

With A Population of 393 Million and Growing, East Africa Offers A Solution To The Global Welder Shortage



By Michael J. Vallez, P.E.
Executive Chairman
GFP International

October 22, 2023

www.gfp-intl.org



TRAIN THE TRAINERS
TRADE SCHOOL TECHNOLOGY TRANSFER
SKILLED TRADES CONSULTING
PROJECT MANAGEMENT
FACILITY MANAGEMENT

The Global Welder Shortage

The global welder shortage is a well-documented problem. Industry can no longer count on the Philippines, China, Korea, or other regions for skilled welders to fill welding jobs on industrial projects across the world. Below find a sample of articles about this severe welder shortage.

Manufacturers Monthly, Docklands, Australia, January 12, 2023

Radical approach needed to overcome skilled welder shortage

“Weld Australia estimates that, unless action is taken now, Australia will be 70,000 welders short by 2030. This urgent issue is not unique to Australia; the US\$5.5 billion US fabrication industry will face a shortage of 500,000 welders by 2030. By 2050, Japan’s demographic downturn will result in a 50 per cent loss in their welding workforce; Japan will need around 250,000 welders. In the United Kingdom, BAE is having trouble recruiting enough welders in Glasgow to keep the Type 26 Frigate project on track.”

Earlbeck Blog, August 29, 2023

WHAT IS THE JOB OUTLOOK FOR WELDERS?

“The welding industry will face a shortage of about 360,000 welders by 2027, according to the American Welding Society. There will be 90,000 average welding jobs to be filled annually between 2023-2027 due to industry growth and anticipated attrition due to retirement. The coming wave of retirements will leave the US with a great deficit in skilled welders in the work force.”

Yonhap News Agency, Seoul South Korea, January 02, 2023

Samsung Heavy brings in 41 welders from Indonesia

“The Indonesians, who arrived Saturday, mark the single largest batch of foreign workers to come to South Korea since the government eased visa regulations for them in December in a bid to help deal with a manpower shortage facing the local shipbuilding industry. The Indonesian welders will start working at Samsung Heavy’s Geoje shipyard after receiving education on workplace safety, the shipyard said. Samsung Heavy said the shipbuilder and its subcontractors had

hired a combined 782 foreign workers as of end-December last year, adding it is planning to raise the number to around 1,200 this year.”

Global Times, December 21, 2021

China’s medium and senior skilled labor shortage expands despite employment pressure

“According to a ranking of the 100 occupations with the "largest shortage of workers" in the third quarter of 2021 released by the Ministry of Human Resources and Social Security, 58 were classified as "manufacturing and related personnel" roles, including home refrigerator manufacturers, instrument manufacturers, welders, and machinery manufacturing engineers.”

Daily Mail WV April 2, 2021

Thousands of new welders needed to bolster shrinking workforce

“More than 50 percent of all man-made products require some type of welding. Thus, despite a steady increase in automated jobs, industries still need the knowledge and hands-on skills of trained and experienced welders. Yet the nation finds itself desperately short of welders. According to the American Welding Society (AWS), the U.S. welder shortage will reach a deficit of 400,000 workers by 2024, while other industry watchers worry it will climb even higher.”

Fox News, February 21, 2020

Demand grows for welding jobs in US as students turn away from trade schools

Weldingvalue.com, November 5, 2020

Global welder shortage – viewpoints from three continents

A Vision for the Future

GFP International has been engaged in supporting education projects and programs in East Africa since 2005. From the beginning of 2022, GFP has been developing plans and programs to raise the industrial trade skills in East Africa with an initial focus on industrial welding.

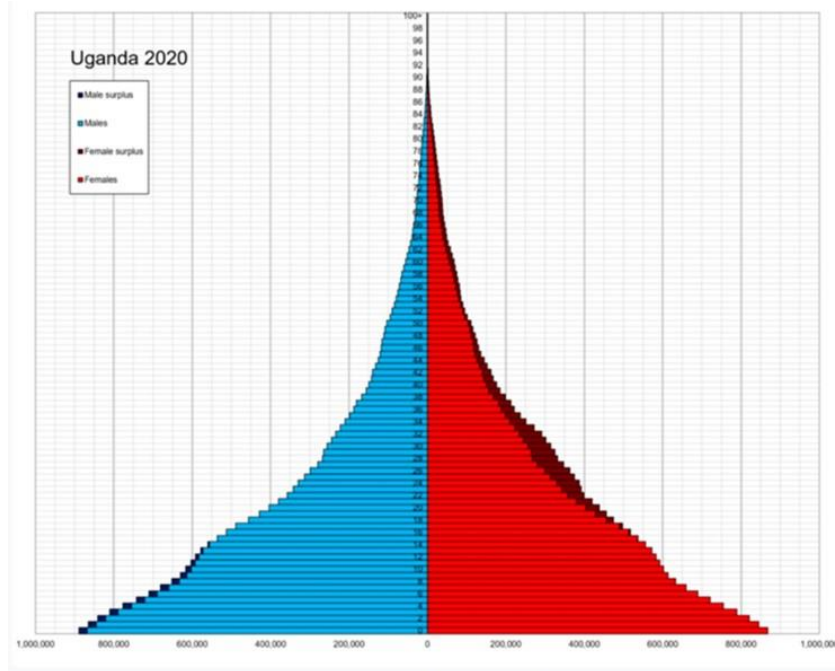


The inspiration for this mission began in 2022 during a meeting with the Honorable January Makamba, then Tanzania's Minister of Energy. He and I were discussing ways to prepare Tanzania for the upcoming industrial projects including the \$40 billion LNG Project being planned by ExxonMobil, Shell Oil, Equinor and other partners, and the \$20 billion East African Crude Oil Pipeline (EACOP) Project by Total Energies. The Train the Trainer program emerged from that meeting, as well as the need to do a gap analysis of skill training at Tanzania's trade schools.

The current goal to prepare 5,000 certified welders by the year 2027 grew from a meeting in January this year with Dr. Noel Mbonde, Tanzania's Director of Technical Education. I had recruited three top welding training and construction experts to accompany me during our assessment of welding training facilities in Tanzania, including Nick Price, head of welding training at Davis Technical College, Ryan Eubank, former global instructor for Lincoln Electric, and Sibum Mpanane, also formerly with Lincoln Electric and now a welding/mechanical contractor in South Africa.

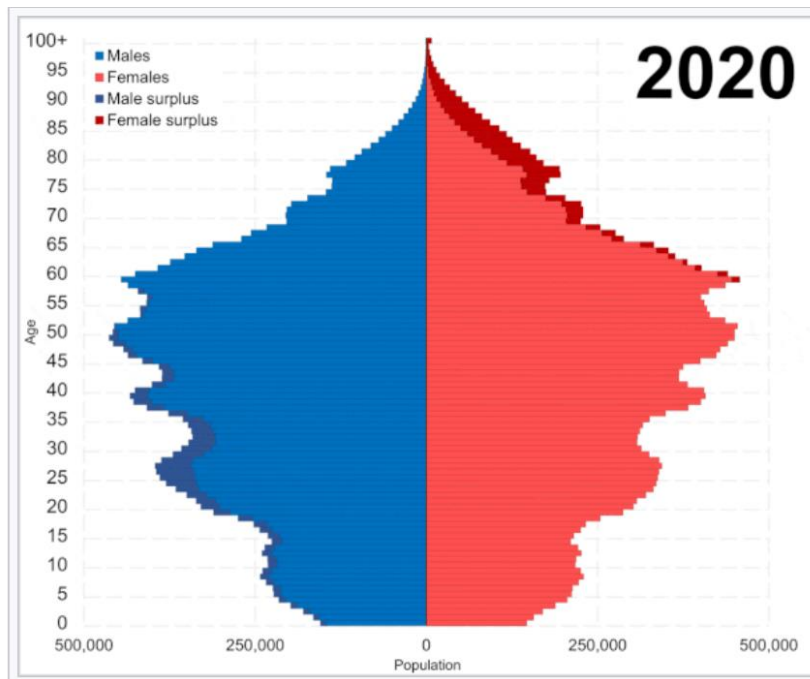


As noted in above headline from Australia's Manufacturers Monthly, a radical approach will be needed to overcome the skilled welder's shortage. The challenge is too great for one stakeholder alone to make a difference. The long-term strategy to address the welder shortage will require a change in paradigm and collaboration between stakeholders to make a meaningful contribution to successful industrial projects and industrialization of Africa. The world is already facing a welder shortage, and the next commodity super-cycle has not yet started. The countries of East Africa, including Tanzania, Kenya, Uganda, Rwanda, and Burundi have several characteristics in common. These countries have a combined population of 393 million that can largely speak English and are politically stable. The demographic profiles point to continued rapid growth in the working-age population for at least three decades. For example, see the population profile of Uganda in 2020.



Population Profile of Uganda

Compare Uganda's population profile with that of the shrinking population of South Korea shown below.



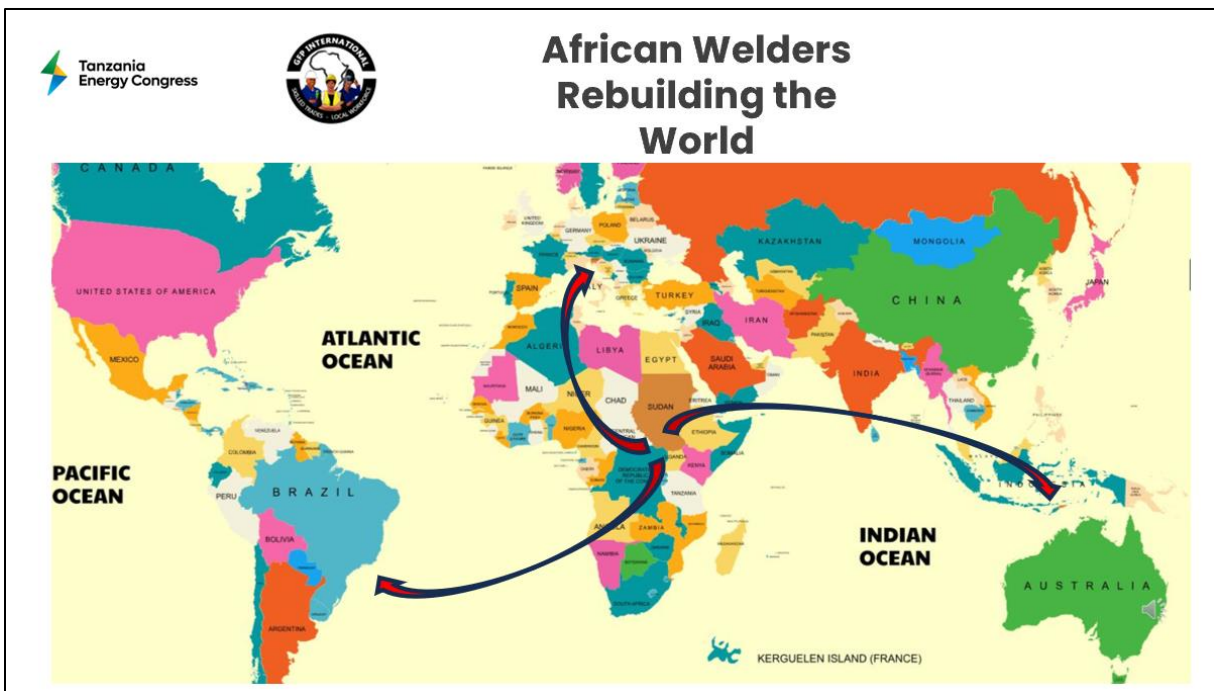
Population Profile South Korea

In September 2023, we gave a talk at the 5th Tanzanian Energy Congress in which we presented a vision whereby the rapidly growing East African youth population could be trained in industrial welding and help resolve some of the global welding shortage. Over half of all manufactured goods have some kind of welding involved in the manufacturing, so this will also bring multiple benefits. A full video of this presentation is available online at:

What Can Advanced Industrial Welding Training do for Tanzania and its Industries?

<https://www.youtube.com/watch?v=rnlMMcKbyfc&t=90s>

In addition to the social benefits of a better trained workforce, this presentation includes a discussion about the benefits to Tanzania in the way of increased income tax revenue from highly skilled welders, and the benefits to industrial project developers through cost savings realized with a skilled local workforce.



Vision for East African Welding Industry

After presenting this vision to the 5th Tanzania Energy Congress, we continued our travels to Kenya, Uganda, and Rwanda to meet with education leaders there including ministers, directors, trade school principals, trainers, and students. Everywhere we went, we found leaders who shared a concern about the burgeoning youth population entering the work force without the skills needed to participate in the new industrial economy. We encountered a newfound awareness that, while improvements have been made at the university level in these countries, the investment and attention to trade schools has been ignored for too long. For example, the Ministry of Education in Rwanda has intensified efforts to hit 60% targets of students leaving secondary schools to join Technical and

Vocational Education and Training (TVET) by 2024 with a launch of campaigns to sensitize youth and parents about the future of work.

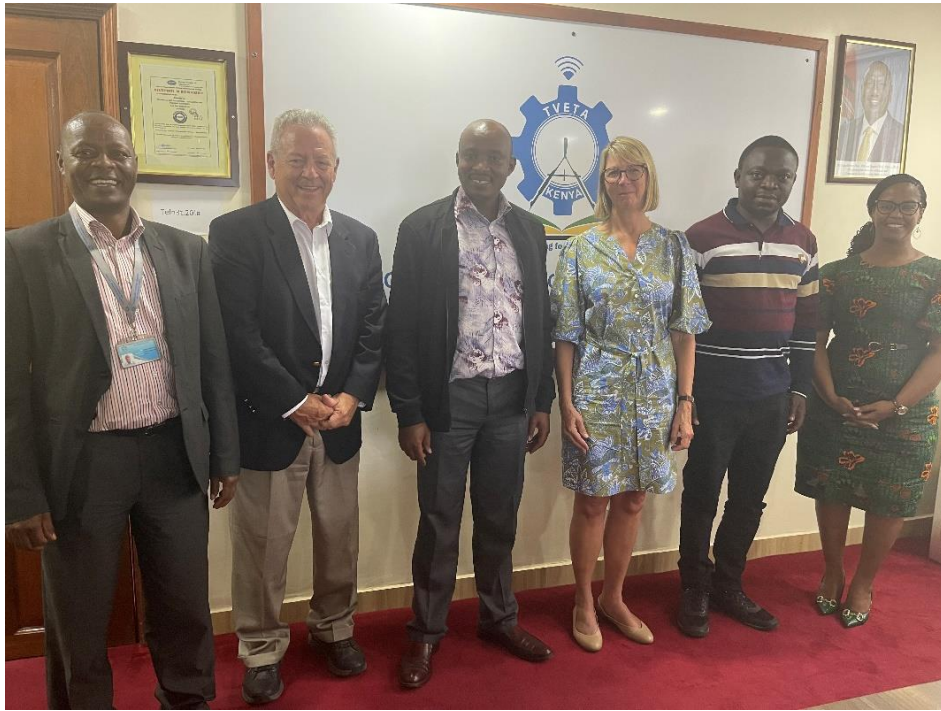
The World Bank helped bring focus to this problem when on July 25-26, 2023, it sponsored the Africa Human Capital Heads of State Summit in Dar es Salaam, Tanzania. Throughout the proceedings, leaders expressed a desire to re-focus on investment in trade school training.

The relatively small investment in human capital required to develop a welding and skilled trade talent pool pales compared to the risks posed by the skill shortage. During the last eighteen months, we have analyzed programs, visited schools, and evaluated curricula and facilities. Through engagement with the Technical and Vocational Trade School Authorities, school headmasters, instructors, and students, we can confidently report that we have a population and leadership that are ready and eager to fill a role in providing the next generation of resource projects with skilled welding talent on the world stage. This is a once in a generation opportunity.

As noted in the group photos below, GFP International confirmed the strong interest in rejuvenating the trade school training sector and, joining in an effort to address the global welder shortage.



With the Honorable Adolf Mkenda, Tanzanian Minister of Education and Dr. Noel Mbonde, Tanzanian Director of Technical Education



With Leaders of the Technical and Vocational Education and Training Authority of Kenya (TVETA)



With Leaders of the Uganda Education Commission and the Technical Vocational Education and Training Operations and Management (TVET O&M)

What Will It Take?

It will not be quick or easy, but East Africa has what it takes to help alleviate the global welder shortage. As noted above, it has favorable demographics. It has leadership that is ready to act. And, equally important, it has cost advantages over other regions. The cost of construction in Tanzania is approximately 10% of the cost of construction in the U.S. For example, an 8,000 square foot building to house a welding school can be built for under \$200,000.00.

Given all the favorable conditions, there are a few conditions which will need to be addressed. Based on the seventeen (17) training locations we have visited and assessed over the last two years, GFP found several major gaps in the training facilities, curriculum, and skill levels.

- **Shop Floor Equipment.** Ideally, every welding training facility will have a set of general shop floor equipment where students can learn to perform basic tasks which will often accompany the work of welding. These include things like a grinder, plasma cutter, shear, pipe bevel machine, lathe, air compressor, milling machine, ironworker and other tools. In the schools we inspected, we did not find any school that had more than 25% of the shop floor equipment needed, based on the value of the equipment.
- **Welding Machines.** GFP found a large gap in the quality and quantity of welding machines needed for industrial welding training. In East Africa, only 15% of a student's time is spent on perfecting his or her welding skill. In an industrial welding training program, 85% of the time is spent on perfecting welding skills. This means that five times (5X) the number of welding machines are needed to train industrial welding than what we found in the East African schools. Many if not most of the welding machines in existing schools were 50-60 years old, many from the 1960's. It appears that during or after the independence movement swept through Africa, the world community funded some investments in training capacity.
- **Buildings and Training Spaces.** In general, modern training facilities are built with 5-meter-high ceilings to accommodate ventilation equipment, gas piping, and other overhead utilities and appurtenances. Most schools we visited did not have this overhead space. In addition, because 5X the number of welding machines are needed to train the same number of welders, there is insufficient floor space to meet the need.
- **Welding Booths.** When a high level of welding practice activity is taking place in a confined indoor shop space, the risk of eye damage from multiple welding arcs is raised. In modern welding schools, this problem is addressed by having welding booths with curtains to block the arc flash from causing eye damage to people in the shop. The schools we visited did not have welding booths or had booths which did not function or were not used.
- **Lighting.** Most shops we visited did not appear to have adequate lighting. Although light levels were not specifically measured.
- **Skills gap.** On one major project where welders from the informal sector were tested, approximately 2% of these welders had the skills necessary to work on the project. This writer had dinner with twelve of these experienced welders in Tanzania who had been

working in the ornamental sector for many years. Not one of them would qualify to work on the East African Crude Oil Pipeline (EACOP) Project. Many welders in the informal sector learn the basics of joining two pieces of metal with a welding machine informally. The existing schools do not teach to any international industrial standards like the AWS. One exception was a school in Kenya which claims to train to a Canadian standard.

Although there are many advantages to sourcing welding talent from East Africa, the above gaps will need to be quickly filled. GFP is working together and supporting East African educators to move this forward.

East African Welding Summit

As noted in the Australian Manufacturers Monthly on January 12, 2023, a radical approach is needed to overcome the skilled welder shortage. It is a problem that no one country, no one company, or one school can overcome. To make headway, GFP is enrolling other partners to hold an East African Welding Summit where a group of constituents, industrial companies, foundations, and agencies can come together and address common problems and potential solutions. The below circle diagram depicts the concept for this welding summit.



The parties shown on the above circle will be invited to participate in the planned East African Welding Summit. GFP International believes that the corporations making investments in Africa will benefit from the advancements in skilled trade training and have an obligation to support it. We also believe that this support will not come unless the TVET authorities themselves commit to support the effort with their own funds, and by reaching out to the international donor community for assistance as well.

The initial goal of 5,000 certified welders by 2027 can certainly be expanded when the right people and organizations get behind it.

**About the Author, Eng. Michael J Vallez, P.E.
Founder and Executive Chairman, GFP International**



Mr. Vallez is the Founder and Executive Chairman of GFP International. He earned a BS Degree in Civil Engineering from Michigan Technological University in 1975 with an emphasis on structural and geotechnical engineering, and an MBA from the University of Utah in 1983. His master’s project was a study of managerial leadership in construction and methods of creating high levels of motivation and productivity. He is the author of several books, the most recent of which was *On Time and Under Budget – The Ultimate Power of Team Leadership*.

From 1975 to 2017, Mr. Vallez gained broad experience in engineering, construction, project development, construction management, design, and project execution under various methods including fast-track; lump sum; design-build; design-bid-build; engineer-procure-construct (EPC); and construction management. In 2016, he formed Vallez International, an international project management, expert witness, and claims consulting firm. From 2017 to 2023, he served on the board of directors of Long International, a “top 3” construction claims consultancy where he provided expert witness consulting services to construction attorneys on cases with disputes ranging from \$15 million to \$850 million, and construction management consultation to other clients. He has managed people and projects in multiple sectors including commercial, industrial, civil, and mining projects that included oil and gas facilities, mineral and chemical process plants, power plants, bridges, highways, transmission lines, high-rise hotels and offices, educational facilities, condominiums, stadiums, retail malls, performance halls, underground mine shafts and tunnels. He has completed projects in all regions of the U.S., and consulted on projects in Australia, Africa, Canada, and Mexico.