety of delivery methods and the most modern and appropriate technology, Saskatchewan Polytechnic programming is employer-driven and focused on relevant skills training.

Saskatchewan Polytechnic has been involved in designing, delivering and managing international development projects for more than 20 years. Saskatchewan Polytechnic's experience internationally is diverse, sometimes helping countries establish market-focused, post-secondary systems, and more recently entering into partnerships that allow professionals overseas to access Saskatchewan's world-class training.

In Ghana, working through Global Affairs (formerly Department of Foreign Affairs Trade and Development (DFATD)&Canadian International Development Agency CIDA) , Saskatchewan Polytechnic played important roles in supporting the development of Accra Polytechnic, Kumasi Technical Institute, Tamale Polytechnic and, most recently (2005/10), the Wa Polytechnic. Lead by CPI Training ([website](#)), Saskatchewan Polytechnic has been delivering the Saskatchewan Polytechnic Welding training and certification at both Newmont Ghana Gold LTD's Ahafo and Akyem mine site over the past five years. The provision of Saskatchewan Polytechnic welding training is in line with Newmont's Corporate Social Responsibility mandate for Ghanaian operations of developing skills capacity of local nationals at both Ahafo and Akyem mine sites.

Needs Assessment Implementation Approach

Goal

To provide detailed information and analysis on the Extractive Industries' real job requirements and a detailed analysis of a cross section of the Ghanaian skill training sector: facilities both private and public, capacity of instructional resources, and curriculum standards and credential requirements by conducting a Needs Assessment through a team of Subject Matter Experts (SMEs).

Objectives

1. Analysis of the gaps in the TVET sector in Ghana as it relates to the needs of the Extractive Industries.
2. Recommendations for a sustainable strategy for skills training reform in Ghana to support the Extractive Industries.

Approach

Data was collected for this Needs Assessment through a variety of public sources and other documentation obtained directly from Ghana. However, the majority of the data collected was obtained through an extensive interview process conducted in Ghana over a twenty-two day period from February 5 through February 26, 2016. A three-member team lead by

Saskatchewan Polytechnic and two consultants from CPI Training travelled to Ghana over this time period and met with individuals from ten vocational schools, thirteen companies within the Extractive Industries (i.e. mining and oil & gas), four Non-Governmental Organizations (“NGO’s”), and two Ghanaian Government agencies.

In most cases, interviews were scheduled in advance with participants. These interviews were typically held with senior personnel (Ghanaian and expatriate) within each organization. All individuals either had direct responsibilities in the hiring, training, or operational areas of their respective organizations or had oversight or expert knowledge of the Ghanaian TVET system. A series of interview questions were also developed in advance, which were used as a guide during the interview process (see Appendix 2). This approach provided forthcoming perspectives that were objective, specific, and directly comparable. The conclusions drawn and recommendations made in this Needs Assessment are based on careful review and analysis of all of the information gathered.

Needs Assessment

Industry Perspective

In general, all companies interviewed recognize that the existing TVET and Skills Training System does not meet their immediate needs of providing highly skilled trades' people and technicians. All companies interviewed would welcome immediate improvements to the system and most shared a common desire to be part of a long-term solution. However, Industry sees Government's previous lack of commitment to address the TVET system's problems as a barrier to sustained Industry participation. Industry needs this to change before it will commit to long-term collaboration. A long-term solution would require a realignment of priorities both in the way of funding by the Government and in the combined commitment of regulators, institutions, and Industry to push the required changes forward.

Through discussions with each of the participating companies, a number of common themes have emerged.

Companies interviewed agree that a competency based training (CBT) model should be taught at the vocational institutions. However, they believe that most vocational schools have not adopted this model and that most schools are using antiquated curriculums. In addition, the focus of the training received by students at vocational institutions is on theoretical aspects rather than on practical applications. Many companies view this to be due in part to a lack of lack of consumables but also due to a lack of practical skills of instructors themselves.

Companies interviewed were clear in their requirement for competent graduates with a much wider and more current practical skill set than those presently coming out of the vocational system.

Regarding the specific capabilities of students of vocational institutions (whether they be from public or public-private-partnership "PPP" institutions), graduates often lack the hands on practical skills that are essential for employment within the Extractive Sector. In fact, it was widely reported that technical program graduates barely have a basic relevant skill level. A similar situation is observed with students that are still completing their training, in that, these students are not sufficiently skilled consistent with their duration of study. This results in the need for Industry to undertake extensive and relatively expensive re-training programs in order to upgrade these students to a required skill level.

Companies' re-training programs have been established in one of two ways. The first is by establishing in-house training centres, complete with fully equipped classrooms and labs, custom designed curriculums, and hiring and retaining competent instructors. The second is by sending key employees abroad for similar vocational training. In general, both methods have been successful for companies however; the associated costs tend to be very high. Companies

recognize that unless the TVET system can be improved there is no alternative other than to continue their re-training programs. They also recognize that such programs are not sustainable and are not in the best interests of improving Ghana's TVET system in the long term.

Companies consistently noted the misguided belief among graduating students that the mere possession of a trade certificate is sufficient proof of qualification to work as a skilled tradesperson within the Extractive Industries. This creates significant problems on the jobsites. This problem appears to stem from a lack of qualified instructors and substandard practical teaching methods at the vocational institutions.

None of the companies interviewed appear interested in starting their own private training schools or in directly funding schools within the existing vocational institutions. Those that have started institutions of their own have either scaled them back considerably or, as in the case of and the Jubilee Field Equity Partners who currently fund the Jubilee Technical Training Centre at Takoradi Polytechnic, are ending their direct funding support reportedly by 2017. The mining Industry in particular reports that the costs for such ventures are simply too high for the benefit received.

Several companies noted challenges in retaining their skilled employees. This appears to be a systemic problem across all of the trades considered in the needs assessment. It is certainly not an uncommon phenomenon in the western world. However, it is a greater problem for the Extractive Industry in Ghana because of the considerable effort and high cost for companies to train their employees in the first place combined with the general lack of skilled tradespeople available within the local workforce. Industry sees benefit in developing a larger pool of skilled trades from which to draw from.

Most of the companies interviewed had a relatively small percentage of women working for them. This appeared to be due to cultural norms in that women are typically not attracted to the Extractive Industries in general and even less to the vocational trades required by the Extractive Sector. However, the companies interviewed reported no bias against hiring women in these capacities. This is consistent with Ghanaian law and with the general practices of companies operating in many jurisdictions around the world within the Extractive Industries. Of the companies interviewed, their more pressing concern is in being able to hire technically competent individuals regardless of their gender.

Industry is not convinced of COTVET's ability to deliver on their stated mandate of stewarding Ghana's TVET system in its current form. This includes the ability to provide qualified instructors, the ability of instructors to teach to relevant curriculums, and the certification of qualified graduating students. In addition, Industry is fully aware of the inabilities of most

institutions to provide modern equipment as well as major deficiencies in practical teaching methods, mainly centered on the lack of consumables.

Industry's view is that there are insufficient checks and balances within the Ghanaian vocational education system and that there is a lack of commitment on the part of institutions, and especially Government, to effect real change. A long-term solution requires a paradigm shift in thinking at the Government policy-maker level. Government must make vocational training a long-term funding priority that involves Industry as a partner in the process.

Industry is unwilling to provide long-term direct funding to the Skills Training/TVET system and sees this as the exclusive responsibility of the Government. This is of course similar to the Canadian model wherein Industry also does not provide long term funding but they may provide lump-sum payments for scholarships and/or contributions for new labs and equipment from time to time. However, the companies interviewed noted they have never been approached, by either Government or the vocational institutions themselves in any such fundraising initiatives.

Industry in Ghana appears ready and willing to lend its support and expertise to improving the system provided it has meaningful input into the learning outcomes and if Industry sees real effort by Government regulators to engage with them. Potential Industry contributions include in-kind funding via apprenticeship programs, by providing expert instructors on a temporary basis, by providing used equipment/consumables, and by clarifying any strategies they may have adopted to increase the numbers of women in the Extractive Industries. Under the right circumstances, companies may be willing to provide "seed funding" to certain programs, equipment, or other infrastructure upgrades.

Consistent with the views of both Government agencies and institutions, Industry sees itself playing an active and critical role in the establishment of competency based curriculum, accreditation of graduating students, and the development of recognized standards. An appropriate way to provide this input would be through advisory boards in collaboration with institutions and Government regulatory agencies.

Industry recognizes that the TVET system is extremely underfunded in its current form. A significant improvement in funding levels is required by Government in order for the TVET system to meet the needs of Industry. Some companies interviewed were aware of recent donations of equipment made to certain technical institutions and polytechnics. These are seen by Industry as important investments. However, several of the companies interviewed noted that these investments do not appear to be coordinated across all of the schools and so equipment may not be deployed where it can provide the best benefit. Industry is also concerned with the systemic lack of funding for consumables and for instructor training.

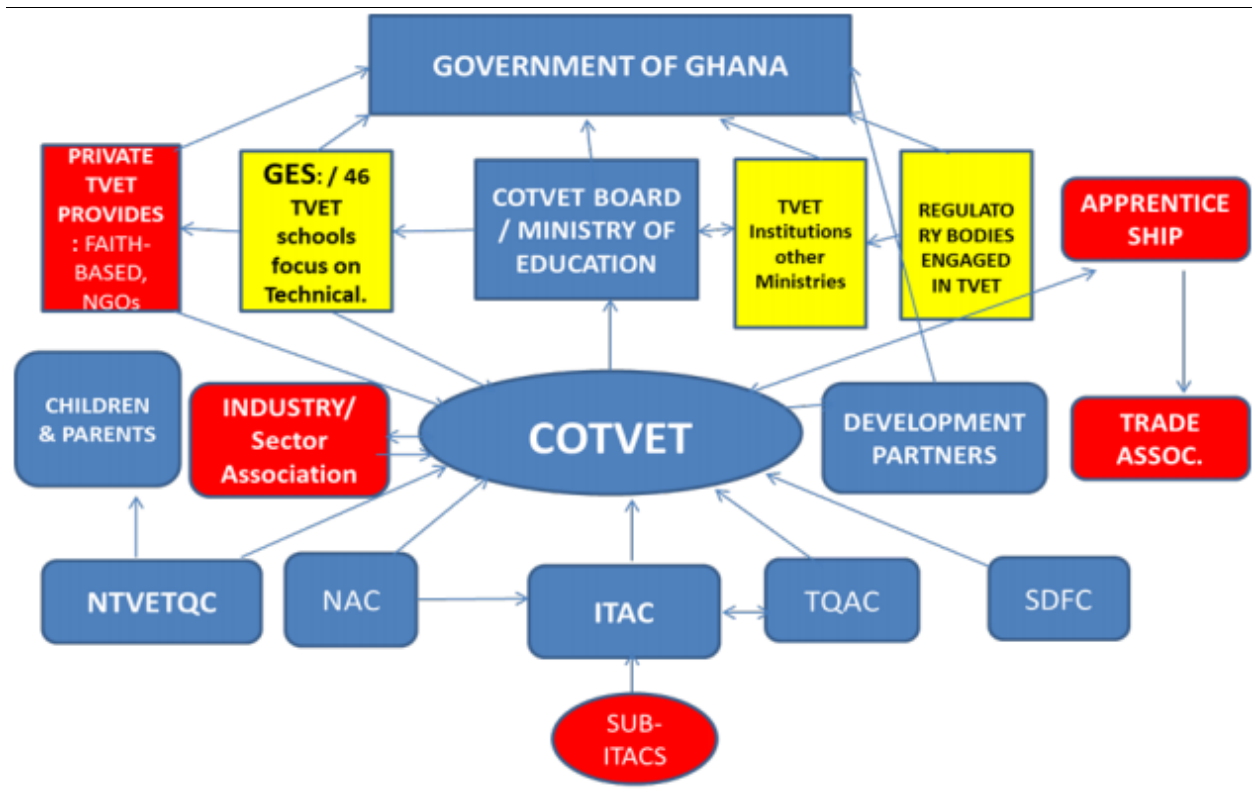
In summary, Industry's perspective is that the vocational system has a number of serious deficiencies, however; with the right approach, they could be resolved. Vocational institutions are required to have modern equipment, sufficient consumables on-hand to allow adequate

practice time and highly skilled competent instructors (ideally with several years of diverse Industry experience) teaching to accredited and relevant course materials. Industry desires a more accountable, transparent, and competent regulatory agency oversight of the TVET system including the abilities of instructors, the quality of the institutions and lab equipment, and independent accreditation of qualified program graduates. In addition, Industry believes strongly that it is a requirement for them to participate directly in the development of relevant competency based curriculum and the establishment of recognized standards.

Ghana Skills Training Sector Analysis

Ghana's Technical Vocational Education and Training (TVET) Structure

The Government is the largest provider of TVET in the country. The Ministry of Education (MoE) is responsible for the administration and the coordination of education in Ghana, and TVET is coordinated through COTVET, a department under the MoE. The MoE has multiple agencies, which handle the concrete implementation of policies. The Government also manages the training of teachers notably the University of Education, Winneba located in Kumasi. The College of Technology Education located at the University of Education trains and certifies instructors at Polytechnics and Technical Training Institutions. The complex inter-relationships between the MoE and its agencies are shown in the figure below.



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There are more than 200 public TVET institutes, including 45 technical training institutes (TTIs) under the MoE, 116 vocational institutes under the Ministry of Employment and Labor Relations (MoELR) (including National Vocational Training Institutes [NVTIs], Integrated Community Centers for Employable Skills [ICCEs], Social Welfare Centers, and Opportunities Industrialization Centers), and the remainder under different ministries. Public institutional TVET providers can be found in all 10 regions of the country.⁸ For the purpose of this needs assessment, the project team focused on the regions of Accra, Takoradi, and Kumasi due to their locations relative to Extractive Sector.

The TVET sector in Ghana has been criticized for its lack of coordination and harmonization, because TVET is provided by a number of ministries and agencies. According to the World Bank Report, it was suggested that despite the creation of COTVET, the agency implemented to bring coordination to the TVET sector, there are still major information gap in the system, and it suggest that COTVET does not have a clear understanding of the situation.

⁷COTVET – GHANA COUNTRY REPORT ON TVET/TVSD (AS PER THE ICQN OUTLINE)
http://www.adeanet.org/portalv2/sites/default/files/icqn-tvsd_contribution_ghana.pdf

⁸ P.Davars & R. Palmar (2013) "Demand and Supply of Skills in Ghana" [Online]. Available:
<http://elibrary.worldbank.org/doi/abs/10.1596/978-1-4648-0280-5> [March 2016].

The following table provides an overview of the various ministries responsible for various TVET institutions.

Ministry	Number And Type of Institution
Ministry of Education	37 Technical Institutes
Ministry of Employment and Social Welfare	38 Vocational Training 3 Opportunity Industrialization Centres (OICs) 9 Leadership Training 9 Social Welfare Centres, Voc 75 Integrated Community Centers for Employable Skills (ICES)
Ministry of Trade and Industry	9 Technical and Vocational Training
Ministry of Agriculture	3 Agricultural Training
Ministry of Road and Transport	1 Technical Training
Ministry of Local Government	26 Community Development Centres (CDC)
Ministry of Tourism	Hospitality Schools
Ministry of Communications	ICT Schools
Ministry of Youth and Sports	11 Leadership Training Centres

Formal and Informal Systems

Ghana's TVET system is comprised of the following: non-formal system and the informal system as well as Ministries, Departments and Agencies, all coordinated by COTVET. During the needs assessment the team was able to observe one or more of these systems.

- The formal system includes primarily time-bound, institution-based, graded, and certified training. It is offered by institutions such as the NVTI (National Vocational Training Institute), Ghana Education Service (GES), youth training institutions and a variety of private vocational training schools.
- Non-formal TVET typically has structured learning objectives, learning times and learning support but will normally not lead to certification. Workshops, short courses and seminars are typical examples of non-formal learning.
- The informal system includes a wide range of flexible programs and processes by which individuals acquire skills and knowledge from designated training venues outside of the home and, in some cases, at home. Traditional apprenticeships make up the majority of the informal sector. Indeed, Ghana has a long tradition of informal apprenticeships, particularly in the following trades: carpentry, masonry, auto-mechanics, welding and fabrication, electrical wiring and repairs and other trades not related to the Extractive Industries.⁹ The informal sector lacks coordination and standardization.

⁹E. Bortei-Doku Aryeetey, D. Doh and P. Andoh, [2011] "From Prejudice to Prestige: Vocational Education and Training in Ghana" [Online]. Available: <http://www.skillsdevelopment.org/pdf/Vocational-education-in-Ghana-research-report.pdf> [2016, March]

COTVET

In 2006, COTVET was established to better co-ordinate and oversee all aspects of technical and vocational education and training in the country, and to designate the coordination of TVET to one body, versus numerous cross-departmental responsibility for the delivery of TVET. Please see Appendix 4 for a full description of COTVET's structure. The objectives of the COTVET are to:

1. Formulate national policies for skills development across a broad spectrum of pre-tertiary and tertiary education, formal, informal and non-formal.
2. Coordinate, harmonize and supervise the activities of private and public providers of technical and vocational education and training including the informal sector.
3. Rationalize the assessment and certification system in technical, vocational education and training.
4. Take measures to ensure the quality in delivery of and access to technical and vocational education and training.
5. Maintain a national database on technical, vocational education and training.
6. Facilitate research and development in the technical and vocational education and training system.
7. Source funding to support technical and vocational education and training activities.
8. Facilitate collaboration between training providers and Industry to promote demand driven curriculum development and placement, and, national internship programs.
9. Promote cooperation with international agencies and development partners.
10. Issue annual reports on the state of skills development in the country.
11. Advise Government on all matters related to the management and improvement of the technical and vocational education and training system.
12. Perform any other functions that are ancillary to the object of the Council.¹⁰

With the exception of DANEST Engineering, and the University of Education (As a University it falls under jurisdiction of the MoE), all the other institutions visited fall under the jurisdiction of COTVET. Although the Jubilee Technical Training Centre was established by Industry (by the Jubilee Field Equity Partners), it is our understanding that the Centre will be handed transferred to Takoradi Polytechnic in 2017.

COTVET mandated is to oversee all aspects of TVET in the country and serve institutions under 12 ministries and its board is co-chaired by the MoE and Ministry of Science, Technology and Innovation. It is the opinion of many stakeholders that COTVET is constrained in its supervisory role given that institutions it oversees are also directly under the supervision of various ministries departments and agencies. Further, COTVET is viewed as an MoE entity versus a cross-ministerial entity, which has been noted to cause tension.

¹⁰<http://www.cotvet.org/new/index.php>

It was made clear that despite the creation of COTVET, the overall coordination of all the parts of the TVET system is still fragmented. It is imperative for reform to be effective that all the major Government stakeholders responsible for TVET unite their efforts, resources and skills, and work together to drive change within the system. Only when there one coordinated approach, can real reform take hold.

Financing of TVET

The public TVET system in Ghana is severely underfunded. Observed obsolete and inadequate training equipment and tools, lack of training materials, inadequate number of qualified instructors with requisite Industrial practical experience, lack of linkage between training institutions and Industry, and lack of relevance of institutional training to the needs of Industry are all a result of inadequate funding to the system.

On average, for the past decade, TVET funding has accounted for less than two percent of Ghana's education sector's annual budget. Comparatively, Canada spends approximately thirty percent of its education budget on TVET education. The funding allocations for TVET in Ghana do not reflect that it is priority for the Government. The World Bank notes that the main financing issue is that at the level of the institution, "...public TVET funding in Ghana is based on enrollment numbers and historical allocations, with no official mechanism to offer financial incentives to better performing departments or staff".¹¹ Coordination issues that exist within the system are affecting the financing of TVET in Ghana; with significant resources being spent by the Government on TVET activities that are not coordinated with COTVET, and largely operate independently of the main TVET-delivering ministries, departments, and agencies.

The financing issues within the TVET system are outside of the scope of this project. However, significant-funding interventions and coordination in the system must occur if Ghana is to reform TVET system.

TVET Policies for Women

The Government of Ghana has initiated several policies and projects to integrate gender equity into the TVET system. These initiatives include:

- ***Gender Responsive Skills and Community Development Project (GRSCDP)***: The GRSCDP under the Ministry of Women's and Children's Affairs is tasked with promoting girls in non-traditional professional trades. The program gives scholarships to girls to enroll in a skilled trade program. The program pays for 100% of the expenses. In addition, the program has allocated a number of computers to the technical schools to ensure that the girls receive upgraded training.

¹¹ P.Davars & R. Palmar (2013) "Demand and Supply of Skills in Ghana" [Online]. Available: <http://elibrary.worldbank.org/doi/abs/10.1596/978-1-4648-0280-5> [March 2016].

- **Women in Technical Education Department (WITED):** WITED is under the auspice of the Ghana Education Service that is under the Ministry of Education. This department, focusing on women in technical education, assists girls in technical schools and links them with women in technical fields. They work in all 10 regions and their respective districts.
- **Girl's Education Unit (GEU):** GEU was formed as a unit within the Basic Education Division in the GES to give new emphasis to the removal of barriers to girls' education (Atakpa, 1995). The coordinating role of the GEU is to facilitate, network, influence, focus, plan and evaluate, and collect and disseminate data and good practices. The GEU has a director, staff, and decentralized network of regional, and district personnel in the regions and districts. In addition, the GEU works with a group of community facilitators who conduct mobilization and sensitization activities in communities and provide follow-up with families in support of girls' education.¹²

Ghana's education policies do not discriminate against a person due to their gender, and formally, there has been commitment to improving gender parity in TVET, as noted above. Despite this, women still suffer the disadvantages of nonparticipation in education due to unwritten policies and mindsets. As noted in "Women in TVET: Input into Ghana's COTVET Gender Strategy Dialogue" analysis of gender issues: cultural, social, or political is necessary to bring to the forefront strategy formulation to move women forward. There is an urgent need for binding and unified strategies of all stakeholders of TVET, as well as the enforcement of existing policies and legislature for gender equality. Further, Industry plays a critical role in influencing TVET. Governments need to demonstrate more political will to convince the Industry about the necessity of gender equality. The skills shortage in the Extractive Industry represents an opportunity for Government and Industry to work in tandem to increase training and work opportunities for women in Ghana.

Skills Training Institutions

The team visited ten training facilities over a three-week period: three public Technical Training Centers, three public Polytechnics, two Universities, one private/public Technical Training Centre, and one private Training Centre. Institutions visited included (please see Appendix 1 for a complete listing):

- Accra Technical Training Centre - Accra
- Accra Polytechnic - Accra
- Regional Maritime University - Tema
- Takoradi Polytechnic - Takoradi

¹² G. Morgan (2013) "Women in TVET: Input into Ghana's COTVET Gender Strategy Dialogue" [Online] Available https://www.academia.edu/4351797/Women_in_TVET_Input_into_Ghana_s_COTVET_Gender_Strategy_Dialogue [March 2016]

- Jubilee Technical Training Centre - Takoradi
- Takoradi Technical Institute - Takoradi
- DANEST Engineering Co. Ltd (a private welding and testing center) - Takoradi
- Kumasi Technical Institute - Kumasi
- Kumasi Polytechnic - Kumasi
- University of Education, Winneba – Kumasi

For the context of this project the needs assessment focused on the following specific industrial trades, which were highlighted by Industry as in high demand:

- Mechanical Maintenance (Millwright)
- Welding
- Electrical
- Instrumentation

The assessment revealed that the current skills training/TVET system is not capable of delivering quality and relevant industrial training at the level required by the Extractive Industries. The absence of Industry engagement, practical and demonstration based curriculum, appropriate equipment, consumables, and instructors with relevant Industry skills, are lacking and provide Industry with little or no confidence in the system. The challenges observed include:

- 1) Lack of modern equipment to deliver effective training
- 2) Lack of consumables to deliver effective training.
- 3) Instructors lack practical Industry experience required to train at the level required by Industry.
- 4) Inadequate instructor compensation to attract and retain quality technical trainers.
- 5) Lack of engagement with Industry in course and program development
- 6) Instructors do not have the industrial experience needed to train to the level Industry requires.

Curriculum

In Ghana, the Ministry of Education prepares all curricula. COTVET, through the Ministry of Education, oversees curriculum development for both the Technical Institutions and Polytechnics. In 2011, COTVET embarked on developing, Competency Based Training (“CBT”). This assignment has been delegated to the Centre for the Development of Competency Based Curriculum at the University of Education Winneba. Currently ten trades are undergoing curriculum development using CBT.

Within the vocational education system, CTB refers to outcomes-based, Industry driven education, and training programs that reflect the needs of Industry. CBT is a key element in the vocational education sector in Canada. The high level of employment rates of TVET graduates in

Canada is a reflection of the benefits of CBT to graduates and Industry. CBT focus on what a student is expected to be able to do in the workplace as opposed to just having theoretical knowledge. It is therefore a training program which ensures that learners have the necessary knowledge, skills, and attitudes or values for employment.

The move towards CBT is a step in the right direction. However, based on the observations of the team, its development and implementation will be a challenge for COTVET. To be successful, CBT represents requires significant and ongoing investment. With an emphasis on hands-on practical learning, CBT is more expensive to administer, since learners must have access to Industry standard equipment and consumables during training. It also requires instructor skills to remain to be updated and maintained. Industry engagement and validation is a key to CBT success. Newly developed CBT needs to be validated and tested by Industry to ensure that graduates have the skills to meet the needs of Industry.

Since the CBT curriculum remains under development the project team was unable to review the details of the curriculum. They were able to review six currently used trade curriculums. The curriculums and syllabuses reviewed are well written with respect to their structure. Learning outcomes, steps, activities are all clearly stated with instructor resources and materials are laid out on a module bases.

However, major deficiencies have been identified. Firstly, the curriculum demonstration based learning is weighted towards lecture and theory versus practical application, a necessary application for trades training. This can be attributed to the fact that training institutions are extremely underfunded and lack capital equipment and consumable resources required to deliver practical training. Secondly, there is no systematic engagement of Industry in the development and validation of the curriculum. After reviewing the content of the curriculum, it is apparent that it does not address or reflect the needs of Industry, which is the aim of vocational/skills training in employment. TVET curricula, programs and training need to be linked to the needs of Industry, and by extension, the job market. Currently, this is the most significant drawback in the curriculum developed for TVET in Ghana.

The following chart demonstrates how Ghana's certification systems for the trades compares internationally:

Table 1: International certification comparisons for Canada, Australia, Germany, UK, and USA.

Certifying Country	Certificate Issuing Body	Certificate Title	Comparable Certification Framework to Canada*	Work Experience Requirement**	Written Exam Requirement	Practical Exam Requirement	ASME Code or Equivalency
Canada Red Seal	P/T Jurisdictions	Journeyperson Welder	----	5 years	✓	✓	✓
Australia	National Standard	Journeyperson Boilermaker/Welder First Class welder	✓	4 years	✓	✓	✓
Germany	State Certificate	Journeyman or Craftsman Welder	✓	4 years	✓	✓	✓
United Kingdom	City and Guilds	Journeyman or Craftsman Welder	✓	4 years	✓	✓	✓
United States of America	Union/ Employer	Journeyperson Welder (Not formal designation)	X	3 - 4 years	✓	✓	✓
Ghana	COTVET	Welding Certificate	X	Annual 2-month Industrial Attachment	✓	✓	None

* Dependent on Provincial and Territorial jurisdictions.

** Tradesperson hours for Canada shows the maximum non-apprentices would have to work (Newfoundland); an Ellis Chart¹³ would find only apprentice term hours/years, which are all shorter than 5 years. Note: BC Industry Training Authority's International Comparison of Training and Certification Systems for Red Seals Trades report (2009) benchmarked 15 countries against 46 key indicators of the Red Seal program and found: Australia met 89% of the criteria, Germany met 85% of the criteria, UK met 76% of the criteria and USA met 59% of the criteria

¹³ <http://www.ellischart.ca/home.jsp?lang=en>

Instructors

Instructors at Technical Institutions and Polytechnics are required to take one year of teacher training at either one of the two public teaching training colleges or at a private college. The University of Education reported that during the technical teacher training the students receive additional shop and lab opportunities to hone their skills prior to being assigned by the Ghana Education Service to an Institute. However, after reviewing the shops they were in the same state as the Technical Institutes and were lacking modern equipment and consumables required to properly train to Industry standards.

At every institution, the team met instructors and administrators. In all cases, instructors and administrators were found to be student-focused and dedicated to providing and delivering quality instruction given the difficult circumstances they operate under. The staff's commitment to education was demonstrated by the pride and enthusiasm they displayed throughout the duration of the visits. However, at every institution visited, instructors and administrators commented that a lack of modern equipment and consumables was a major challenge to addressing the needs of Industry. At one institution it was noted that the total student expenditure for consumables is 10 CEDIS per term (the equivalent of approximately CAD\$ 3 per term). COTVET is trying to address lack of equipment through a major investment from the World Bank, and the team saw new equipment being installed in a few institutions, however access to consumables budgets remains a major issue.

Interviews revealed that instructors had little or no Industry experience. In Canada, significant and relevant Industry experience is a requirement for instructors of vocational education. As in Canada, the TVET salaries and compensation cannot compete with Industry, making it difficult to recruit and retain highly skilled instructors in Ghana. In addition, there is little or no opportunity for instructors to upgrade their skills to remain up-to-date of changes in the technology in use by Industry.

Lack of skilled instructors, combined with shops and labs, which are under equipped, with very little in the way of consumables, results in the majority of instruction delivered by lecture or theory. Only a small percentage of time appears to be devoted to practical application. The lack of practical learning opportunities is reflected in the quality of graduates produced. Industry stakeholders noted that the majority of graduates they observe, lack not only high-level practical skills, but also basic practical skills to function in their respective trade.

Mechanisms that offer instructors opportunities to engage with Industry to upgrade their skills, would greatly improve the quality of instruction. A sustainable commitment from Government is needed, to properly fund the entire system. It is lacking at every level including equipment at the schools themselves, salaries for and retention of qualified instructors, and materials for students to obtain their practical experience.

No female skilled trade instructors were observed at any of the facilities visited. Further research revealed that in 2011/12, females represented 18 percent of the total teaching staff at

public vocational schools in Ghana. Of that 18 percent, it can be assumed these teachers were responsible for teaching programs for traditional female occupations. If gender equity in TVET is a priority of the Government, increasing the number of female instructors in non-traditional occupations is a first step to achieving that goal.

Infrastructure and Facilities

Government funding, in fact funding of every kind, is deficient at all of the public institutions visited. In particular, there is virtually a complete lack of consumables available at schools and/or the funding for them almost non-existent. Given their limited resources, the instructors still strive to provide the best education possible given the circumstances. With respect to equipment, each public school seems to have one, maybe two, areas that they are better equipped in than other schools (a good welding shop in one, a good machine shop in another, etc.). Combining and concentrating equipment between institutions might be one way to improve learning outcomes. In general, private institutions are much better equipped, staffed, and run. However, there was only one private school (in this case a very small specialty welding school) with adequate materials, and where students can practice welding skills.

In the report, “Women in TVET: Input into Ghana’s COTVET Gender Strategy Dialogue”, women surveyed described TVET institutions as masculine to the point of offense to women. “Some suffer violence, scornful language from fellow students and even trainers, the lack of separate toilet and leisure facilities, absent or costly transportation, inflexible timetables, and above all the lack of female teachers, trainers and management. Such conditions are considered to be hidden causes for the low involvement of women in TVET.”¹⁴ To encourage women to participate in TVET, TVET institutions need to be designed to be gender inclusive, which requires the supply basic facilities accommodating women, such as separate washrooms, change rooms, a safe and sure learning environment, additional transportation and female trainers and teachers. Of all the intuitions observed, gender inclusiveness was not a priority.

Of the vocational schools visited, only a few were in a position to deliver a program to Canadian standards, or that could meet the needs of Industry. Below is an overview of facilities well equipped to deliver Canadian Industry training to Industry standards.

¹⁴ G. Morgan (2013) “Women in TVET: Input into Ghana’s COTVET Gender Strategy Dialogue” [Online] Available https://www.academia.edu/4351797/Women_in_TVET_Input_into_Ghana_s_COTVET_Gender_Strategy_Dialogue [March 2016]

Ghana TVET Facilities Overview Based on Ability to Deliver Training To Industry Required Standards

School	ACCRA / TEMA Region			TAKORADI REGION				KUMASI REGION		
	Accra Technical Training Centre (ATTC)	Accra PolyTechnic (AP)	Regional Maritime University (RMU)	Takoradi Polytechnic (TP)	Jubilee Technical Training Centre (JTTC) at Takoradi Polytechnic	DANEST Engineering Company Ltd (DANEST)	Takoradi Technical Institute (TTI)	College of Technical Education Kumasi (COLTEK) ⁽⁴⁾	Kumasi Polytechnic (KP)	Kumasi Technical Institute (KTI)
Location	Accra	Accra	Accra/Tema	Takoradi	Takoradi	Takoradi	Takoradi	Kumasi	Kumasi	Kumasi
Date Visited	10-Feb-16	11-Feb-16	12-Feb-16	15-Feb-16	15-Feb-16	15-Feb-16	16-Feb-16	21-Feb-16	21-Feb-16	22-Feb-16
School Type	Technical High School ⁽³⁾ (Pre-Tertiary)	Post Secondary Polytech	Post Secondary Polytech	Post Secondary Polytech	Post Secondary Polytech	Private Training Provider	Technical High School ⁽³⁾ (Pre-Tertiary)	Post Secondary Polytech	Post Secondary Polytech	Technical High School ⁽³⁾ (Pre-Tertiary)
Public, Private or Combination	Public	Public	Private	Public	Public-Private Partnership ⁽¹⁾	Private	Public	Public	Public	Public
Program:										
Welding	Yes	No	Yes ⁽²⁾	No	No	Yes	Yes ⁽²⁾	No	No	No
Electrical	No	No	Yes ⁽²⁾	No	Yes	No	Yes ⁽²⁾	No	No	No
Instrumentation	No	No	Yes ⁽²⁾	No	No	No	Yes ⁽²⁾	No	No	No
Mechanical	No	No	No	No	Yes	No	Yes ⁽²⁾	No	No	No

(1) Developed with private funding from Jubilee Field Partners but will revert to Takoradi Polytechnic stewardship in 2017

(2) Equipment purchased but yet to be commissioned; not visually inspected

(3) Pre-tertiary technical high schools acting as "feeder schools" for the Polytechs or direct to Industry

(4) Technical Teacher Training College within the University of Education, Winneba

As discussed, COTVET is attempting to address the challenge of inadequate equipment and facilities. However, there does not appear to be a systematic funding approach, beyond donor funding, developed or undertaken to ensure equipment and facilities are continuously renewed and upgraded. Further, there appears to be no plan to ensure that schools have appropriate funding for consumables and materials necessary to deliver practical training.

A concerning tendency at the majority of institutions was a lack of safety standards and culture. In many cases, shops and laboratories and shops had either none or inadequate safety and protective equipment available for students and instructors. Students were observed wearing sandals and running shoes, versus steel-toed boots. In welding shops, students were not supplied masks, and when they were, they were often faulty. Significant intervention is needed including adequate funding and training to improve safety standards in the TVET sector.

It is clear that there is currently a lack of funding for institutions to be able to supply every student with Personal Protective Equipment (PPE). Further, students often do not have the resources to obtain their own PPE. This is obviously a need for the institutions to address. The Extractive Sector has a strong safety culture and it is critical that technical institutions align themselves with the culture that is expected on the job site. Regardless of the resource

restraints for PPE, culture starts with education. In conjunction with COTVET, a TVET wide safety program is recommend to be developed and implemented within every industrial trades training program being delivered.

Student Assessment

Given that the field visits overlapped a school holiday period, access to students was limited. Of the discussions with students that were held, students tended to have a good opinion of their instructors' knowledge and teaching abilities. However, they reported that most of their training was spent in lectures and so was theory-based with comparatively little practical lab work. Consumables, lack of equipment & tools, and other infrastructure issues (i.e. lack of electrical power) were noted by students as their key concerns at the schools.

There were few or no female students observed at any of the schools during the assessment. This may be due to the fact that females account for less than 15% of the enrollments in technical trade programs (welding, fabrication, mechanics, carpentry, plumbing)¹⁵ As mentioned, previously COTVET and the Government of Ghana have developed specific policies and programs to increase female participation in non-traditional occupations. However, there appears to be little in enforcement and monitoring of these initiatives, resulting in continued low enrollments of females.

The result of this limited practical content is reflected in the concerns of Industry in that students and graduates of Ghana's TVET system lack the required Industry-relevant practical skills necessary to enter into employment in their respective fields of training. As described elsewhere in this report, Industry has resorted to relatively expensive upgrader courses for these employees in order for them to obtain the skill sets they require. Industry reports that it is often not receiving technical program graduates with competencies in essential skills such as reading, writing, mathematics, etc. The lack of essential skills may be due in part to the streaming of students into the vocational system. Students who perform poorly academically are often streamed to the TVET schools. Deficiencies in essential skill levels related to the TVET system is an area for further investigation.

It should be reiterated that the insufficient supply of consumables, training materials and basic tools by the institutes, significantly hinders the ability of students to obtain practical experience and relevant skills required by Industry. To address the lack of these needed technical training requirements the institutions typically rely on "Industrial Attachments", or voluntary work placements, to achieve the practical component of their course content. Relying solely on Industry to provide practical training can be an ineffective way of delivering the overall practical competencies in the curriculum, as Industry is generally self-serving of their own needs. Those companies who had participated in the Industrial Attachment program noted that ill-prepared students were often relegated to sanitation or cleaning related work, versus gaining practical experience in their respective trade.

¹⁵ http://www.un.org/en/ecosoc/newfunct/pdf/vpd_undcf.pdf

If students are well prepared for employment with existing practical skills, Industrial Attachments can be useful in providing students an opportunity to develop their practical skills, know-how and understanding necessary for employment in a particular occupation or trade. However, it should be noted that most of the training institutions showed little follow-up with students, in addition Industry may not recognize the value that these Industrial Attachments could have for both students and themselves. Without proper training of students, including significant hands-on practical training, prior to work placements, the value of Industrial Attachments cannot be realized.

Industry Engagement

Polytechnics and Technical Institutes around the world tend to have difficulty keeping up with technology used by Industry. Upgrading equipment in shops and laboratories to reflect the technology used by Industry will always be an ongoing requirement. However, based on the antiquated equipment observed in many of the schools visited, it is a much greater problem in a developing nation such as Ghana.

International post-secondary Institutions have tried to address this challenge by the establishment of active Industry engagement departments with well-developed communication strategies. Industries typically respond positively to requests for help and are generally willing to make significant contributions to post-secondary institutions, often through financial contributions for equipment and new building campaigns. This is due in part to the fact that the international programs delivered meet Industry standards and Industry is the beneficiary of this investment through the recruitment of the graduates. Therefore, there is an incentive for Industry to provide direct or in-kind contributions to the institutions.

In Ghana, equipment has been donated to some of the institutions visited by various foreign development organizations. These donations were generally organized through the efforts of COTVET and not by the Technical Training Centre itself. In some cases, schools have made direct requests to Industry for donations however, there is often no follow up and so it is likely that opportunities are missed. It appears that direct requests to Industry are ad hoc rather than strategic.

All schools rely on Industrial Attachments (work practicum) as the main source of providing practical hands-on experiences. An Industrial Attachment is not the same concept as an apprenticeship program in Canada. In an apprenticeship program, Industry and Institutions work together to determine the number of hours and practical experience in a particular trade to meet the projected needs of Industry. Industry participates in the process by agreeing to accept the students for specific a period and to provide those students with valuable and specific Industry experience. In the case of Industrial Attachments, there is little collaboration between the institutions and Industry. As a result, Industry accepts students “as they are able” and often the experience provided is not relevant to the student’s trade. The development of a more meaningful Industrial Attachment and/or apprenticeship program is needed.

An Industrial Attachment can be secured in three ways. The first is when Industry requests specific students from specific trades from the schools. The second is by students securing their own attachments themselves. The third and more common way is through an institution's industrial liaison department. Many of the schools visited have such departments and, in general, the numbers of staff members are dependent upon the student population (although at most schools visited these departments appear to be an understaffed department). In theory, Industry liaison officers are generally responsible for obtaining both Industrial Attachments for students and for following up with the participating companies and students during and after the attachment period is complete.

It was reported at one technical institute that the number of available Industrial Attachments over all trades is extremely low (only 5% of the students placed). Further, because of the sheer number of attachments and relatively low number of Industry liaison staff, some companies and students are not visited at all during their attachments. This is compounded by limited funding at the institutions resulting in lack of transportation for the liaison officers to be able to visit Industrial Attachment locations that might be in a remote location.

There was also little evidence of effective Industry advisory committees at the individual institutions to solve common problems. It would be ideal to have committees made up of key Industry representatives, school management, and Government regulators (COTVET). Some Industry engagement was observed at Kumasi Polytechnic, with various Industries participating in Industrial Attachments. However, such examples were rarely reported and there was no evidence of a coordinated effort to improve communication and collaboration between schools and Industry.

Many of the above problems could be addressed by establishing fully staffed development offices within the institutions with clear mandates to build relationships with and secure additional long term funding from Industry. Specific sponsorship programs could be promoted with companies for such things as "naming rights", for school labs that feature company-donated equipment, donations of materials/consumables, etc. These activities could be extended to target alumni within key Industries as a way to encourage additional Industry support. The institutions should explore each of these fund development areas further.

In addition, better collaboration and cooperation is needed between institutions and Industry regarding Industrial Attachments. Additional funding for scholarships should be explored with Industry. The establishment of advisory boards with consistent mandates to solicit and act on institutions and Industry's common concerns is also needed.

Organizational Development and Institutional Sustainability

Internationally, Continuing Education and customized offerings to Industry (Business Development) play an important role in the revenue generated by public institutions over and above those monies receive from Government for core funding of programs. Continuing Education courses and customized courses for Industry are offered on a cost plus basis.

All of the post secondary's visited offered Continuing Education programs, but there was no evidence and very little, if any, development of customized courses for Industry at the public technical Institutions and to some degree at the Polytechnics. There was no evidence of special interest courses being offered and marketed to the general public or customized courses developed to meet Industry needs. This may be due in part to the lack of equipment and consumables available in the shops and, given the significant deficiencies and lack of Industry relevance in core programs, these programs may be difficult to market. Nonetheless, they provide an opportunity for significant revenue generation, if the quality of programming can be ascertained, and area to be further developed. A side benefit of offering customized and special interest courses is additional revenue for instructors.

Polytechnics reported there was very little contact with alumni, community/Industry engagement, or fund raising activities sponsored by the Institution. Albeit Ghana is a poor country and the effort to raise monies from the community may not be successful. However, Industry has indicated a willingness to contribute more in the way of funding either direct or in kind via apprenticeship, providing expert instructors, consumables, etc., but only if there is a clear commitment that they are full participants in the development of curriculum and the deficiencies in equipment and instructor competencies at the institutions are addressed.

In most cases, Industry in Ghana had never been approached to support skills training institutions with equipment, consumables, Industrial Attachments, or any other donations. Conversely, Industry has not typically been proactive in engaging with either COTVET or the vocational schools themselves in identifying their needs. There appears to be a significant opportunity for Industry, COTVET, and the schools to engage with each other not only on the program development level, but also with fund raising initiatives.

In countries like Canada, every post-secondary institution has Development Office whose sole purpose is to reach out to Industry for support in the form of equipment and donations. The institutions realize that Industry is willing to engage in the development of education, however, Industry is preoccupied with managing their own operations. Consequently, these Development Office's play an important role in engaging Industry in getting involved in the post-secondary system in a meaningful way.

Government Perspective

Two Government entities were included in the needs assessment and their perspectives on the challenges facing TVET system are included below. These entities were COTVET and the Petroleum Commission of Ghana (“PCG”). Unfortunately, a meeting with the Mining Commission could not be convened due to the unavailability of key personnel at the Commission. In the case of COTVET three different meetings were held: one at the beginning of field visits prior to any discussions with Industry or any institutional visits, the second during the institutional visits in Accra, and the third meeting was at the conclusion of all field visits just before departing Accra.

The Petroleum Commission agreed that the TVET system is not meeting the technical needs of the Extractive Industry Sector. The Petroleum Commission has hard data through the tracking of work permit applications of the types of expatriate technical positions that are required by the Extractive Industry. They realize that very few Ghanaian technicians have the necessary skills and experience they require.

COTVET also realizes the TVET is not meeting the needs of the Extractive Industry. Technicians required by the Extractive Industry are highly skilled, using sophisticated equipment and processes that meet with international standards by which they must comply. The current TVET system, in its current form, cannot meet the needs of the Extractive Industry, especially in the trade areas.

Training of Ghanaians in these areas would provide the Extractive Industries with a pool of talent to reduce the number of expats entering the country and provide excellent employment opportunities.

COTVET

In general, COTVET shared many of Industry’s perspectives with the recognition that there is a lack of modern equipment, and consumables required to provide relevant training to meet the needs of Industry. They also recognized curriculum must be based on Industry-recognized standards, both of which needed to be developed in collaboration with Industry. They stated that they are working hard to address these challenges. Some of their on-going initiatives include:

- ***Ongoing review of the National Apprenticeship Program (NAP):***
NAP is a relatively small-scale program providing additional classes and services to only 1 percent of the 440,000¹⁶ youth involved in informal apprenticeship. NAP is poorly funded, and has not reached its potential.

¹⁶ P.Davars & R. Palmar (2013) “Demand and Supply of Skills in Ghana” [Online]. Available: <http://elibrary.worldbank.org/doi/abs/10.1596/978-1-4648-0280-5> [March 2016].

- ***The establishment of the Skills Development Fund (SDF):***
The objective of the SDF is to finance technical and vocational skills (and technology development) programs in prioritized economic sectors through a demand-driven mechanism that is managed by COTVET. The SDF was initially through donor funds, and would be recapitalized through an Industry levy. Since its establishment, there has been little or no progress on sustainably financing the fund.
- ***Ongoing development of CBT (10 trades):***
Progress has been made on the CBT for a number of trades. However, the Industry engagement component, essential to CBT appears to be lacking.
- ***Infrastructure development for Technical Institutions and Polytechnics nationwide:***
New equipment and infrastructure was witnessed at a number of schools visited. The financing of these initiatives was made possible through donor funding. There was no discussion regarding sustainable financing mechanisms for future upgrades.
- ***Capacity building for TVET instructors:***
Training workshops for TVET instructors in CBT have occurred. However, considerable training in CBT and upgrader training is necessary for the system to meet the needs of the Extractive Industries.
- ***Student Entrepreneurship Business Model Program:***
Administered under the Development of Skills for Industry Project. The program provides guidance and support to students in establishing their own businesses. Central to the program is an "Entrepreneurship Competition" where students in the 13 DSIP partner schools will form teams to participate in a competition of business ideas in TVET, as part of the process of acquiring the appropriate competences and skills to enable them start and manage their own micro businesses after school.

Many of these initiatives have not yet been completed and in various phases of development. COTVET readily admits that while work is progressing there is a lot of work yet to be accomplished.

COTVET recognizes that there is an immediate need for Industry engagement, particularly in the areas of curriculum and standards development. They would also like to see Industry become more active at the schools by providing surplus materials for consumable requirements and by donating used equipment for hands-on training. COTVET is also looking to Industry to make their in-house experts available to schools to assist in teaching practical content. They also seek the expansion of the Industry apprenticeship program to be able to fulfill the required number of on-the-job hours.

Concerning these initiatives, COTVET is aware that while they have engaged with certain Industries, their engagement with the Extractive Industry is lacking. For example, one of

COTVET's standing committees is the Industrial Training Advisory Council ("ITAC"). ITAC reportedly has wide representation made up of members from COTVET, Industry, unions, vocational schools, and others technical associations. Its purpose is to provide a platform for COTVET to obtain input to its activities, and report to these stakeholders on the progress of its initiatives. However, there appears to be no representation from the Extractive Industries on this committee. The deficiencies in COTVET's overall communication process and engagement with the Extractive Industry needs to be addressed. They welcome any assistance in helping them develop competencies in these areas.

Petroleum Commission of Ghana ("PCG")

The mandate of the Petroleum Commission of Ghana's ("PCG") is to regulate and manage the utilization of petroleum resources and coordinate the policies in the upstream petroleum sector. Their activities include community relations, technical compliance, local content, licensing and permitting, and work permit application. They were also aware of the deficiencies in equipment and consumables within the vocational schools and recognize the need to modernize course curriculum to so that graduating students met Industry's needs.

The PCG have been tracking work permit applications by oil and gas companies and reported that the vast majority of work permit applications for foreign experts are for highly skilled technicians and journeymen tradespersons. They note that the numbers of these foreign experts is higher than they would like it to be. This underscores the need to improve the TVET system in Ghana and develop homegrown talent.

Legislation exists (LI 2204) which compels foreign companies to hire Ghanaian workers in all positions within an organization whenever possible. This causes problems for companies where there are not sufficient competent workers available from which to draw. Companies have therefore been obliged to train Ghanaian employees to the levels needed for them to be job qualified. In many cases, this has involved sending their employees abroad to technical training centres in such places as the United States, the United Kingdom, and Australia to obtain the specialty training they require.

The PCG tracks the number of Ghanaians in the petroleum sector sent abroad for training. They did not indicate the number of Ghanaians tracked but it is recognized that this is an expensive way for companies to meet their obligations. PCG noted a definite need to enhance the delivery of technical and trade programs locally as this would employ more local people and reduce overall costs. A "Made in Ghana" solution is one that the PCG would welcome and support. By this they mean a TVET system that not only addresses the needs of all stakeholders but one that is managed and sustained by the stakeholders without ongoing support from international donors or unnecessary influence from external agencies.

Some examples can be cited from Canada's oil and gas sector. In the oil sands of Alberta, Industry took it upon themselves to create the Oil Sands Safety Association (OSSA), which sets the standards for safety in the region. Consequently, because the region has a high demand for

human resource capital, all educational and training organizations (including vocational training institutions) adopt and teach to the standards developed by OSSA. In addition, Enform, an oil service training organization which is funded 100% by Industry, has become the defacto organization for all students and employees to take oil servicing training. Even vocational training institutes use Enform to train their students and prepare them for working within the sector. Examples, like OSSA and Enform suggests that there can be a “Made in Ghana” solution led by Industry, while benefiting the TVET system and Industry as a whole.

Minerals Commission

The Minerals Commission is a Government agency that serves main promotional and regulatory body for the minerals sector in Ghana. The Minerals Commission is responsible for the regulation and management of the utilization of the mineral resources of Ghana and the coordination and implementation of policies relating to mining. Unfortunately, the team was not able to meet with the Minerals Commission in Ghana, therefore an assessment of the Commission’s contribution to and participation in TVET is unavailable.

The Commission's primary responsibility is to foster the efficient and effective regulation and management of the utilization of Ghana's mineral resources. This is accomplished through the development of a solidly knowledge-based, self-led organization, which recognizes that mining investment would take place and be sustained only if it is under Win-Win circumstances.

The Commission is required by law to carry out the following functions:

- Formulate recommendations of national policy for exploration and exploitation of mineral resources with special reference to establishing national priorities having due regard to the national economy;
- Advise the Minister of Lands and Natural Resources on matters relating to minerals;
- Monitor the implementation of laid down Government Policies on minerals and report on this to the Minister;
- Monitor the operations of all bodies or establishments with responsibility for minerals and report to the Minister;
- Receive and access public agreements relating to minerals and report to Parliament;
- Secure a firm basis of comprehensive data collection on national mineral resources and the technologies of exploration and exploitation for national decision making; and
- Perform such other functions as the Minister may assign to it.

In fulfilling its functions, the Commission engages in the following activities:

- Investigate the background of applicants, process applications for mineral rights and recommend their grant or otherwise to the Minister;
- Review agreements relating to minerals; collect, collate and analyze data on the operations of mining companies for decision making and for dissemination;
- Organize and attend workshops/ seminars/ conferences, as well as issue publications to promote mineral sector activities;

- Liaise with other Government agencies, notably the Bank of Ghana and the Ghana Revenue Authority (GRA) to ensure that the spirit of the sector's fiscal regime is maintained;
- Liaise with other Government agencies, notably the Geological Survey Department (GSD) and the Environmental Protection Agency (EPA) to monitor and ensure the adherence of mining companies to the terms and requirements of the mineral rights granted to them.¹⁷

In summary, Government agencies share considerable common ground with Industry and have similar goals related to curriculum development and the establishment of recognized standards. Government agencies agree that involving Industry in both is necessary and will provide legitimacy to both initiatives. Improved engagement between the Government and the Extractive Industries in these areas is needed. Government agencies would also like to see additional funding and support from Industry as it relates to improving the TVET system. This is not an unreasonable expectation. However, Government will need to demonstrate to Industry a clear commitment to improving the TVET system in order to obtain lasting Industry support.

Non-Governmental Organizations (“NGO”) and Donor Perspectives

Three different NGO’s and one donor agency were included in the needs assessment. These were GIZ, Technoserve, DAI Energy Resources Group, and Western Regional Coastal Foundation (“WRCF”). As NGO’s, their general mandates are to improve Ghanaian society either through the direct funding of specific initiatives in the country or they provide related expertise and direction to Government or Industry. They described several common observations and objectives related to the TVET system and the Extractive Industries in Ghana.

GIZ’s mandate is to match Ghanaian companies with European companies and creating strategic alliances for various projects. Their focus is on job creation and increasing income generation opportunities. GIZ reported that there is a need to set standards that meet with Industry needs, a view also shared by WRCF.

DAI promotes international best practices with a mandate to helping communities out of poverty. Through the WRCF, they play the role of facilitators by bringing various stakeholders together in forums to share ideas and find common ground. They reported that there appeared to be very little training through TVET that is addressing the specific needs of the oil and gas sector. DAI reported that COTVET had coordinated the delivery of various pieces of new equipment to various institutions via World Bank funding. WRCF noted that the development of national standards was part of their mandate. They expressed interest in facilitating such discussions, which is an opportunity that should be reviewed further.

¹⁷ <http://www.eservices.gov.gh/MINCOM/SitePages/MINCOM-Home.aspx>

Technoserve's focus is in developing local economic initiatives that assist with supplier linkages. Bid analysis, responding to Requests for Proposals (RFP's) and bid preparation, as well as enhancing youth entrepreneurship some of the services they provide. They reported that when a student finishes TVET training there are no mechanisms for them to enhance their skill sets as new technologies are introduced to the market place.

All interviewed concur that TVET is not meeting the needs of Industry. They reported that related activities between stakeholders do not seem to be coordinated. The establishment of common curriculum, modern teaching methods, and the development of recognized standards were all seen as required across the TVET system. The importance of these being developed in collaboration with all stakeholders was underscored as a requirement for sustainability. Ongoing communication between all stakeholders was seen as critical for success.

Conclusions and Recommendations

The Technical Vocational Education Training (TVET) system in Ghana as it applies to the Extractive Industries requires significant intervention. Allowing the status quo to continue without such intervention will result in the observed skill gaps becoming wider as technology changes and the needs of Industry become more complex. Ghana needs to develop a strategy to reforming TVET that integrates international best practices into Ghanaian framework that responds to the realities of Ghana. The simple adoption of an existing international model or framework would not be effective. Any reform must be developed within Ghanaian context if it is to be adopted and sustainable.

Previous interventions have tended to be piecemeal. What is lacking is a comprehensive effort to address all aspects of the TVET system to ensure lasting success. A significant multi-year investment is recommended that establishes a system that is able to respond to the needs of Industry, is sustainable in design, and produces work ready graduates that are able to realize the economic opportunities that Ghana's Extractive Industries offer. Such investment should address both the short-term requirements of Industry and the long-term objectives of the Government of Ghana in order for the Ghanaian TVET system to become relevant and more competitive both domestically and internationally.

This could be accomplished by adopting a simultaneous bottom-up and top-down strategy. The bottom-up component should focus on the Training Institutions themselves by developing Industry-relevant curriculum, addressing the significant shortages of consumables, training instructors to be able to deliver the content that Industry requires, and developing and delivering continuing education/upgrader courses to alleviate the immediate skills gap. Addressing these areas would provide immediate benefit to Industry by increasing the pool of skilled tradespeople and would improve the immediate capacities of the Institutions themselves. The top-down component should focus on strategic planning based on market research and data that reflects future trends and needs of the Extractive Industries. In addition, it would also include development of standards, accreditation, and business development at the Institutions in order to build long-term sustainability.

Central to successful implementation and long-term sustainability of any strategy is that all stakeholders (Government, Institutions, and Industry) must become engaged as willing participants in all aspects of all components. COTVET, ITAC, NVTI, along with Industry need to play a major role in their development. In particular Industry, as the end customer, has much to contribute to and gain from a successful result. While they have indicated a willingness to participate, they have also made it clear that they must see benefit in participating. Finally, any resulting strategy must be managed and maintained locally within Ghana. If such ongoing involvement and support is developed at the local level the resulting strategies have a higher probability of remaining sustainable in the long term

Based on the information gathered through the needs assessment from the Government, Industry, Institutions, and the work of previous interventions, the following recommendations are made.

Recommendation One:

National Standards Development for One Trade (i.e. Welding)

The lack of Industry-driven standards in Ghana is a major impediment to TVET reform. Without standards that reflect the needs of Industry, there is a lack of relevance, which is demanded by Industry. Industry driven standards set the base for curriculum, instructor development, and continuing education programming. Without Industry engagement in their development and subsequent review, the TVET sector is unable to prepare students effectively for employment.

Recommendation One would establish a working group comprised of COTVET, the Ministry of Education, a sample of partner vocational schools, Industry representatives, technical specialists (welding, mining, oil & gas), Canadian experts, and other key stakeholders be established to develop National Trade Standards for Welding that meet Industry requirements. The mandate of the working group should include the following:

- Establish a Trades Standards Working Group comprised of representatives from COTVET, the Ministry of Education, a vocational schools, Industry representatives, technical specialists, and international experts
- Conduct a review of existing gaps in national standards
- Conduct a detailed Industry needs assessment
- Undertake a comparative analysis of Ghanaian standards to international standards for the trades (i.e. Welding) and identify gaps and areas for improvement.
- Develop national standards
- Obtain Industry-validation of standards

Recommendation Two:

Industry-Driven CBT Program Development and Implementation for One Trade (i.e. welding)

The Government of Ghana through COTVET has begun the process of introducing CBT throughout the TVET system. Currently ten trades, including welding, are undergoing CBT curriculum development and implementation at the national level. However, these changes have not yet been widely introduced or implemented at the Institutional level. There are expected to be significant challenges ahead in both the development and implementation of the CBT program. Recommendation Two would involve bringing stakeholders together to develop the required curriculum as well as establishing a training program to enable delivery of CBT at the Institutional level.

The process should identify gaps and improvements for the existing curriculum, and insure that it is relevant to the needs of Industry. Further, curriculum should be reviewed and revised as required to ensure gender equality principles are integrated in resources, manuals and

textbooks. Training must be practical in nature and utilize the CBT curriculum currently under development as a base for comparison with similar internationally recognized curriculum. Instructor training is a key component of this recommendation as many instructors are currently lack sufficient skills required to teach a curriculum that is relevant to Industry. Training of instructors in CBT techniques and methods will also be required for successful implementation of COTVET's mandate.

Curriculum Development:

Upgraded curriculum must be validated by Industry during the development process. A focus on developing basic/essential skills should be a major component of the curriculum. Strong essential skills such as reading, numeracy, and soft skills contribute to success in training and in the workplace. Tools are available to understand, assess and improve these skills should be implemented into the developed curriculum. It is also recommended that a safety component be included within all curricula developed in order to promote a strong safety culture which Industry demands.

CBT requires access to capital equipment and consumable resources to be effective. Provision of equipment (where necessary) and consumables to schools, to test the curriculum will be required. However, a long-term strategy involving Government and Industry must be developed to ensure Institutions have adequate modern equipment and consumables into the future.

This recommendation includes the following activities with respect to curriculum development:

- Establish a Program Advisory Committee for welding
- Training on developing and delivering Competency Based Curriculum
- Training on integrating essentials skills in trades training curriculum.
- Comparison and gap analysis of Ghanaian welding curriculum to international curriculum
- Develop new welding curriculum including a safety component
- Gender review of curriculum and resources
- Obtaining Industry-Validation of curriculum
- Upgrade facilities and provision of necessary consumables to deliver new curriculum.
- Test new curriculum and revise if necessary

Instructor Training:

Recommended instructor training requirements are twofold. Firstly, instructors lack the technical skills necessary to deliver training required by Industry. Secondly instructors require training on teaching methodologies for delivering CBT. The demonstration would deliver a series of technical upgrader welding courses aimed at "training the trainer" to ensure that instructors have the skills necessary to deliver the programs required by Industry to students. A

specific focus on training female instructors could be included. Concurrently, instructors would participate in training workshops on competency-based training, teaching methodologies, essential skills and study tours to various Industry stakeholders. A long-term strategy to promote and support Industry Attachments beyond the life of the project will be imperative to ensuring the skills of instructors are current and up-to-date.

The following activities are included in this recommendation:

- Train the Trainer by upgrading the technical welding skills of instructors
- Providing training on teaching methodologies on delivering CBT
- Gender Training workshops to integrate approaches into curriculum teaching practices
- Establish ongoing Industry Attachments for instructors

Once proven successful Recommendation Two could be implemented in other Polytechnics and Technical Training Centres. It could also be easily adapted to other trades as the components remain the same.

Recommendation Three:

Demonstration Project for Women in the Trades

Attracting women into non-traditional trades is a priority for COTVET. Although a number of policies and programs are in place to improve gender equity in TVET, few results have been achieved. Recommendation Three, would establish a gender-sensitive welding program for women only. New gender-sensitive and Industry-driven welding curriculum would be developed and, as outlined in the process in Recommendation Two, female-friendly facilities would be established and, ideally, female instructors (once qualified) would deliver the programs to female learners. Industry would be engaged to provide female-focused Industry Attachments and employment opportunities.

This recommendation would include the following components:

- Identification of Industry Partners: Work with selected Industries obtain trade positions as a first-choice career option for women; and position graduating female students as viable sources of quality skilled workers for those Industries
- Assessment and Essential Skills Training: Help women make an informed career decision about a career in trades and address gaps in essential skills
- Gender Training for faculty, staff and management on integrating gender equity principles in all aspects of TVET – curriculum, resources, teaching methodologies etc.
- Workforce Coaching: Provide soft skills training in the areas of Industry expectations, protocols, team building, and work place communication
- Job Retention: Provide job search, job placement services and retention services to assist with securing and retaining employment

In summary, although the current TVET system in Ghana requires significant interventions, there is a willingness and desire by all parties to find solutions to the challenges. The recommendations are not expected to be capital intensive. However, if any can demonstrate positive outcomes, they should help develop much needed confidence amongst stakeholders that could lead to increased engagement in the reform of the system.

All of the recommendations are scalable and could be implemented over multiple trades, in multiple schools and regions across Ghana. The recommendations provide an opportunity to develop and test a framework for TVET reform, based on international best practices, that addresses the needs of Ghana while considering the realities of the country. The recommendations provide opportunities to receive feedback and integrate the feedback into future reforms. The recommendations proposed are an opportunity to set the roadmap for further investment and development of the TVET sector.

Appendices

Appendix 1 – Project Participants

No	DATE	ORGANIZATION	TYPE	NAMES	TITLE
1	February 1, 2016	Hess Corporation	Oil / Gas	Qaasim Shittu	- Global Supply Chain Manager
2	February 5, 2016	Council for Technical & Vocational Education & Training ("COTVET")	Government	Samuel Thompson Seth Asamoah Theophilus Zogblah Clara Tigenoah Josephine Ewusie	- Coordinator Policy & Planning - Coordinator CBT Assessment & Certification - Coordinator, Occupational Standards - Coordinator, Gender & Persons With Special Needs - Research, Monitoring & Evaluation Officer
3	February 5, 2016	Newmont Mining Corp	Mining	Matt Auge	- Maintenance Manager
4	February 8, 2016	Deutsche Gesellschaft für Internationale Zusammenarbeit ("GIZ") GmbH	NGO	Hartwig Michealsen	- Team Leader
5	February 8, 2016	Technoserve	NGO	Samuel Baba Adongo Paa Kwesi Forson Jude Bopam	- Country Director - Business Advisor - Business Advisor
6	February 9, 2016	Asanko Gold Ghana	Mining	Frdederick Attakumah Rammy Obpro-O'fferie	- Executive - Corporate Affairs - Manager - Community Affairs
7	February 9, 2016	Komos Energy	Oil / Gas	George Sarpong	- Director, Corporate Affairs
8	February 9, 2016	DAI Energy Resources Group Western Region Coastal Foundation (WRCF)	NGO	Barnaby Briggs Matthew Armah Kamil Mohammed	- Senior Advisor - CEO/Team Leader - Private Sector Liaison Manager
9	February 9, 2016	FMC Technologies Inc	Oil / Gas	Mario Lagunes	- Country Manager
10	February 10, 2016	Accra Technical Training Centre (ATTC)	Pre-Tertiary School	Jonathan Tawiah Kwablah Clement Bedialco Asane Arico Dometey Andrews Ohene	- Rector - Principal - Vice Principal, Administration - Vice Principal, Academics - Vice Principal
11	February 11, 2016	Council for Technical & Vocational Education & Training ("COTVET")	Government	Seth Asamoah Theophilus Zogblah David Prah Clara Tigenoah	- Coordinator CBT Assessment & Certification - Coordinator, Occupational Standards - Coordinator, Quality Assurance - Coordinator, Gender & Persons With Special Needs
12	February 11, 2016	Accra Polytechnic (AP)	Post-Secondary School	Sylvester Achio (Plus various additional staff)	- Rector
13	February 11, 2016	Schlumberger SEACO Inc	Oil / Gas	Sam Eshun	- Corporate Affairs Manager
14	February 12, 2016	Regional Maritime University (RMU)	Post-Secondary School	A. Addy-Lamptey Gibril Jaw	- Provost - Vice Provost

No	DATE	ORGANIZATION	TYPE	NAMES	TITLE
15	February 15, 2016	Takoradi Polytechnic	Post-Secondary School	Rev. John Frank Eshun Ken Braxon Rebecca Glade	- Rector - Academic Affairs - Centre Administrator
16	February 15, 2016	Jubilee Technical Training Centre	Post-Secondary School	Matthew Kweku Gyan	- Centre Manager, JTTC
17	February 15, 2016	Danest Engineering	Private Trainer	Daniel Kwarkyi	- Owner
18	February 16, 2016	Takoradi Technical Institute	Pre-Tertiary School	Jonathan Tawiah	- Principal
19	February 16, 2016	Seaweld Engineering Ltd	Oil / Gas	Michael Avorkliyah	- International Operations & Business Development Manager
20	February 17, 2016	Subsea 7 S. A.	Oil / Gas	Olivier Cardous	- Resident Manager
21	February 17, 2016	FMC Technologies Inc	Oil / Gas	Mario Lagunes	- Country Manager
22	February 18, 2016	Tullow Ghana Limited	Oil / Gas	Kwasi Boateng	- Social Performance & Public Affairs Manager
23	February 18, 2016	Rigworld International Services Ltd	Oil / Gas	Syntyche Naa Gbedemah	- General Manager
24	February 18, 2016	Genesis Oil & Gas Services	Oil / Gas	Yvon Asafu-Adjaye	- Director, Finance and Business Development
25	February 19, 2016	Petroleum Commission of Ghana	Government	Edward Appiah-Brafah Paul Frempong Kwasi Senya	- Manager, Human Capital - Advisor - Training Officer
26	February 19, 2016	African Mining Services	Mining	Greg Hudson Adelaide Boye	- Training Manager - Corporate Administration Manager
27	February 22, 2016	Kinross Gold Corporation	Mining	Ken Norris	- General Manager
28	February 23, 2016	COLTEK	Post-Secondary School	Prof. Reynolds Okai	- Principal
29	February 23, 2016	Kumasi Polytech	Post-Secondary School	John Poku	- Director
30	February 24, 2016	Kumasi Technical Institute	Pre-Tertiary School		
31	February 26, 2016	Council for Technical & Vocational Education & Training ("COTVET")	Government	Sebastian Deh	- Executive Director

Appendix 2- Bibliography / References

	DOCUMENT	SOURCE	DATE
1	Employment Opportunities in the Ghanaian Extractive Industry	German Development Corporation (GIZ)	2015
2	Demand and Supply of Skills in Ghana	World Bank	2013
3	Ghana Country Report on TVET/TVSD	COTVET	2014
4	Organization Brief	COTVET	2015
5	ATTC Student Brochure	ATTC	not dated
6	Welding Syllabus	TVET	2010
7	Student Industrial Training Log Book	Takoradi Polytechnic	not dated
8	Journal Volume:2/2012	Regional Maritime University	2012
9	Mechanical Technology Education Syllabus	University of Education	not dated
10	Electrical/Electronic Engineering Syllabus	University of Education	2001
11	Electrical/Electronic Engineering Syllabus (Proposed)	University of Education	2014
12	Furniture Design and Production Syllabus	University of Education	2001
13	Btech (Top-Up_ Electrical and Electronics Program	University of Education	2015

Appendix 3- Interview Questions

I. Industry Perspective

1. Identify the Needs of Industry (Extractive, oil & gas sectors)
 - a. What are the existing gaps in new employees?
 - b. What are the existing gaps in the TVET sector?
 - c. What training have you invested in?
 - d. What training has been successful?
 - e. What training has been unsuccessful?
 - f. What would you do different? Or the same?
 - g. What would you like to see for skills training? Solutions?
 - h. Would you hire a local Ghanaian school to conduct contract training?
 - i. What are your business practices with respect to gender equity?
 - j. How is your company adhering to the Government legislation on local content and participation law (LI 2204)

2. What is Industry willing to support?
 - a. Funding Model
 - b. Program Advisory/School Boards
 - c. Upgrader Programs
 - d. Facilities
 - e. Consumables
 - f. Capacity building for existing vocational schools

II. Infrastructure – Facilities Review

1. What are your infrastructure needs/program?
2. What industrial programs do you offer?
3. Where do you source materials? Suppliers?
4. Does the infrastructure match Industry needs?
5. Are all training labs functional and equipped?

III. Curriculum Review

1. Conduct a comparison between Sask. Poly and Schools and identify the gaps.
2. Is Industry engaged in your curriculum development or review?
 - a. If yes, how are they involved?
 - b. If no, why not?
3. Do you have partnerships with international post-secondary's to obtain curriculum? Or is it developed from scratch?
4. Is there any consideration of gender equity in curriculum development and content?

5. Is there are national standard for the trades? If no, what work is being done to develop national standards? Who is responsible?

IV. Student Assessment

1. What program are you involved it?
2. Why did you choose this program?
3. Do you like the program?
4. What would you change about the program?
5. Is the program meeting your expectations?
6. What education did you receive?
7. What would you change about the program?
8. Did you feel prepared for Industry once you graduated?

V. Instructional Assessment

1. How long have you instructed the program?
2. What training did your receive to instruct the program?
3. What do you like about instruction?
4. What are the strength of the institutions?
5. What are the gaps that need to be addressed?
6. Do you meet with Industry about content and curriculum?
7. What evidence do you have that Industry needs are being met?
8. How does the institution assess the success of the program?
9. How successful are your graduates in obtaining long term employment?
10. What are the challenges you see in improving your school? PowerPoint, online, hands-on?
11. What methodologies do you use in your classroom?

VI. Government

1. What are the existing gaps in the TVET sector?
2. Is there a national standard for the trades? If no, what work is being done to develop national standards? Who is responsible?
3. What are your measures of assessing the effectiveness of vocational schools?
4. Do you engage Industry on the effectiveness of vocational schools?
5. How active are you in enforcing Ghana's local content and participation law? (LI 2204)
6. What role can Industry play in vocational education?
7. How do you see Industry participating in the Government's initiative in making Ghana developed nation?
8. Who needs to lead the reform of the vocational education sector?

VII. Organizational Development and Institutional Sustainability

1. Are you providing contract/corporate training?
2. Do you participate in trade advisory boards?
3. Do you conduct fundraising?
4. Do you engage your alumni?

5. What is your school's primary source of revenue?
6. How does your school generate revenue?

Appendix 4: COTVET Structure

Governing Structure of COTVET

COTVET is governed by a fifteen (15)-member Council appointed by the President in consultation with the Council of State. Through the Board, five (5) Standing Committees and three Sub-Committees have also been established. The Standing Committees and their functions are enumerated below:

1. **National Apprenticeship Program Committee:** The Committee coordinates the activities of the National Apprenticeship Program (NAP). This program has been put together by the Government of Ghana as one of its strategies aimed at reducing youth unemployment in the country and COTVET is coordinating its implementation. Apprenticeship is an Industry-driven career training that combines on-the-job training with related technical instruction that is essential to sustain a quality workforce. As part of the program, the Master Craftsmen will be given appropriate training from time to time to enable them undertake the Apprenticeship
2. **The National TVET Qualifications Committee:** The Committee is the main regulatory authority for the National TVET Qualifications Framework and its overall function is to advise the COTVET Board on, and to do all things necessary or expedient, for the maintenance of a credible, rigorous, effective, and efficient qualifications framework for the TVET system.
3. **Training Quality Assurance Committee:** The overall function of this Committee is to safeguard the interests of learners, parents/guardians, employers, Government and the general public by ensuring that training providers and qualification awarding agencies maintain satisfactory standards in the delivery of training and the award of qualifications.
4. **Industry Training Advisory Committee:** The overall function of the Committee and its sub-committees is to develop National Occupational Standards or knowledge, skills, and work performance standards for the definition and issuance of qualifications.
5. **Skills Development Fund Committee:** The Committee e has been established under the COTVET Board to oversee all aspects of the implementation of the Skills Development Fund. The Committee is responsible for the evaluation and recommendation of proposals for approval by the COTVET Board.
6. **Sub-Committees of the Board:** The three (3) Sub-Committees of the Board are:
 - a. Human Resources
 - b. Finance and Audit
 - c. Projects

7. **Other Structures:** Additionally, Industry groups such as AGI and GEA have become active in supporting the TVET providers. With focus now on making TVET demand-driven, these groups have become very critical in shaping the sector. The country's Development Partners have also taken a lot of interest in this sector and have not relented in providing financial assistance and other forms of support for TVET/TVSD in Ghana. A Project Support Unit (PSU) has therefore been established under COTVET to implement various Projects supported by the Development Partners. The PSU is headed by a Project Coordinator and supported by Financial Management Specialist, Procurement Specialist, Monitoring and Evaluation Specialist among other expertise. Long and short term consultants are called in when the need arises.

Due to the importance the Council places on funding of skills, a Division has also been created – the Skills Development Fund Division - to specifically be responsible for the implementation of the Skills Development Fund. Issues related to grant appraisal and approval are referred to the SDF Committee which eventually reports to the Board of COTVET.

The organization chart of COTVET is shown below:

