SHINE

Solar Hands-on training and International Network of Exchange

Greening TVET for the solar industry in Africa

Short read

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About SHINE

This research is a part of the **Solar Hands-on training and International Network of Exchange (SHINE).** SHINE is a Capacity Building project funded by the EU Commission that seeks to drive the green transition and enhance energy Access in Africa. A European African consortium, involving VET providers and stakeholders from education, industry, and policy makers, is collaboratively redesigning a market-oriented VET program focused on solar panel technology.

The main objective is to deliver an innovative capacity building program in Solar Training in Africa and to co-develop curriculum updated to the local needs.

To achieve this ambitious goal, the working methodology is divided into three distinct phases:

- The first phase is focused on research, during which study visits, interviews, and meetings with key stakeholders in TVET, employment, and the energy sector (schools, universities, government bodies, and the private sector) are conducted to map out the current state of solar energy and training, identifying the main challenges and opportunities.
- Once the context is understood, capacity-building pathways are designed to upskill trainers in VET centres in Nigeria, Ghana, and Uganda, with specific training provided in centres of excellence in Europe.
- Finally, based on the groundwork, the training for educators, and collaboration with key stakeholders, the curriculum is co-created and redesigned to align with market needs

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Introduction

The world stands on the brink of a green economic transformation, ready to unlock the vast potential of renewable energy to power its economies and societies. With its abundant sunlight and significant untapped resources, Africa is perfectly positioned to leverage solar energy as a catalyst for the continent's development and environmental sustainability. This is crucial, as traditional energy systems struggle to meet the growing energy demand. Still more than half of the continent does not have access to electricity and even when there is access it is not reliable or affordable for everyone.

The greening of economies through a process of low carbon transition (LCT) is also seen as a pivotal strategy in creating green jobs. ILO estimates that by 2030, 24 million new jobs will be created globally if the right policies to promote a greener economy are put in place[1]. For Africa, leveraging this potential will be critical to create employment for its ever-growing youth workforce, which is estimated to become the largest in the world by 2040. So far, Africa has been struggling with creating sufficient employment, especially jobs that can be labelled as decent. In this regard, the call for a *just* energy transition that provides pathways for scaling up clean energy supply and creating decent employment opportunities for youth, while at the same time improving access to affordable and reliable electricity and ensuring that no-one is left behind, is growing increasingly louder.[2]

However, one key element is holding Africa back in realising its potential which is the skills mismatch that exists between the needs of the private sector in a changing labour market, and the educational background and skill-set of its youth. Technical and Vocational Education and Training (TVET) is in this respect crucial, not only in equipping youth with the right skills for the labour market today but also preparing youth for the future of work. However, TVET institutes in Africa still face many barriers and systems for identifying, integrating and implementing new green competencies in TVET in Africa remain underdeveloped.

Greening TVET, an approach that aims to support green skills development and facilitate sustainable policies and institutionalise sustainable practices and education, is seen as a key strategy to enable Africa to not only respond to the global call for a low-carbon transition, but to drive and thrive in the green economy. However, despite its prominence, there is still a lack of conceptual clarity of what greening TVET actually entails and which "green skills" are meant to be developed. In addition, as TVET institutes in Africa face radically different challenges than their Northern counterparts, a more contextualised understanding of Greening TVET in Africa is crucial to inform pathways for change.

This short read aims to fill these gaps by outlining the main definitions and approaches of greening TVET and green skills and apply these to the solar industry in Africa. As such, this short read provides a theoretical foundation for programmes and policies aiming to green TVET in Africa.

1 *ILO (2018) World Social Outlook.*
2 *Lijfering, S. Kazimierczuk, A., Abagun, O. (2024).*

Green skills and the need for greening TVET

Accelerating the green transformation, while expanding access to the opportunities it opens up, requires the development of skills, knowledge and competences that can drive innovation, support sustainable practices, and adapt to new technologies. These skills, also labelled 'green skills', are broadly understood as "The knowledge, abilities, values and attitudes needed to live in, develop and support a sustainable and resource efficient society", and encompass a variety of different skill-sets.[3]

There are many different understandings of what constitutes a green skill. The green skills index[4] identifies four types of skills that can be marked as green:

1. **Engineering and technical skills:** These are hard skills encompassing competences involved in the design, construction and assessment of technology, usually mastered by engineers and technicians.
2. **Science skills**: These competences are essential to innovation activities and are in especially high demand at each stage of value chains and in the utility sector.
3. **Operation management skills:** This refers to the know-how related to the change in organizational structure required to support green activities.
4. **Monitoring skills:** This refers to the skills required to assess the observance of technical criteria and legal standards.

However, it is increasingly acknowledged that green competences go beyond just technical skills and also encompass more transversal skills which include soft or life skills that can be applied across a wide range of jobs and support green transitions through other avenues than technical application.[5] Examples include strategic thinking, project management, decision-making, leadership, and effective communication. In addition, entrepreneurship skills are deemed increasingly important as most new labour market entrants in the green economy end up self-employed. Finally, digital skills and basic digital literacy are recognised as essential in navigating the technological advancements that come from the green and technological transformation.[6]

Skills forecasting

To determine the skills that are needed both in the current labour market but also in the future of work it becomes increasingly important to conduct labour market and skills analyses. Skills forecasting can in this regard play a crucial role in facilitating and shaping change and transitions, as they provide evidence-based insight into labour market trends and a range of other societal developments and their implications.[7] The private sector can use forecasts to anticipate future skills shortages which can inform the development of training programmes and policies to promote skills development and utilisation. This is particularly important for TVET institutions as they provide the pipeline of workers for these industries and need to equip and prepare youth for the future of work.

3 *Cedefop; OECD (2015)*
4 *Arthur, C. (2022)*
5 *Lijfering, S. & Lacey, N. (2023)*
6 *Howard, C. (2023)*
7 *Cedefop (2021)*

However, labour force data is weak in most African countries and systems for identifying, integrating and implementing new green competencies in TVET in Africa are limited.[8] In terms of identification, only 20% of African TVET stakeholders surveyed in 2020 said that their country regularly conducts national skills forecasts and that these forecasts pay explicit attention to the new skills required in a green economy.[9] Regarding integration, a 2017 analysis of the existing qualifications for sustainable development occupations in South Africa found that green skills occupations are poorly defined in the national system of occupations and that the bulk of environmentally-related qualifications are registered at tertiary or postgraduate education levels, reflecting a specialist entry-point and limited pathways into environmental jobs for individuals with lower-level or non-traditional qualifications.[10] Finally, in terms of implementation, a study examining the status of green skills and technologies on offer in TVET institutions in Africa found that the majority of TVET courses do not integrate green technologies in their training and that practical training through project work was missing. It also noted low skill levels among instructors linked to low levels of funding and support, including insufficient staff training on renewable energy skills and green technologies.[11]

While foresight research and more industry-driven curricula are useful to support demand-driven curricula, the dependence on employer-specific competencies means there is little engagement with the realities of the predominantly informal nature of African labour markets and self-employment, which is where the majority of workers end up. In addition, an external skills audit might not pick up the more nuanced skill needs in a changing labour market and may not align with the structure of the TVET system and other non-formal and informal training offers. As such, there is a growing need for more contextually driven approaches that take the reality of African economies and VET systems as the starting point.[12] This entails engaging with different stakeholders in the ecosystem to look more systematically at the elements of the system that are needed to support both the demand for skills and the development and utilization of skills in a holistic manner. McGrath describes this as skills ecosystem thinking, which recognises that future skills are influenced by a variety of interconnected factors and stakeholders. These can range from industry demands and political conditions to financial resources and cultural norms.[13]

Greening TVET

In line with these calls, emerges the concept of Greening TVET which, in broad terms is understood as "the process of adapting knowledge and practices to align them with the overall concept of sustainability". However, despite its prominence, there is no consensus on what greening TVET actually refers to and which approaches should be taken. Building on the framework presented by the UNESCO-UNEVOC International Centre for Technical and Vocational Education and Training and the work of Majumdar,[14] three perspectives on greening[15] TVET can be discerned. Firstly, on an institutional level, which sees greening TVET as an approach aims to align the educational institution with sustainability practices. Adding a sustainability mindset to the operational practices, strategic decision-making, curricula development and creating a green culture is seen as critical in preparing students for the future of work in the green economy. The second approach focuses on the learners, providing them with the right knowledge, skills and attitudes to make them active members of green economies and enable them to pursue lifelong

8 *Cramer, J. Sender, A. Oqubay (2020)*
9 *Regt, W. de, & Gianchandani, P. (2020)*
10 *Ramsarup. P. (2017)*
11 *Jahonga, W. M., Ngore, P. R. Muramba, V. W. (2015)*
12 *Allais, S. (2023)*
13 *McGrath, S. (2022)*
14 *UNESCO-UNEVOC International Centre for TVET (2017)*
15 *Majumdar, S. (2010)*

and decent work.' The third perspective views greening TVET as a cross-cutting theme that is influenced by externalities like policies and plays a role in reinforcing, or reorienting certain beliefs and values within society.

Despite different entry points, what most theories on greening TVET agree is that "Greening" goes far beyond simply what is taught. Greening reaches into all aspects of the institution's operations or enterprises. Based on existing literature,[16] we developed the following definition of greening TVET:

> *"Greening TVET is an approach that aims to facilitate sustainable policies and institutionalize sustainable practices and education in schools, communities and workplaces to equip individuals with the green skills and knowledge necessary to actively participate in sustainable practices and enabling them to pursue decent work and contribute to the green economy."*

In conclusion, to effectively green TVET, it is crucial to adopt a holistic and context-specific approach. Rather than relying solely on established qualification frameworks and immediate skill requirements, TVET should address the diverse and multifaceted realities of Africa. This includes considering informal economies, political dynamics, and socio-cultural factors to better meet the needs of learners and adapt to evolving industries. This will be particularly important for the solar sector, as the industry is still emerging and changing, which requires a responsive and future-oriented approach It also requires an inclusive and gender-responsive approach that recognises the different experiences and perspectives of learners and addresses inequalities on multiple dimensions, including for learners with disabilities, female students in male-dominated fields and facilitating meaningful engagement of youth in decision-making processes.

In addition to institutional changes, greening TVET should involve shaping the enabling environment through policy adaptation and promoting sustainable practices within industries and communities. Recognizing and addressing both internal challenges, like resource limitations and teacher shortages, and external factors, such as policy frameworks and industry demands, will help TVET align more closely with learner and labour market needs. In this regard, a multi-stakeholder approach is instrumental, whereby key players in the TVET and solar ecosystem come together to identify the emerging skill needs, determine relevant training requirements and establish supportive structures and favourable policies. This collaborative and contextual approach is essential for empowering young people to lead the transition towards a sustainable future.

[16] *See the various definitions in the UNESCO UNEVOC Glossary: here.*

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