Discussion Paper

Skills for a Just Transition to a Green Future

Published by

giz Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) GmbH

As a federally owned enterprise, GIZ supports the German Government in achieving its objectives in the field of international cooperation for sustainable development.

Published by
Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) GmbH

Registered offices
Bonn and Eschborn, Germany

Friedrich-Ebert-Allee 32 + 36
53113 Bonn, Germany

T +49 228 44 60-0
F +49 228 44 60-17 66
I www.giz.de

Programme / project description
Sector Project Technical and Vocational Education and Training (TVET)
svbb@giz.de

Author
FAKT Consult

Responsible / Editor
Amelie Daas, Annika Hornberger, Anja Speicher

Design / layout
FLMH | Labor für Politik und Kommunikation

Photo credits / sources:
TVET Material Handover Photovoltaic Programme Ghana © GIZ / Letivi Media, Page 17
TVET Material Handover Photovoltaic Programme Ghana © GIZ / Letivi Media, Page 32
Solar Plant Sao Mai Corporation Vietnam © GIZ / Thomas Imo, Page 40
Small Hydro Power Promotion Project Nepal © GIZ / Dirk Ostermeier, Page 48
Small Hydro Power Promotion Project Nepal © GIZ / Dirk Ostermeier, Page 58
Solar Plant Sao Mai Corporation Vietnam © GIZ / Thomas Imo, Page 59

URL links
This publication contains links to external websites. Responsibility for the content of the listed external sites always lies with their respective publishers.

On behalf of
German Federal Ministry for Economic Cooperation and Development (BMZ), Divison 104 Education.

GIZ is responsible for the content of this publication.

Bonn, October 2022

Discussion Paper

‘Our biggest challenge in this new century is to take an idea that seems abstract – sustainable development – and turn it into a reality for all the world’s people.’

Kofi Annan

Table of Contents

List of Figures

Text Boxes

List of Abbreviations

ALMM	Active Labour Market Measure
BMZ	Bundesministerium für wirtschaftliche Zusammenarbeit und Entwicklung (German Federal Ministry for Economic Cooperation and Development)
CE	Circular Economy
CEDEFOP	European Centre for the Development of Vocational Training
CoE	Centres of Excellence
DC	Development Cooperation
EE	Energy Efficiency
ESD	Education for Sustainable Development
EU	European Union
FC	Financial Cooperation
GHG	Greenhouse gases
GIZ	Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) GmbH
ILO	International Labour Organization
IRENA	International Renewable Energy Agency
IPCC	Intergovernmental Panel on Climate Change
JTF	Just Transition Fund
KfW	KfW Development Bank
LMIS	Labour Market Information System
LNOB	Leave No One Behind
MSME	Micro, Small and Medium-sized Enterprises
NDC	Nationally Determined Contribution
NQF	National Qualification Framework
NSDS	National Sustainable Development Strategies
PV	Photovoltaic
RE	Renewable Energy
RPL	Recognition of Prior Learning
SSC	Sector Skills Committee
SDG	Sustainable Development Goal
TC	Technical Cooperation
TVET	Technical and Vocational Education and Training
UN	United Nations
UNEP	United Nations Environment Programme
UNESCO	United Nations Educational, Scientific and Cultural Organization
UNIDO	United Nations Industrial Development Organization

Abstract

The transition to an environmentally sustainable and low-carbon economy, a so called Green Economy, will generate new jobs, while also causing jobs losses, and will alter the skill requirements of many jobs. This will have major implications for future Technical and Vocational Education and Training (TVET) systems as they need to provide the existing and future workforce with the required skills to find decent employment in the emerging Green Economy.

In order to explore, within the context of Development Cooperation (DC), how TVET has to adapt to meet the future requirements of Green TVET, a series of five studies is developed. Their aim is to distil necessary intervention needs, state practice-oriented recommendations, and develop a policy vision for the future. The current study presents the initial discussion paper which seeks to explore the role TVET can and should play in a Just Transition to a Green Future and how DC can support partner countries in this endeavour. Based on a review of recent literature and interviews with selected technical cooperation projects, seven theses and recommendations for the design of DC interventions related to Green Skills have been developed. These are intended for an interested public and professional audience, to serve as input for interdisciplinary expert discussions and to give new impetus to the conceptual development of Green TVET approaches.

Thesis 1 A successful Just Transition requires a coherent alignment of green agendas and skills development policies

A successful transition to a Green Economy requires the systematic orientation of educational systems and TVET systems towards sustainability. This can only succeed if sustainability is incorporated into a country's development strategies and all policy areas, including TVET – and vice versa, if TVET is integrated in environmental and sustainability policies. Developing countries often lack the required structures, but can be supported through strengthening governance and coordination mechanisms.

Thesis 2 The private sector needs incentives, sanctions and support to develop a demand for Green Skills

In many countries, the private sector does not yet demand Green Skills as market incentives are often insufficient. The employment gains of a skilled workforce will not materialise if the private sector is not comprehensively incentivised and supported to develop Green Jobs and demand Green Skills. Companies are often unmotivated to invest in costly environmental protection measures if (a) regulations

are not effectively enforced by authorities and (b) if they do not bring significant cost savings or additional revenue in the short term. DC measures promoting sectors with green potential such as renewable energy, energy efficiency, construction or waste recycling should examine and address both, the regulatory and incentive systems in order to promote the growth of Green Jobs.

Thesis 3 A Just Transition cannot be successful without the integration of the informal economy in green, economic and TVET policies

Given the prominence of the informal economy in many developing countries, it has to be given appropriate weight in the transition processes for two reasons: (1) to potentially reduce environmentally harmful activities in the informal economy and (2) in the context of Leave No One Behind (LNOB), to facilitate the inclusion of marginalised people working in the informal economy in modernised TVET systems.

Thesis 4 TVET is crucial to prepare the labour force for a Just Transition but TVET systems need to be strengthened and aligned with comprehensive social protection measures

The transition to a low-carbon economy will inevitably lead to structural and sometimes disruptive changes in the labour market. TVET systems and labour market policies are crucial instruments to prepare in time for this shift, if they (1) react flexibly to changing skill requirements, (2) transmit solid occupational and transferable core skills, (3) address initial training as well as re- and upskilling, (4) equally include women and (5) are aligned with active labour market policy for facilitating a Just Transition.

Thesis 5 Just Transition requires holistic TVET reforms, in line with Education for Sustainable Development, to ensure relevance, attractiveness and inclusivity

Current TVET systems are too weak to support a Just Transition. They often miss the necessary governance mechanisms, are poorly financed, lack sufficiently skilled teachers and instructors and are not linked to other education pathways.

As a consequence, TVET continues to be portrayed as second-rate education. There is a need for broad and holistic TVET reforms that are well coordinated with other relevant policies. These reforms should include alignment with sustainability and digitalisation policies, multilevel-governance approaches and close interlinkage with other forms of education. This needs to be complemented by mainstreaming of Education for Sustainable Development (ESD), integration of local knowledge and last but not least, initial and further training of TVET personnel that incorporates Green Skills and ESD.

Thesis 6 Just Transition increases the need for labour market forecasting to match emerging skill demands

Due to higher workforce mobility, shorter innovation cycles and the mega trends digitalisation and greening, the skill needs of future labour markets will become increasingly dynamic and the importance of skills forecasting will continue to increase. Anticipation mechanisms can be based on national labour market information systems (LMIS) if they exist and are functional. Alternative and sometimes more efficient solutions are sectoral or locally based skills forecasting approaches. Private sector engagement and a close interlinkage of labour market forecasting with TVET systems is indispensable to make use of the findings for the modernisation and greening of occupational profiles and curricula.

Thesis 7 The emerging skill demand in a Green Economy will require TVET to rapidly adapt existing occupational profiles and develop new ones

TVET systems are often slow in responding to changing skill demand. Thus, policy makers, project designers and practitioners need to strike a balance between a sufficiently rapid response to market needs and the anchoring of modernised or new green qualifications in qualification frameworks and TVET systems. Potential approaches for 'rapid response' include providing support to the private sector to develop in-company training programmes and the development of non-formal trainings as well as of certified training modules that can later be added to an existing occupational profile. The greening of occupational profiles should be guided by the relevance of occupational fields to greening, the demand for Green Skills, as well as an analysis of industry practice and the need for greening this practice. Further guiding aspects should be policies for mainstreaming green content in occupational profiles and curricula and the existing standards of a country for development of qualifications and curricula.

Based on the considerations above, the following types of DC interventions in TVET are recommended:

DC Interventions for a successful Just Transition

- **TVET system reform projects:** The modernisation of partner countries' TVET systems towards an adequate skills development for a Green Economy requires to integrate green strategies and a comprehensive set of instruments into TVET system reform projects. These include the greening of selected occupational profiles as well as the development of new ones; the mainstreaming of Green Skills across all occupational profiles and qualifications; capacity development for training providers; supporting skills development initiatives at local levels; and supporting institutions to develop coherent policy and regulatory frameworks.

- Projects promoting **skills development in selected Green Sectors:** In absence of a guiding policy framework for greening TVET, projects promoting sectors with greening potential should select relevant individual occupations and curricula as entry point and should emphasise potential employment effects;

- Projects addressing a **Just Transition:** Project designs focusing on Just Transition and employment promotion through re- and upskilling should cover all areas of the integrated employment approach* and programmes need to be embedded into a national policy for labour market transformation;

- Projects supporting **Green Skills development in the informal economy:** Although the promotion of Green Skills as part of projects supporting skills development in the informal economy is not yet well researched, Green Skills acquisition in the informal economy should be included in national TVET agendas. This will need the involvement of informal economy associations.

* For a short description of the integrated employment approach, please see page 59.

1 Introduction

The need for action in environmental and climate protection is immense: this decade will decide how the Earth's climatic conditions will change in the future. For the Paris Climate Agreement of 2015, the international community has therefore agreed on a binding limit of the temperature increase on Earth to "well below 2°C" to avoid reaching the critical climate tipping point (IPCC, 2021).

Despite the growing international commitment to climate and environmental agendas, implementation poses major challenges for countries, as it requires nothing less than a restructuring of economic systems with far-reaching consequences for the way we live. This includes, for example, the areas of macroeconomics and growth, as well as industrial, business, labour market, and social including education and qualification policy (ILO, 2019a). Carbon intensive sectors such as energy, mobility, construction and housing need to undergo a profound transformation in terms of technology, usage concepts and consumer behaviour. In addition, the COVID-19 pandemic has severely affected the economies of many states, particularly in less resilient developing and emerging countries (ILO, 2020a). Following a concept termed "Recover Better", international institutions have highlighted the hope that the recovery phase could serve not only to rebuild the pre-COVID-19 economies, but also to promote a reconstruction which is in line with our planet's environmental and climatic limits.

'It is high time now to take the skills development to a level where everybody should know about the importance of sustainable development.'*

This transition to a less pollutive, less environmentally degrading and less carbon intensive economy – a Green Economy – will however not be possible without workers with the appropriate skills to facilitate and accelerate this economic transition. Education systems will need to adapt to the newly emerging requirements, not only in relation to skill sets, but also to the forms and methods of teaching and learning. This concerns the entire educational system from basic to higher and adult education, but it is particularly true for Technical and Vocational Education and Training. TVET serves to equip current and future job seekers, as well as those already in the labour market, with the skills they need to earn a decent living in a Green Economy.

* Interview from DC Project in India. Please note: All interviewees have been anonymised due to data protection regulations.

The partner countries of international development cooperation (DC) also face this highly complex task in their respective contexts. They must set a decisive environmental, economic and political course for the future. At the same time, they need to engage in the continuous process of building and restructuring the domestic economy and education system in such a way that, in accordance with the UN 2030 Agenda for Sustainable Development, no one is left behind ('leave no one behind' – LNOB) in the transition to a Green Economy.

Intervention measures related to environmental sustainability have been part of DC since the 1990s. Activities such as the mainstreaming of sustainability in the TVET system or the provision of training for the personnel of, for example, the renewable energy (RE) sector, are documented in a wide range of best practice papers and sector reports issued by German DC organisations such as GIZ and KfW.

However, most partner countries have so far been unable to undertake far-reaching reforms for the transition to a Green Economy. With the high urgency of global change, more systematic efforts are needed by DC to effectively support partner countries in this transition and, in doing so, to strengthen the catalytic function of TVET systems to facilitate this change.

At the same time, reforms will need to address the demographic challenge of many partner countries which are experiencing a strong population growth and a steadily growing number of new labour market entrants. This will become even more difficult with the current fragile political climate and the numerous conflict situations around the world, even outside the war-torn countries. Crises like the Russian invasion of Ukraine highlight the fragility of global interdependencies. With rising prices for globally traded commodities such as oil or grain, countries might feel inclined to shift their focus more towards national food security or energy independence. This could imply a re-allocation of resources at the expense of already limited educational budgets. It will thus be all the more important to systematically advise and support partner countries in their transition to a Green Economy, despite major current challenges, in order to minimise medium- to long-term sustainability risks.

How to read this paper

This paper seeks to explore how DC can support partner countries in strengthening their TVET systems so that they facilitate a Just Transition to a Green Economy. It is based on a review of current literature, interviews with people involved in a range of GIZ projects and thematic discussions with DC and economic experts. This discussion paper is the initial part of a series of five related studies. Seven theses have been developed that are intended for an interested public and professional audience, to serve as input for interdisciplinary expert discussions in DC institutions and to give new impetus to the conceptual development of approaches to TVET in DC. The theses sketched out in this paper discuss the following key questions of greening skills and TVET:

- How is employment changing in formal and informal labour markets in developing countries and how must TVET systems be designed to meet the demands of a Green Economy?

- How can it be ensured that the transition to a Green Economy is just, and includes vulnerable groups?

- What experiences can be drawn from the adaptation of TVET systems in industrialised, emerging and developing countries and what does this mean for DC interventions?

- In what way does the wider institutional context, regulations and supportive private sector frameworks in emerging Green Sectors play a role in supporting partner countries to strengthen their TVET systems?

The theses presented below are thematically clustered: the first three theses deal with the fundamental political and economic framework necessary for a successful transition to a Green Economy and the transition's interdependence with the availability of Green Skills. They explore (1) the importance of coherent economic and TVET policies to match the supply of and demand for Green Skills, (2) the role of the private sector to strengthen the demand for these skills, and (3) the importance of including the informal economy in the transition process. The remaining theses explore the role and design of TVET systems in a Just Transition process, i.e. (4) what functions TVET provides in the transition, (5) the need for holistic TVET system reforms as well as (6) improved skills anticipation systems to fulfil these functions, and (7) different approaches to green TVET curricula. Based on these considerations, the last part of the paper focuses on the design of intervention measures, highlighting four different project types. It should be noted that this paper does not represent positions of the German Federal Ministry for Economic Cooperation and Development (BMZ).

2 Definitions

The discussion on the **transition to a Green Economy** (also referred to as the "**Green economic transformation**" or "**greening the economy**") and the associated approaches to achieving socio-economic change continues to be highly heterogenous. It is widely acknowledged that there is still a lack of a unified understanding of the associated terms. Below, the understanding of key terms as used in this study is briefly outlined.

A **Green Economy** is a market-based economy oriented towards environmental sustainability, economic profitability and social inclusion. Similarly, the United Nations Environment Programme (UNEP) defines it as an economy "that results in improved human well-being and social equity while significantly reducing environmental risks and ecological scarcity". Thus, **"green"** is used as a synonym for ecological (low-carbon, resource-efficient, non-pollutant) and social sustainability in contrast to conventional economic practices. Green practices include sustainable production processes, products and consumption patterns with the circular economy as a general paradigm for resource efficiency.

The transition to a Green Economy will necessitate major changes in conventional economic patterns. In order to highlight the interconnectedness of environmental and social spheres, the term **Just Transition** will be used in this paper to describe the process of "greening the economy in a way that is as fair and inclusive as possible to everyone concerned, creating decent work opportunities and leaving no one behind" (ILO). As such, it addresses the impact of the transition to a more climate friendly, less polluting and resource-efficient society in terms of one that offers more, better and decent work as well as social and environmental justice (Gass et al., 2020).

Green Jobs, according to ILO, are "decent jobs that contribute to preserving or restoring the environment, be they in conventional sectors such as manufacturing and construction, or in emerging Green Sectors such as renewable energy (RE) and energy efficiency (EE)". They help to (a) improve the efficiency of the use of energy and natural resources; (b) avoid or reduce the emission of greenhouse gases (GHGs); (c) protect and rebuild ecosystems; (d) support adaptation to climate change; and (e) avoid or reduce waste and pollution" (van der Ree, 2017).

Statistically, Green Jobs can be categorised in two ways. They can either support processes within conventional industries to become more environmentally friendly, or they can be categorised in relation to their final output (products and services that benefit the environment). **Green Sectors** are thus economic sectors or industries whose outputs contribute to the reduction of emissions and environmentally harmful practices. They entail emerging sectors such as the RE or e-mobility sector, even though there might be grey areas, as the definition does not mean that all activities along the value chain are necessarily environmentally friendly.
A Just Transition will entail systemic changes, including new products, services, production processes and business models. This will inevitably change the tasks and duties to be performed by certain professions.

Green occupations are thus professions whose set of tasks help to reduce the consumption of energy and raw materials, limit GHG emissions, minimise waste and pollution, protect and restore ecosystems and enable the private sector and communities to adapt to climate change.

The anticipated change in the occupational landscape will necessitate new skill sets which enable workers to adapt to the emerging requirements. **Green Skills** encompass "the knowledge, skills, values and attitudes required to live in, develop and support a sustainable and resource-efficient society" (UNIDO). It should be noted that there is not yet a universally accepted definition of Green Skills, but Germany has committed its 2022 G7 presidency partly to the development of mutually agreed definitions of key concepts (BMZ, 2022). For this reason, we adopt the above definition as the current working definition. Defined as such, Green Skills do not only include the necessary skills to work in Green Jobs but also fundamental environmental skills for jobs that are outside Green Sectors. This requires not only changing but also widening the technical and soft skills. Yet, the adaptation and expansion of skill sets will not be possible without a change in the current educational system in general and the TVET system in particular.

Education for Sustainable Development (ESD) provides all learners with the knowledge, skills, values and ability to act required to address the pressing global challenges such as climate change, loss of biodiversity, unsustainable resource consumption and inequality. ESD is thus a lifelong learning process which promotes the cognitive, socio-emotional and behavioural dimensions of learning. As such, it encompasses learning content and outcomes, pedagogy and the learning environment itself (UNESCO).

Green TVET equips people with the knowledge, competencies, skills, values and attitudes demanded by emerging Green Jobs to enable them to actively participate in a Just Transition and act as socially and environmentally responsible citizens.

The design of Green Skills training programmes differentiates between three principal target groups:

- **Initial training programmes** mainly target young people that do not possess any previous occupational skills or work experiences. This is a main target group of TVET institutions. These students seek to acquire occupational skills that will enable them to access employment opportunities and to pursue an occupational career.

- **Skill upgrading or upskilling** targets workers who are either employed or self-employed and who want to acquire new Green Skills on top of an existing qualification or occupational skill. Training programmes may be in-company or modular short courses. The aim of these courses is threefold: (a) to overcome gaps for Green Skills in a sector in a rapid manner, (b) to provide a worker with new Green Skills that are needed in the labour market, and (c) to improve the prospects of a business to access new business opportunities in Green Sectors. Before entering a skills-upgrading course, applicants usually have to prove their entry qualification either through evidence of a formal qualification or assessment of skills.

- **Reskilling** courses in the context of a Just Transition usually target people who are unemployed or at risk of losing their jobs due to the transformation of the sector they are working in. The aim of these courses is to enable a person to change or improve a qualification or skill in order to maintain employment or re-enter the labour market.

TVET Material Handover Photovoltaic Programme Ghana © GIZ / Letivi Media

3 Theses on Skills for a Just Transition

3.1 The political and economic framework for a Just Transition

Thesis 1 A successful Just Transition requires a coherent alignment of green agendas and skills development policies

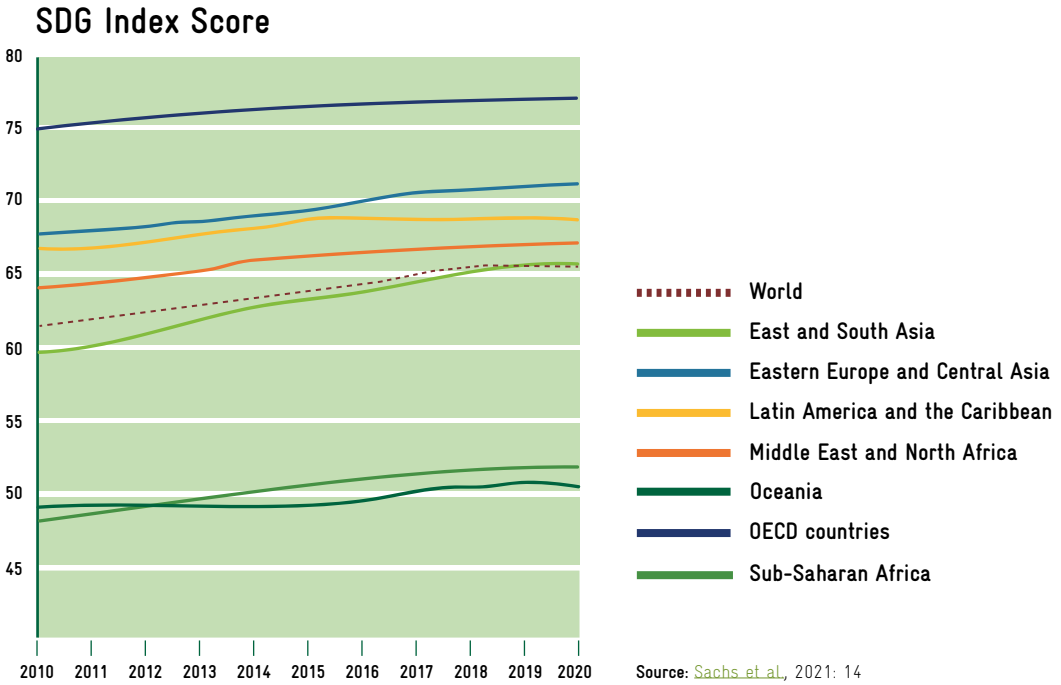
Coherent policy and implementation structures are indispensable to accelerate the demand for Green Skills, but also to promote their supply. This is a particular challenge for developing countries, which often lack a proactive government and suffer from weak governance structures.

193 countries, more than two thirds of which are developing countries, have signed the 2030 Agenda for Sustainable Development with the Sustainable Development Goals (SDGs), which offers a comprehensive global policy framework for the development of national sustainability policies. The 2030 Agenda includes the educational system in general and the TVET system in particular as an integral area for shaping the transformation. TVET is addressed in SDG 4 on quality education[1], but is also a cross-cutting topic in most other SDGs.

According to the SDG Index, 165 countries compare their progress on the SDGs with a baseline measurement. Sub-Saharan African countries are at the bottom of this list; of them, Cabo Verde (rank 86) performs best, while the Central African Republic (rank 165) worst. The countries of "East and South Asia" rank in the middle to lower field between 43 (Thailand) and 149 (Pakistan) (cf. figure 1). Changes in the Earth's climate and ecosystems are already having dramatic and negative social and economic impacts, affecting people and their livelihoods, economies and ecosystems. In view of sustainability risks, developing countries are far more vulnerable than most OECD member countries and their challenges on the path to sustainability are considerably higher.

[1] SDG 4: Ensure inclusive and equitable quality education and promote lifelong learning opportunities for all.

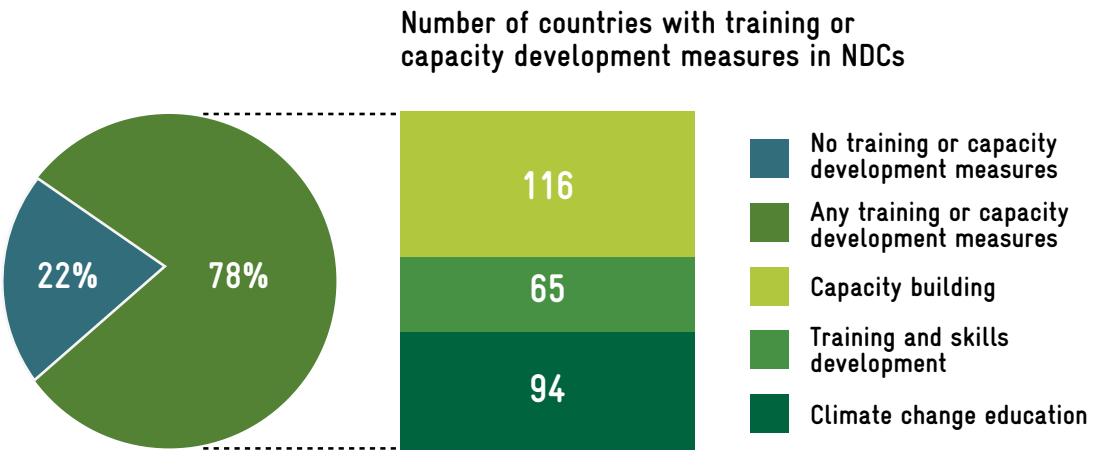
Figure 1: Progress on the SDG Index by region (2010-2020)



Source: Sachs et al., 2021: 14

In addition to the 2030 Agenda, the 2015 Paris Climate Agreement provides guidance for national sustainability policies. 184 signing countries have committed to take adaptation and mitigation action for specific sectors through Nationally Determined Contributions (NDCs). More than three quarters of those countries mention the importance of training or capacity development for Green Skills in their NDCs (cf. figure 2).

Figure 2: Share of countries that mention capacity development and skills training in their NDCs



Note: the sample consisted of 169 NDCs.

Source: ILO (2019): 21

However, in most cases, neither the National Sustainable Development Strategies (NSDSs) nor the NDCs outline skills development policies for Green Jobs specifically (ILO, 2019a). The United Nations Educational, Scientific and Cultural Organization (UNESCO, 2021) points out that policy makers in Africa need additional institutional support and training in local and global climate change and environmental science, including impacts and vulnerabilities, to form their policy decisions. In the Asia-Pacific region, the weak top-down decision-making pyramid is one of the biggest challenges to initiate change. **Policy decisions at the top level fail to be implemented due to weak coordination mechanisms with downstream authorities and weak implementation capacity at all levels.** This suggests that institutional guidance for sustainability mainstreaming in public authorities can be a helpful entry point for technical cooperation (TC). **The establishment and training of sustainability and gender officers in all ministries and official units and their systematic integration into decision-making, reporting processes and qualification frameworks in particular could advance green mainstreaming[2] in partner countries.**

Although progress can be observed in national laws, regulations and policies on environmental issues, some countries are better than others at coherently integrating green policies into national employment and skills policies and vice versa (van der Ree, 2017). In particular in developing and emerging countries, Green Skills remain a major gap in the national policy landscape (ILO, 2019a). Although high-income countries fare better in general, an analysis of six European countries highlighted their need for stronger coherence among national environmental and TVET policies (CEDEFOP, 2019). Globally, most initiatives were ad hoc strategies, limited to the local or regional level (ILO, 2019a).

‘The green transition can generate millions of jobs, but these are conditional on the availability of relevant skills and training.’*

A Just Transition to a Green Economy requires coherent legislation, effective enforce-ment structures at all levels, (economic) incentives and sustainability education to push companies towards sustainable business practices and consumers to sustainable consumption patterns. This is a prerequisite for a substantial increase in the demand for Green Skills. To achieve this progress, **governing institutions need to abandon their siloed thinking and forge new paths of exchange and consensus building** between and among technical disciplines, political and administrative institutions and implementation structures.

* (ILO, 2019a: 188)

[2] Green mainstreaming refers to the systematic incorporation of sustainability issues throughout all governmental institutions and policies. As such, it includes the process of assessing the implications for climate and environment of any planned action, as well as the iterative procedure of integrating respective objectives into policymaking, budgeting and implementation processes at national, subnational and sector levels.

Governments must take a proactive role to reconcile the demand and supply of Green Skills

The implementation of a green agenda is promoted by **government institutions that act as facilitators, coordinate strategies across ministries and departments, jointly assess the impact of policies, find appropriate compromises and cooperatively drive implementation.** In Germany, for instance, a National Sustainability Council has been established at the Chancellor's Office; it is equipped with renowned scientists and public figures. The interdisciplinary team of experts focuses on all 17 SDGs, including TVET. On the European level, the European Union (EU) unveiled a new growth strategy in December 2019 ("the European Green Deal") for a fair and prosperous society with a resource-efficient and competitive economy, with zero net greenhouse gas emissions (GHG) in 2050 and economic growth decoupled from resource use[3]. TVET plays a crucial role in fostering a skilled workforce for a successful transition to a Green Economy. A sustainability policy requires the systematic collection of relevant data on economic, environmental, and social issues, which enables the anticipation of skill needs.

'Implementation and enforcement of policies continue to be among the biggest challenges facing all countries, and the greatest challenge of all is monitoring and evaluation of policy performance, for all country income groups.'*

In countries with a limited commitment to sustainability and weak implementation structures, Green TVET struggles with a labour market which has no significant demand for workers with Green Skills. This mismatch increases with the degree of rigid departmental thinking, the absence of public-private and social dialogue and unclear procedural and responsibility regulations at vertical and horizontal administrative levels. It is exacerbated by a lack of sufficient budgets and personnel, insufficient qualifications in the administration, missing (economic) incentive structures and corruption. Recent GIZ projects for RE and EE promotion in Africa, such as the Green People's Energy project in Zambia and the German Climate Technology Initiative in Ghana, address these issues by including Green TVET components and supporting cooperation mechanisms between the private sector and TVET institutions.

Green TVET policies require clear ownership and an active steering role from the government to give high-level strategic direction and clear mandates to all ministries and administrative bodies involved. However, in developing countries, green policies have often been stimulated by international environmental agendas and international development agencies involved in the development of strategies, such as NDCs and NSDSs

* (ILO, 2019a: 36)

[3] Decoupling resource use from economic growth is highly debated; in general it refers to the ability of an economy to grow without incurring proportional increases in environmental pressure and resource consumption, e.g. through an increase in efficiency through procedural and technological innovations.

(ILO, 2019a). Although these can be important drivers for the development of skills policies for Green Jobs, it is crucial that national governments take up full ownership for these strategies. This underpins the ILO's statement that national sustainability strategies are an indispensable prerequisite for successful Green TVET approaches.

An effective sustainability policy for a Just Transition needs a coherent policy framework, reform-minded governing bodies, cross-disciplinary thinking and communication as well as functioning implementation structures. In this regard, DC can support its partner countries by facilitating the systematic integration of sustainability concerns in all policy areas and strengthening their implementation mechanisms.

Smart flagship initiatives can unleash potential for the governance of a Just Transition and matching the demand and supply of Green Skills.

Well-designed and coherent policies at subnational and sectoral levels can help to fill the coordination gap at national level to align skills development and sustainability policies. Thus, besides the strategic top-down approach, a bottom-up approach is equally important: existing national strategies in policy areas need to be aligned with sustainability strategies, and pilot initiatives in a sector or local area might be scaled up to the higher level (ILO, 2019a). However, the lack of frameworks for the implementation of sustainability strategies limits the commitment of both public and private stakeholders to green subjects.

Donor-driven flagship initiatives such as the EU Covenant of Mayors campaign, which was originally limited to EU member states, have shown that it is able to mobilise local actors from politics, administration, private sector, civil society and academia for concerted climate action by establishing communication and cooperation structures, offering a simple target system, guided implementation and a convincing marketing concept.

While such initiatives cannot replace governance, they can show how green mainstreaming can work in practice, where Green Skills are relevant in the context of the initiative and which skill profiles need to be adapted or created.

Thesis 2 The private sector needs incentives, sanctions and support to develop a demand for Green Skills

The supply of a skilled workforce is crucial for a Just Transition, but the private sector needs to be comprehensively promoted and incentivised by the government to develop Green Jobs and demand Green Skills.

Changing the traditional economic development path requires a reorientation of all economic stakeholders. In order to change harmful behaviour, a legal framework is needed that is effectively enforced. **However, it takes more for employers to shift to the path of sustainability: economic incentives that make sustainable behaviour less costly than harmful behaviour and support structures that help companies to adopt sustainable production patterns. Here, Green TVET is one of the most important enablers, as it provides the necessary skills to foster innovation, which is crucial for a transition process.**

ILO (2017) outlines five factors that enhance the necessity for a Just Transition:

- growing degradation of the environment and reduced provision of clean air, fresh water and carbon storage, with adverse effects on economic activity and human health;
- changes in public and private investment patterns, increasingly favouring clean energy over fossil fuels;
- shifts in public policies aiming to accelerate the transition towards more sustainable economies;
- changing consumer preferences that reflect growing awareness about environmental protection and sustainability considerations; and
- innovation and technological developments leading to gains in energy and material efficiency.

‘Governments need to understand the opportunities and pitfalls to minimise the costs and maximise the gains, striking a fine balance between environmental objectives and competitiveness, industrial development and job agendas.’*

However, developing countries face various economic and institutional constraints that make a Just Transition difficult (cf. Thesis 1). **Public sector efforts carry a high risk of failure due to interest group pressure, profit-seeking or imperfect information – problems that lead to outcomes favouring certain groups rather than society as a**

* (UN-PAGE, 2017: 17)

whole. Measures that are specifically designed to promote certain industries or technologies, such as feed-in tariffs for RE, tax breaks for innovative companies and green public procurement, require good governance (UN-PAGE, 2017).

Given the lack of green agendas in many partner countries, corporate interventions for green mainstreaming with the private sector have focused on cost benefits (cost savings e.g. through energy, water and material efficiency) and market benefits, especially through green value chains. Both are based on the individual interests of companies. As experiences from Ghana, Mongolia and Côte d'Ivoire show, companies are not motivated to invest in costly environmental protection measures if these do not bring significant cost savings or additional revenue in the short term, or as long as a penalty or bribe is affordable. Therefore, donor-funded credit lines for greening the private sector, even with a grant component, have rarely been successful unless the government has effectively enforced green industrial policies. **This suggests that DC to promote green businesses and Green TVET can be most effective when combined with strengthening governance structures, at least at the local (and regional) level.**

'There is a complete lack of awareness and knowledge. Awareness is the biggest issue when it comes to the implementation part.'*

Legislation can promote or impede a green market. For example, an energy feed-in law can be a market opener for RE products and services. Similarly, subsidies can prevent or hinder market development for green products and services. A major barrier to EE and RE markets is high public subsidies for fossil fuels that make heating, cooling and transport affordable for the poor. As experience from interventions in Mongolia and Côte d'Ivoire shows, low energy prices from fossil energy have proven to be a strong disincentive to investment in energy saving and RE.

DC measures to promote RE and EE, including TVET, should therefore examine the incentive systems in the partner country during the project planning phase and, if necessary, include further measures to flank the core measures.

This could be, for example, policy advice to mitigate poverty risks from higher fossil fuel prices and short- to medium-term labour market projections to provide a realistic assessment of employment opportunities for RE experts.

* Interview from DC project in India

Innovative companies usually start by training or re- and upskilling their own local workers through workplace training programmes, e.g. company-internal workshops and mentoring, or, in fewer cases, by using the services of specialised private training providers to train their workers. A similar approach can be observed in donor-funded projects that promote skills development in green occupations. The major difference is that companies usually cover their actual needs for skilled workers in the short term through in-house training, whereas in some DC projects skilled workers are trained for emerging markets, i.e. the labour demand may not yet fully exist at the time the training is provided. For example, in GIZ's Vocational training in the sector of renewable energies and energy efficiency project (ProFERE) in Côte d'Ivoire, energy auditors were trained without significant demand for their services in the short term. Initially, it was difficult to find trainees, while later qualified trainees did not find an opportunity to apply their new skills. Therefore, a market development component was later added to ProFERE II to support the implementation of the regulation which requires large energy consumers to conduct energy audits. This illustrates once again the importance of an integrated approach in DC that addresses both the supply and demand side of the labour market.

Focusing on potential employment benefits Development Cooperation can give more leeway to support partner countries in the transition to a Green Economy. However, there is a risk of only promoting jobs in growing Green Sectors and not changing the environmentally harmful practices of existing industries, which often comes with additional costs.

'As TVET systems are slow in responding to labour market changes we cannot afford to wait until the private sector demands Green Skills. We need to anticipate the demand and need to start now with the greening process of TVET systems and occupations.'*

* Quote from GIZ Thementag 2021 "Going green – skills and jobs for a sustainable transformation"

Thesis 3 A Just Transition cannot be successful without the integration of the informal economy in green, economic and TVET policies

Although often below the radar of green, economic and TVET policies, the informal economy plays a crucial role for a successful Just Transition in developing and emerging countries. The potential to reduce environmentally harmful activities and the imperative to leave no one behind (LNOB) make the inclusion of the informal economy inevitable.

The informal economy plays an important role in developing and emerging countries and is explicitly addressed in SDGs 8[4] and 10[5]. The informal economy includes all enterprises, workers, and activities that operate outside the legal regulatory framework of society, and the output they generate. In particular, it refers to employment outside the labour protection regulations, whether in formal or informal enterprises.

With 2 billion people working in the informal economy, it includes 60% of the global labour force and more than 90% of micro, small and medium-sized enterprises (MSMEs) (IMF, 2021), encompassing a variety of forms within and outside economies (ILO). Thus, informal employment is the norm rather than the exception, in many parts of the world (OECD, 2008). Informal employment is highest in Africa where it forms 85.8% of total employment. The proportion is 68.2% in Asia and the Pacific, 68.6% in the Arab States, 40.0% in the Americas and 25.1% in Europe and Central Asia (ILO, 2018c). **Given the magnitude of informality in many countries, it is imperative to understand the local informal economy in order to systematically include it in a Just Transition process.**

Most people working in the informal economy are engaged in two or more jobs at the same time (Chen & Doane, 2008). Usually they have to face poor working conditions, such as low and irregular payment, lack of social security and recognition, unsafe work places and a lack of access to information, markets, finance, training and technology (ILO). However, the informal economy provides many people with their only possible access to productive employment and livelihood security, especially for marginalised groups such as women and migrant workers, and serves as a social buffer and fall-back option in times of economic turmoil (GIZ, 2019). It thus plays a crucial role in eradicating extreme poverty and hunger and promoting gender equality, particularly since marginalised people are even more vulnerable to the effects of climate change due to their restricted access to resources (ILO, 2018a). Cultural, economic and social gender differences exacerbate the vulnerability of women, who often earn a lower income from labour but also have a risk of exposure to higher decent work deficits.

[4] SDG 8: Promote sustained, inclusive and sustainable economic growth, full and productive employment and decent work for all.

[5] SDG 10: Reduce inequality within and among countries.

The informal economy is associated with environmentally degrading and polluting activities, although these activities are not necessarily more harmful to the environment than activities of the formal economy. Partly because it is often viewed as 'illegal' or 'unregulated' by policy makers, the informal economy has rarely been considered in the transition to a green, more resilient economy (Brown et al., 2014), despite its potential in a range of informal activities that benefit the poor, such as collection and trade of recyclables.

Formalisation of the informal economy can threaten the livelihoods of those engaged in it (e.g. introduction of a formal waste management system that attributes the property rights of recyclables to contracted waste collection firms). However, examples from different countries have shown that a cautious formalisation strategy can be successful both economically and socially.

This requires a rethinking of local policy and administration and the abandonment of dogmas that frame the informal economy as a threat to local authorities and a detriment to the economy. It is about developing a more inclusive, greener and resilient economy and improving formal regulatory systems, informal economy operations and their interactions (Brown et al., 2014). In this context, awareness raising, information, education and training in the informal economy as well as the promotion of linkages to the formal educational system, especially through the Recognition of Prior Learning (RPL), are of particular importance.

'Rather than discrediting the informal economy, we need to ask how to capture the informal economy's potential to accelerate the transition to a low-carbon economy.'*

Many concepts which have been developed for workers in the formal economy can also be used in training for informal workers, for example, safety training in the waste and recycling sector (Kawakami & Khai, 2010). ILO and the European Centre for the Development of Vocational Training (CEDEFOP) have defined key competences for Green Jobs such as entrepreneurial or adaptability and transferability skills that also apply to jobs in the informal economy (ILO, 2011).

When targeting the informal economy with re- and upskilling measures and improving apprenticeships related to Green Skills, the organisation of training makes it necessary to consider the special needs of informal workers in terms of educational level, accessibility and location, language, time and involvement of local organisations. The integration of life skills into training as well as offers for basic literacy and numeracy training can increase the impact and attractiveness of the training offer for target groups (GIZ, 2019).

* Muyeye Chambwera, International Institute for Environment and Development, 2012

Besides enhancing the skills of individuals, training measures especially on the handling of (low-tech) technology and quality management play an important role (cf. text box 1). Respective qualification measures should therefore be embedded in a reliable legal framework and in a broader strategy to increase social acceptance of the informal economy (GIZ, 2019).

Text box 1: Quality management for solar photovoltaic (PV) installation in Côte d'Ivoire and India

The RE cluster of GIZ's **Indo-German VET Programme** (IGVET) in India and GIZ's **Vocational training in the sector of renewable energies and energy efficiency** project (ProFERE) in Côte d'Ivoire have reported that the lack of adequate training for workers in micro and small enterprises installing solar PV systems has caused quality issues in installation, e.g. small fractures in the PV modules. This has led to shorter repair cycles, higher costs, longer amortisation periods* and a general loss of trust in the technology. Adequate training for installation and maintenance as well as quality regulations on products (e.g. quality standards for import) can help to increase trust in the technology and the sector.

* Time period until returns or cost savings exceed the initial investment.

This requires a close and inclusive cooperation of the stakeholders, including relevant government organisations, cooperatives and informal associations, civil society organisations, and the private sector (Marty, 2016). Experiences from non-green DC projects, e.g. the Financial Cooperation (FC) Ghana TVET Voucher Project, and green projects, e.g. GIZ's Indo-German VET Programme (IGVET), highlight the importance of closely cooperating with trade or industry associations representing (informal) MSMEs of the respective sector. **Cooperation with women's associations is important to give women better access to professional opportunities through TVET and other support measures.**

Dual training programmes that aim to improve the informal apprenticeship system such as those supported by TC and FC in Ghana provide an opportunity to include green content into the training of both master craftspeople and apprentices. The involvement of master craftspeople in the design of training programmes is a key success factor, as they can be important change agents for greening jobs in the informal economy. Due to historical, political and social reasons, informal economy associations are not found in every country, and those that do exist often lack sufficient institutional capacities. This requires initial capacity-development measures for these associations to enable effective coordination.

Various programmes and projects show positive environmental and economic impacts that can be achieved through training for environmentally friendly activities in the informal economy, for example, in urban agriculture (Benson et al., 2014). In Côte d'Ivoire, the Handwerkskammer Saarland (the chamber of crafts for the German region of the Saarland) supports a project which uses informal craftspeople in urban areas as multipliers. As they are closer to the needs of poorer households, informal artisans are trained to sensitise private households to the benefits of solar devices and to carry out maintenance work for small photovoltaic (PV) devices (e.g. ventilators).

- **All this suggests that the informal economy needs to be integrated into ecologically sustainable value chains and its workers must be provided with access to support measures, in particular TVET, to participate in the process of change and its opportunities.**
- **In order to strengthen gender equality, special programmes in existing and new projects should be set up for the training of women and girls in order to meet their special needs, which include a protected learning and working environment and adjusted training hours to enable the fulfilment of traditional family tasks.**

3.2 The role of TVET in a Just Transition Process

Thesis 4 TVET is crucial to prepare the labour force for a Just Transition but TVET systems need to be strengthened and aligned to comprehensive social protection measures

The transition to a low-carbon economy will inevitably lead to structural, sometimes disruptive changes in the labour market. TVET systems and labour market policies are crucial instruments to prepare in time for this shift. This will allow minimising frictions and help to leave no one behind (LNOB).

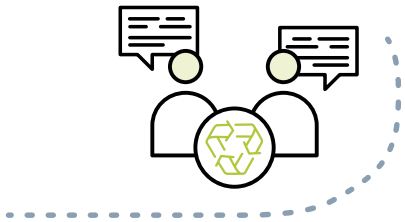
The transition to a Green Economy will have substantial implications for labour markets globally. Some industries, such as oil refining, will largely disappear; existing industries are undergoing technological change and new economic sectors are emerging or growing, such as those related to the circular economy[6] (CE) and RE. The global RE sector, for example, is forecasted to grow from 12 million jobs[7] in 2020 to 38 million in 2030 and 43 million in 2050 (IRENA 2021: 54).

In general, the transition will impact the labour market in four ways:

- Labour market transformation displays two sides: There will be a **growth in global employment** induced by the transition to a sustainable energy sector and CE (ILO, 2018a). Simultaneously, there will be **job losses in declining high-carbon industries** and workers will not be able to find adequate replacement in growing industries, even if this loss is at a modest rate (1% of the global workforce) as predicted by the ILO (2019a: 24) (cf. figure 3 and 4).

- The majority of occupations will be moved to other emerging industries (**reallocation**). This includes the **substitution of employment** (e.g. waste management jobs in landfill sites moving to incineration and recycling).

- **Existing jobs will be transformed** to incorporate new skill sets and work methods, e.g. jobs in sectors where energy and resource efficiency are relevant (e.g. manufacturing processes changed to be cleaner, new materials and products used in construction).



[6] The circular economy is a model of production and consumption in which existing materials and products are kept in the cycle of use for as long as possible. This requires an economic system that includes (1) innovative forms of use, such as sharing or leasing, (2) services for reuse, repair, refurbishment and rental, and (3) private companies for high-quality material recycling and (municipal) infrastructure for thermal recycling.

[7] In the 1.5°C scenario.

- **Job growth and job losses will be unevenly distributed across skill levels, regions and genders:** While most new jobs will be created in medium- and high-skilled occupations, low-skilled workers are most at risk of redundancy. In developing and emerging countries, decarbonisation efforts will have greater impacts on labour markets since these countries tend to have labour rather than capital-intensive industries and more energy-intensive economies (Auktor, 2020). In some regions, the transition might even induce negative effects on overall employment due to job losses in e.g. the coal or oil sectors (cf. text box 3). As for gender patterns, the ILO predicts that "men in mid-skill occupations will have the greatest need of reskilling and upskilling to enable them to tap into new job opportunities. This also suggests that current occupational gender stereotypes are likely to persist: women will get only a fraction of the jobs created, unless measures are taken to train women in relevant skills, so that they can benefit from potentially created jobs" (ILO, 2019a: 24).

Text box 2: Modeled Global Employment Effects for the Circular Economy (CE) and Renewable Energy (RE) Sector

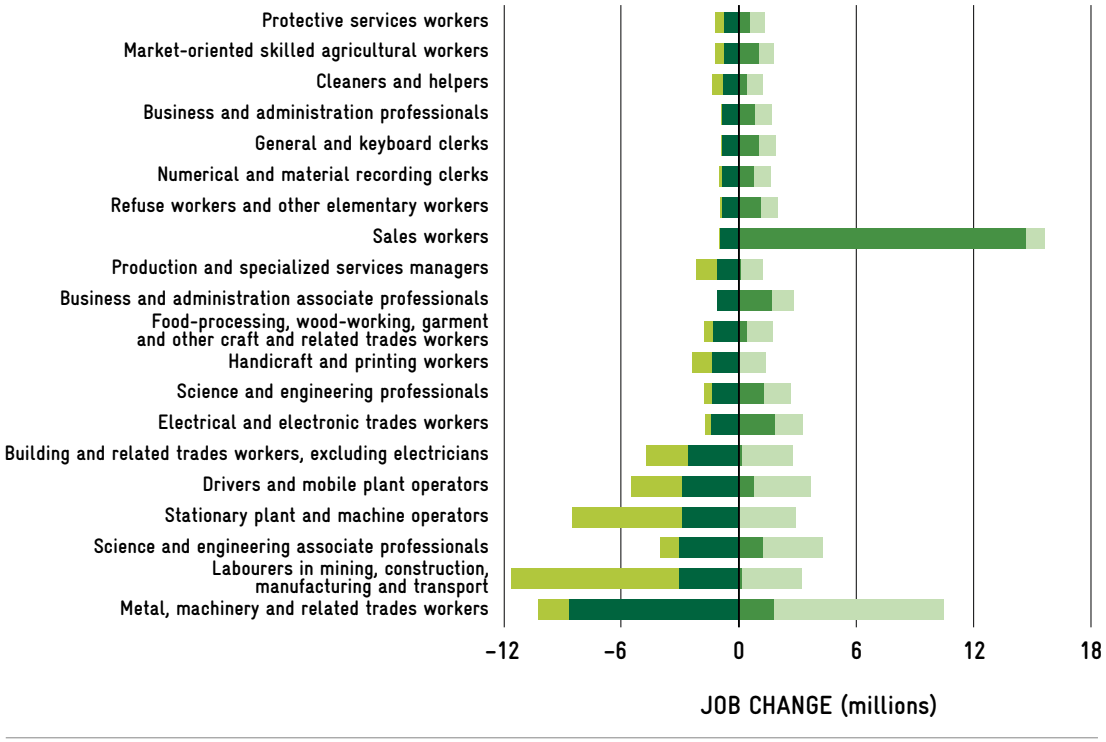
The transition to a Green Economy will most affect those sectors which are responsible for large parts of global greenhouse gas (GHG) emissions, such as energy, transport and construction. A modeled global analysis (ILO 2018a; 2019a) on the employment effects caused by the transition to RE and a CE by 2030 has found that the **transition from a fossil-fuel based to a RE sector** is expected to generate a net growth of 18 million jobs by 2030. The emerging value chains of the RE sector will accommodate for 24 million new jobs, while in the declining traditional energy sector 6 million jobs will be lost. Five million of these workers will be able to find a job equivalent in the emerging industry. **The transition to the CE**, in turn, is forecasted to generate a smaller net growth of jobs (seven million), but will see much wider shifts of employment between industries. The CE is forecasted to create 77 million new jobs along its value chains, while 70 million jobs are projected to be lost, primarily in industries related to primary resources and the manufacturing sector. Of these, 40 million people will be able to find a job in the emerging industry, while 30 million workers will lose their jobs without finding adequate replacement in the new industries (ILO, 2019a: 140).

More than a third of the twelve million jobs provided globally by the RE sector in 2020 is concentrated in China, while only 324,000 are currently found in Africa (IRENA 2021: 34). At the global level, the RE transition will induce future net job growth. However, the Middle East and Africa will experience net job losses (around 300,000 and 350,000 jobs, respectively) if the economic structure of these regions does not divert from the historical trend and projections to 2030 (ILO, 2018a: 14).

The demand for skills will shift over time as parts of the value chain gain and lose signifi-cance and technologies mature. Initially, the development and introduction of new technologies might absorb high numbers of workers temporarily. For example, 80% of South Africa's workforce in the RE sector currently consist of construction workers (IRENA, 2021: 51). However, the demand for labour and the type of skills required may change when technologies settle and operations and maintenance become more prominent.

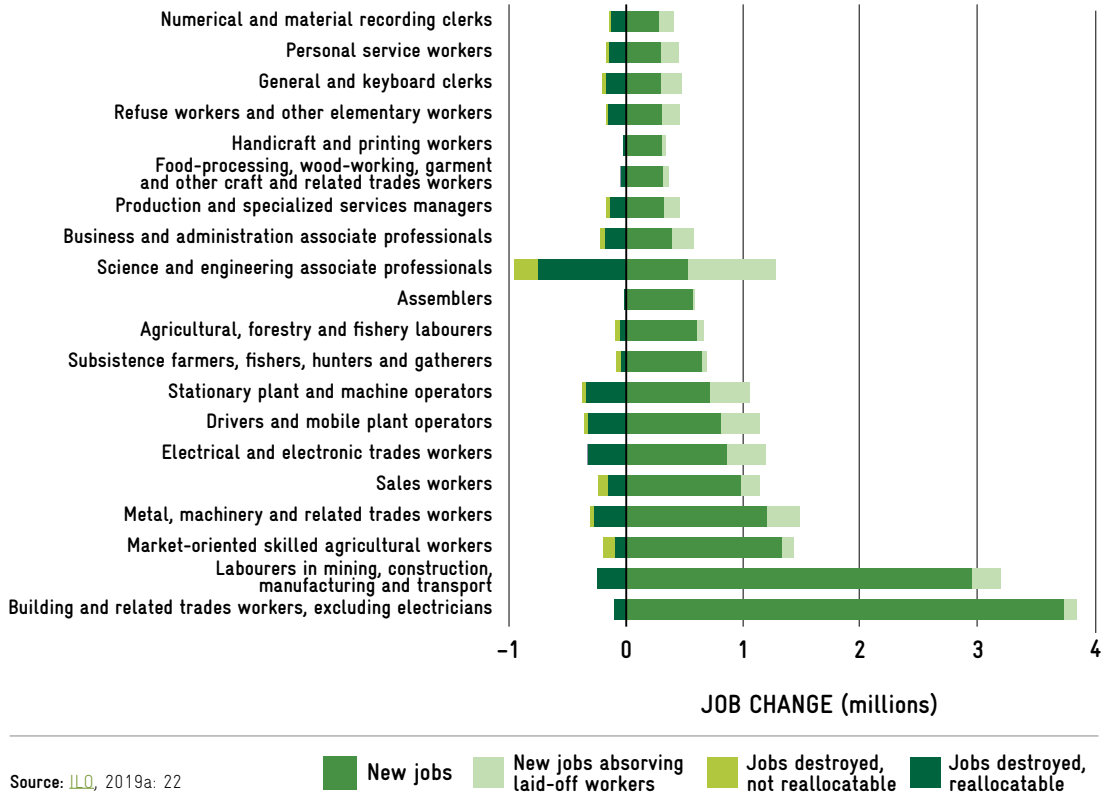
TVET Material Handover Photovoltaic Programme Ghana © GIZ / Letivi Media

Figure 3: Occupations most susceptible to job destruction and reallocation across industries in a global circular economy scenario, 2030



Source: ILO, 2019a: 23

Figure 4: Occupations most in demand across industries in a global energy sustainability scenario, 2030



Source: ILO, 2019a: 22

In addition, digitalisation and the COVID-19 pandemic are putting substantial strain on overall employment, particularly in developing countries. This catches many people, especially the vulnerable, unprepared and can lead to increasing poverty and inequality. **There is an urgent need to actively counteract these dynamics with a holistic approach combining various policies, such as labour market and social as well as education and training policies.**

The ability of workers to adapt their skills and switch across sectors will be a key factor for job security. **TVET plays thus a central role in preparing the existing and future workforce for the emerging skill requirements and the foreseeable transformation of the labour market.** TVET systems, in order to be responsive to the dynamic developments of green technologies, must include both: a future-oriented initial TVET that prepares young people for future labour markets as well as to facilitate lifelong learning, i.e. the re- and upskilling of the labour force. **This requires a modular system of training with flexible entrance and exit points. TVET can then take up an essential role in specifically preparing underprivileged, vulnerable people for jobs in growing markets, thus enabling them to move up the social ladder.**

TVET systems will have to face the challenge of providing for solid vocational skills and at the same time allowing for flexibility and adaptability. Transferable core skills, such as communication skills, analytical reasoning and adaptability, are becoming increasingly central to ensuring labour market mobility, both vertically across sectors and occupations, and temporally to adapt to new developments in a sector (Pavlova, 2019; IRENA, 2021). However, the focus on transferable skills should not come at the expense of transmitting sound occupational skills, theoretical knowledge and awareness. Only based on a firm educational fundament learners and future workers can undertage meaningful up- and reskilling processes in the course of their (working) life.

However, TVET should not solely be responsive to the demand for labour. By pre-empting skills developments, **TVET itself can be an important driver of change. Education and skills training are crucial for raising environmental awareness and can thus contribute to creating a market for green products and services or drive technological innovation** (cf. text box 1).

Existing **TVET institutions need to be strengthened** so as to facilitate the implementation of the required changes. These include adapting existing initial TVET programmes and developing new occupational profiles based on data forecasting. In addition, there is a need for strengthening short-term up- and reskilling programmes for the existing workforce. In order to meet dynamic demands, TVET systems need to anticipate skills developments in a timely manner and become increasingly flexible. This requires a close integration of and coordination with industry (companies, associations, chambers) and civil society at an early stage and on a regular basis.

Moreover, a **Just Transition will require comprehensive social protection measures** for those at risk of losing their jobs, such as **Active Labour Market Measures (ALMMs)**, effective labour market institutions and career guidance. For workers from declining industries at risk of being laid off, social programmes to create alternative livelihoods must be embedded in the economic restructuring process and planned with the participation of social partners representing affected workers and communities (ILO, 2019a). TVET can contribute by ensuring access to re- and upskilling for those affected (this may include entrepreneurship and financial literacy programmes to promote self-employment), by providing career guidance and through the Recognition of Prior Learning (RPL). In the case of reallocation between industries, ALMMs should include incentivising employers to provide job opportunities to vulnerable persons. In addition, they should facilitate internships, career guidance and job matching, as well as social protection measures for the transition phase.

RPL and certification of skills, including those acquired through informal or on-the-job training, are vital to overcome potential bureaucratic barriers that prevent suitable workers from finding employment in new industries. The country component of GIZ's Green People's Energy project in Zambia, for example, has developed solar PV upskilling modules for electricians in the current workforce. To enable trainees who have work experience in the electrical sector, but no formal education, it cooperates with selected TVET institutions to offer RPL programmes across the country. Assessments are accompanied by short training sessions on workplace safety, human rights and entrepreneurship.

Text box 3: 'Recover Better' and the Just Transition Fund to respond to the disruptions induced by the COVID-19 pandemic

The OECD recommends that countries, as part of their Recover Better approach, use a flexible and responsive set of ALMMs that stimulate labour demand, such as hiring subsidies and social security exemptions, to prevent excessive unemployment that may hinder the recovery.

A suitable model to support partner countries may be the Just Transition Fund (JTF) that the EU has launched for its member countries to socially facilitate and buffer the transition. The fund shall "alleviate the socio-economic costs triggered by the climate transition, supporting the economic diversification and reconversion of the territories concerned, and helping people to adapt in a changing labour market". In order to unlock and implement JTF resources, EU Member States need to ensure consistency with the smart specialisation strategies* and National Energy and Climate Plans**.

A similar challenge fund, tailored to the specific needs of developing and emerging countries, could help partner countries to modernise their TVET institutions. In addition, it could support the design and implementation of short- to long-term labour market strategies as well as the establishment of innovative coalitions, flexible TVET approaches and labour market mechanisms to manage a Just Transition. Such a fund could be financed from the respective state budget and leveraged by contributions from (one or several) donors.

* National and regional authorities across Europe shall design smart specialisation strategies in the entrepreneurial discovery process, so that the European Structural Investment Funds can be used more efficiently and synergies between different EU, national and regional policies, as well as public and private investments can be increased.

** To meet the EU's energy and climate targets for 2030, EU countries need to establish a 10-year integrated national energy and climate plan for the period from 2021 to 2030. These plans need to address the following topics: EE, RE, GHG emissions reductions, interconnections and research and development.

To sum up, the transition to a Green Economy will have uneven labour market effects. TVET's key role in preparing the labour force for a Just Transition includes:

TVET systems need to be strengthened to react flexibly to changing skill requirements.

They need to concomitantly transmit solid occupational and transferable core skills.

- ➜ There is a need for new and adapted initial TVET programmes, as well as for an upscaling of short-term re- and upskilling programmes.
- ➜ TVET needs to promote gender equality in the context of Just Transition processes and the modernising of economies.
- ➜ TVET needs to be aligned with comprehensive social protection measures, such as ALMMs, career guidance and RPL.

Thesis 5 Just Transition requires holistic TVET reforms, in line with Education for Sustainable Development, to ensure relevance, attractiveness and inclusivity

In many partner countries, current TVET systems are too weak to support a Just Transition. Holistic reforms are a precondition for Green TVET. Such reforms must expand TVET's mandate from a pure skills training to offering a holistic educational pathway, including Education for Sustainable Development (ESD).

In many partner countries, TVET systems have developed from colonial education structures and are still struggling with this legacy. During colonialism, education served the narrow objectives of the colonial administration. With the exception of the mining sector, developing technical and vocational skills in the local population was not a priority. While TVET gained importance after independence, higher education still seems to be the most attractive pathway to social mobility, even though it does not necessarily lead to meaningful employment. By contrast, **TVET continues to be portrayed as second-rate education.** This has led to weak, fragmented and underfunded TVET systems in many partner countries that are often not responsive to the labour market (Oketch, 2007; McGrath, 2011).

In sub-Saharan Africa, the slave trade and colonialisation essentially prevented early industrialisation dynamics, which in Europe happened to be the main drivers of both economic development and the emergence of TVET systems. While in Europe, TVET systems developed to meet the needs of growing industries (Allais 2020b), in sub-Saharan Africa formal TVET was installed from above as a "neglected annex" to colonial educational systems. Organic linkages with the predominantly informal and agrarian subsistence economies were rare. To date, TVET's lack of alignment with the wider socio-economic context is reflected in the **restricted labour market opportunities for TVET graduates.** The latter also proves to be a major structural barrier to improving TVET systems (Allais 2020a, 2020b). In some partner countries, traditional informal systems of skills development coexist alongside formal ones, for example, traditional master craftspeople in small enterprises in Western Africa or Arab countries. However, governments have rarely adopted a holistic approach of integrating informal and formal skills development.

A large proportion of TVET practices are still related to extractive industries and other forms of unsustainable economic development. At the conceptual level, TVET remains rooted in an understanding of industrial, formal, full-time and remunerated work, mostly performed by men. This neither corresponds to the reality of informal and agricultural subsistence work with a high proportion of female workers (cf. Thesis 3), nor is it easily compatible with notions of sustainable production and consumption patterns (Langthaler et al., 2021).

Policymaking and research reflect TVET's traditional orientation towards employability in that they have tended to respond to economic rather than to social or environmental concerns. On that account, **ESD has so far played only a marginal role in TVET.** This stands in contrast to general education, where ESD has been introduced in various forms and to an increasing extent over the past decades (e.g. in the UNESCO Decade for Education for Sustainable Development 2005-2014). In fact, education is an important

cross-cutting issue, as reflected in the UN 2030 Agenda for Sustainable Development and its SDGs. It plays a key role in building critical awareness and attitudes across countries and populations to enable a Just Transition at a global scale (Target 4.7[8]).

Given TVET's marginal position in many countries, current TVET policies are often not aligned with other relevant policies, e.g. those concerning employment, social and environmental issues. ILO studies point out that even if countries have well defined policies in the environmental and TVET sector, adequate coordination between the two is widely lacking (ILO, 2019a; 2011; also, cf. Thesis 1). This can result in unprepared and overstrained TVET systems that are not able to provide the required skills.

In addition, TVET and labour market policies **rarely address digitalisation and the transition to a green future in a simultaneous and coherent way**. These two great labour market transformations of our time, often called the "twin transformations", are related to each other in a complex and sometimes contradictory way. The impact of digitalisation on sustainability comprises favourable aspects (e.g. reduction of emissions) as well as unfavourable (e.g. increased need of rare earth elements, e-waste production). In turn, sustainability considerations have been a driver of digitalisation, e.g. to make production processes more efficient. At the same time, the increased energy consumption and e-waste production can counteract benefits of digitalisation. In addition, digitalisation may entail various social issues such as unequal access to digital technologies (digital divide), which in turn can increase social disparities. An example for this are risen inequalities in education due to, among other factors, unequal access to digital technologies. These complexities emphasise the necessity to develop holistic policies in order to respond coherently to the challenges and potentials arising from the "twin transformations", e.g. the European Skills Agenda 2020 and its Pact for Skills.

At the governance level, the imperative of a Just Transition calls for a shift in focus. In many partner countries, such as India, Bangladesh, South Africa and Tanzania, education and TVET systems have traditionally been highly centralised. **A stronger consideration of the regional and local levels, besides the national level**, would facilitate the involvement of intermediary and municipal stakeholders such as associations or community organisations. This can help TVET institutions to meet the skill requirements of informal and subsistence agricultural work alongside formal employment (cf. Thesis 3).

Job-specific skills training for Green Jobs will not be sufficient for TVET to draw on its full potential for a Just Transition. **Rather, TVET must become a holistic educational pathway**. Therefore, TVET curricula should incorporate ESD (awareness, values and practices) and strengthen general education components (theoretical knowledge, cognitive skills, abstraction, transferable skills). In addition, Green TVET needs to build on and **integrate traditional knowledge** and work-related practices. Often, such local knowledge systems prove to be highly relevant for developing sustainable production and consumption patterns that are adapted to local contexts.
Furthermore, **the training of TVET personnel is essential for spreading Green Skills in TVET systems**. Current research in educational science identifies the competences and

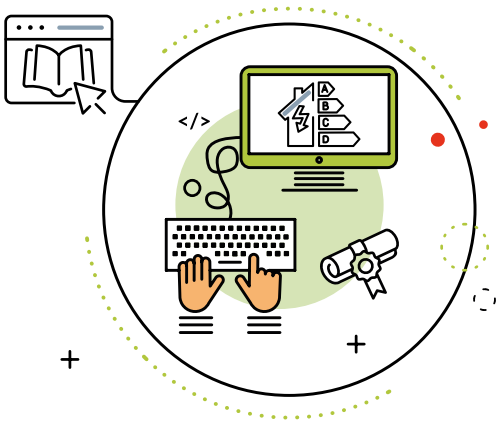
[8] Target 4.7: By 2030, ensure that all learners acquire the knowledge and skills needed to promote sustainable development, including, among others, through education for sustainable development and sustainable lifestyles, human rights, gender equality, promotion of a culture of peace and non-violence, global citizenship and appreciation of cultural diversity and of culture's contribution to sustainable development.

adequate actions of teaching personnel in classrooms and workshops as the most essential factor for high-quality training (Helmke, 2021; Hattie, 2012 & 2009). TVET teaching staff in the classrooms and workshops serve as role models for the trainees. Therefore, re- and upskilling of TVET personnel, including TVET teachers, trainers and in-company instructors, is extremely important (IRENA, 2021; Leicht, 2021). The role of TVET personnel is critical in promoting not only the development of workplace-relevant Green Skills, but also for changing institutional and learning cultures and for a behavioural change towards environmental sustainability among young people (ibid.; GIZ, 2016). In Brazil, for example, teacher training as part of GIZ's TVET for Green Growth and Employment Project has proven to be a key driver to anchor bottom-up approaches, with motivated teachers required to lead the transition and initiate research and cooperation at the micro level.

Therefore, re- and upskilling of TVET personnel needs to focus on (Leicht, 2021):

- ➜ Theoretical knowledge and practice-oriented strategies necessary to develop Green Skills;
- ➜ Specific Green Skills to be developed in the respective training occupations;
- ➜ Resource-efficient training and classroom/workshop management;
- ➜ Local knowledge and traditions;
- ➜ Greening institutional, teaching and learning culture.

However, it must be emphasised that the change of individual human attitudes and behaviour is a long-term process, which takes time (Leicht, 2021; Hattie, 2012 & 2009).



There is a need for broad and holistic TVET reforms that are well coordinated with other relevant policies. These reforms include:

- Alignment with **sustainability and digitalisation policies** as well as with **labour market development and social protection.**
- A **multilevel governance approach** to allow for integration of regional and communal stakeholders.
- Close **interlinkage with other forms of education** to ensure mutual permeability and to prevent TVET from becoming a career dead-end.
- **Mainstreaming of ESD and integration of general educational components** to transform TVET into a holistic educational pathway.
- **Integration of local knowledge** to ensure local relevance and contextualisation.
- Appropriate **training of TVET personnel** to draw on the potential of role models and change agents.

Solar Plant Sao Mai Corporation Vietnam © GIZ / Thomas Imo

Thesis 6 Just Transition increases the need for labour market forecasting to match emerging skill demands

A Just Transition will increase the need for skills forecasting and anticipation of labour market demands. Mechanisms and approaches need to be adjusted to local capacities and require a closer interlinkage with TVET systems.

Skills forecasting gives evidence-based insights into current and future labour market trends. Since the transition to a Green Economy is associated with major shifts in quantitative and qualitative skill requirements (cf. Thesis 4), **skills forecasting is essential to inform labour market and educational policies.** Currently, the lack of information on the emerging skill mismatches in the context of the transition to a Green Economy remains a key challenge worldwide (ILO, 2019a). Due to higher workforce mobility[9], shorter innovation cycles[10] and trends such as digitalisation, the skill needs of future labour markets will become increasingly dynamic and the **importance of skills forecasting will continue to increase** (Bertelsmann Stiftung, 2016).

Skills forecasts can only be indicative of trends and a certain degree of inaccuracy and uncertainty cannot be avoided. Modelling employment changes includes the development of potential future scenarios which consider a variety of factors. There are efforts to model future skills changes until 2050 (e.g. for the RE sector (IRENA, 2021)), although skills forecasts usually cover a time span of around 10 years (ILO, 2015: 73).

Private sector engagement is critical to identify labour demand and skills gaps as well as to define occupational standards. However, as private sector stakeholders (especially MSMEs) often lack the experience and capacities to fully anticipate future skill needs, capacity development measures are essential for stakeholders. A particular challenge faced by many low-income countries is the informal economy, which comprises large shares of total employment. Since data and information is typically lacking, **approaches to skills forecasting need to consider ways to include stakeholders of the informal economy**, e.g. trade associations representing sectors with largely informal MSMEs (cf. Thesis 3).

On a global level, the general institutionalisation of skills anticipation systems has improved during the last years. A study by UNESCO-UNEVOC (2020a: 14) reported that 83% of surveyed countries[11] have or plan the introduction of regular skills forecasting.

[9] This includes moving between jobs as well as national and transnational migration - a megatrend that will continue in the face of climate-related changes and ongoing conflicts (BMZ 2030).

[10] Due to digitalisation, wider access to information and technology, technological innovations are predicted to replace settled technology at greater speed.

[11] Respondents from 56 countries worldwide took part in the survey, covering high-, middle and low-income countries from all global regions.

However, **specific forecasting for Green Skills is rare**, especially in low-income countries. EU member states also often lack regularly produced data and information (CEDEFOP, 2019). In a global analysis, ILO (2019a) found that only a few countries specifically address Green Skills, while 25% of the countries studied – all developing countries – have no skills forecasting system in place at all.

Skills forecasting approaches need to be adjusted to local capacities

Approaches to introduce forecasting for Green Skills should focus on the definition and integration of categories and measures into existing systems in order to cover relevant Green Sectors. Anticipation mechanisms can be based on national labour market information systems (LMIS) if they exist and are functional. It should be born in mind, however, that LMIS are highly complex and require sophisticated research and statistical capacities, sufficient financial resources, the continued involvement of a broad range of stakeholders and a functioning communication system that feeds labour market information into TVET policy and planning. As these capacities and mechanisms are often lacking in countries supported by DC, the feasibility of such an approach needs to be carefully assessed and information gains weighed against the resources required. One approach to use resources efficiently is to address skills forecasting on a regional level, as supported by GIZ's TC project Regional Cooperation for the Development of Technical and Vocational Education and Training (RECOTVET III). This project supports labour-forecasting studies in selected sectors (e-mobility, RE) in different Asian countries and will feed the results of the studies back to the LMIS and TVET systems of the respective countries. The use of **sectoral consultation bodies**, such as Sector Skills Committees (SSCs) or thematic labour market observatories **for sector-specific labour forecasting, present an alternative approach**. Their aim is to regularly assess emerging qualitative and quantitative skills gaps for selected industries through research and consultations among all main stakeholders. In India, for example, the Skill Council for Green Jobs was established in 2016. Its mandate is to undertake industry skills gap analyses and to develop national occupational standards along with curricula and certifications of trainers and learners in the Green Economy. This includes the RE, transportation, waste management, construction, and water management sectors. As such, it regularly commissions and publishes research on skills gaps, especially in the solar sector. GIZ's TC project Innovation and Investment for Inclusive Sustainable Economic Development (ISED) in Indonesia cooperates with a solar energy association and supports the establishment of respective sector skills bodies at national level. One challenge is that in many of the least-developed countries such institutions are lacking.

TVET and employment policies need to be linked to sound information

Translating information and results of the forecasts into policies, programmes and measures at different levels of TVET systems is of crucial importance (ETF & CEDEFOP, 2016). This is a limiting factor as many countries fail to develop a policy response due to their weak institutions, even if they have been able to produce forecasts. In particular, the link to the development and continuous improvement of training programmes is weak (Pavlova, 2019). A survey among selected countries (UNESCO-UNEVOC, 2020a: 16) found that only about 25% of TVET institutions are receiving information on future skills change from government or sectoral institutions.
Apart from successful ad hoc assessments of skill needs, good practice examples from DC projects are still rare. In order to address this shortcoming, DC projects could include explicit measures to support forecasting of skill demand and use them for the needs assessment to plan training programmes on Green Skills. These could include:

- **Strengthening existing or emerging systems (LMIS, SSCs) to focus on the forecasting of Green Skills** e.g. by institutionalising skills forecasting mechanisms among relevant actors, especially with regard to sectors with green growth potential.

- Given the anticipated acceleration of skills changes in future labour markets, the need to closely link skills anticipation systems with the updating and design of training programmes will become even more important. **Strengthening institutional capacities for iterative processes of consultation and exchange among all stakeholders** will become increasingly important.

FC projects usually build on such capacities promoted by TC projects. For example, the FC project *Promotion of TVET in Ghana, Phase III* seeks to establish a Centre of Excellence (CoE) for Green Technologies and will build on established Sector Skills Councils (SSCs) and updated curricula which will have been adjusted to labour market needs with a high industry involvement.
In the absence of a general forecasting system, **skills anticipation for Green Jobs should be conducted through ad hoc and individual studies for specific sectors** (ILO, 2019a). These can be supported by DC and serve as a valuable starting point and policy leverage. In Brazil, for example, the initial implementation of a skills assessment for RE as part of GIZ's TC project TVET for Green Growth and Employment together with the responsible ministries of education and energy served as a valuable basis for the improvement of the cooperation and coordination between the line ministries involved. As much as possible, **ad hoc studies should be based on national strategies for greening** (e.g. sectoral strategies for energy or construction) to cover the most relevant sectors. Experiences, e.g. from GIZ's TC project Market Entry in Renewable Energies and Energy Efficiency for the Productive Sector in Ghana, have shown that as part of skills forecasting, **positive quantitative employment forecasts can provide strong policy leverage** to convince decision makers of the importance of the transition to a Green Economy, beyond climate and environmental considerations.

Thesis 7 The emerging skill demand in a Green Economy will require TVET to rapidly adapt existing occupational profiles and develop new ones

TVET systems must act fast to be responsive to the increasing demand for Green Skills. The greening of TVET can be achieved through the integration of relevant skill sets in existing occupational profiles and the development of new occupational profiles.

The Green Economy will see an increase in demand for green occupations. Therefore, the skill demand requires fundamental changes of TVET in the following three main areas (CEDEFOP, 2019; GIZ, 2013):

1. Demand for **new green occupational profiles** becomes relevant when a high degree of skills change is necessary in an existing occupation or when a new technology is being introduced that requires a completely new skill set (e.g. RE farmer, biomass energy technician) (ILO, 2018a).

2. **Greening of existing occupational profiles** that require adaptation of skill sets by adding new modules and/or redesigning the overall training programme and taking Greening or rather environmental protection into account as a cross-cutting theme. Greening existing occupational profiles refers to workplace requirements in terms of work processes, product standards, new technologies applied, the introduction of new materials, or the use of existing materials being smarter and/or more resource-efficient.

3. Most existing occupational profiles require a **change in environmental awareness and behaviour** in order to become more climate and environmentally responsive, but are not green per se (e.g. bus drivers can drive more fuel-efficiently, mechanics can dispose of waste such as oil in an environmentally friendly way).

It needs to be considered that **TVET systems are slow in responding to changing skill demand**. Greening of qualifications is a time-consuming and bureaucratic process that is often too slow to respond to the emerging labour needs of companies. In the future, change in skill demand is likely to occur even faster due to shorter technological innovation cycles and higher labour market mobility (Bertelsmann Stiftung, 2016).

Thus, compromises need to be sought between a sufficiently rapid response to market needs and institutional anchoring of a new or modernised green qualification in a national qualification framework (NQF):

- Supporting enterprises and industry partners to develop, pilot, and adapt **in-company re- or upskilling programmes**;
- Developing, piloting and implementing **non-formal training**, courses and modules in partnership with the private sector that address skill gaps in a sector without necessarily being formalised;
- Developing **modules for skills training/skills upgrading** that can later be **added to an existing qualification profile.** These modules should be designed from the beginning to be compliant with the standards for qualification design of a partner country.

Studies indicate that **greening of the economy will not require so many new green occupational profiles per se, but rather relies on a greening of existing occupational profiles** that can incrementally evolve into new occupations (CEDEFOP, 2019; ILO, 2019a). Analyses of skill demand in the context of e-mobility in Germany, for example, found that existing occupational profiles are flexible enough to incorporate new qualification requirements, e.g. to accommodate new technological trends (BIBB, 2017). The greening of existing occupational profiles should be part of a **continuous process of adapting an occupation to the change of labour markets** due to technological, economic and social developments, and the change of subsequent skill demand (ILO, 2019a: 112). This requires assessing specific green relevance in each occupation. Holistic TVET policies suggest that the development and review of occupational- and industry-specific Green Skills is not enough. Rather, TVET's educational mandate highlights **the importance to enhance generic Green Skills in all sectors, occupations and training programmes through the incorporation of generic green content** (environmental and climate change awareness, etc.) (cf. Thesis 5).

The greening of occupations should therefore be guided by:

- Relevance of occupational fields for greening the economy;
- Demand for Green Skills in the current and future labour market undergoing greening;
- Analysis of industry practice together with the training needs and skills gaps in industry;
- Policies and guidelines for mainstreaming green content in occupational profiles and curricula;
- Developing green occupational standards in line with the existing standards of a country for development of qualification and curricula, as well as teaching, learning and assessment materials;
- Accreditation of modernised green training standards within the NQF to (1) sustainably integrate them in national TVET systems and (2) to use certification to make the recognition of green competences comparable, transparent and valuable for graduates and employers.

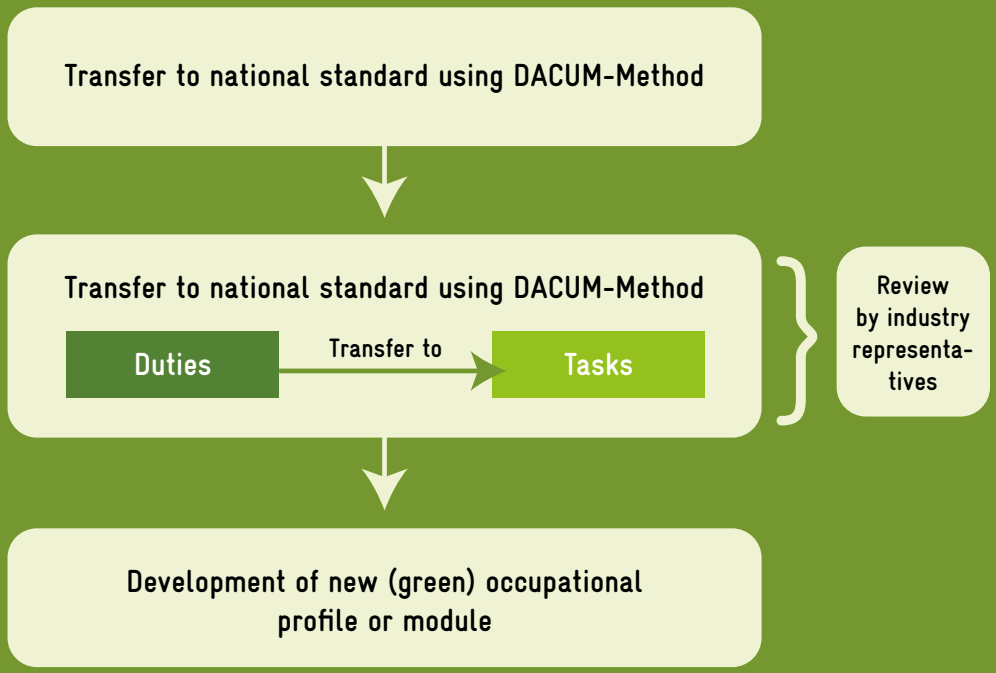
The process of greening occupational profiles should follow the **best practice of private sector participation** in the entire process in order **to ensure that the occupations are market relevant**. This includes assessing the demand for Green Skills and reviewing and verifying occupational standards as well as standards for training delivery. **Sector skills bodies consisting of industry representatives present a suitable format for assessing demand for Green Skills and for greening occupational profiles** (cf. Thesis 6).

Practical experiences from projects show that an efficient process is to first **develop and test modules for skills-upgrading on Green Skills that can later be integrated into existing occupational profiles for greening an occupation.** This practice has been used in the field of installation and maintenance of photovoltaic (PV) systems: Modules were developed for non-formal skills-upgrading of workers and technicians in the field of electrical installation. After piloting, the modules were incorporated into the curriculum of initial formal vocational training of electrical trades. The same practice was followed in the case of greening occupational profiles in construction: Specific modules were developed that addressed the energy efficient production, use and processing of new construction materials. These modules were later incorporated into formal TVET occupations. In this process, it was vital to strictly use the existing process standards for the development of occupational profiles and the respective curricula, teaching, learning and assessment materials of the country. This will ensure integration in the national qualification system and that TVET practice is smooth and efficient.

The fast development of new green technologies is a challenge for TVET systems and TVET providers as they need to adapt to these changes. DC can play a key role in facilitating the transfer of green technology know-how into TVET systems in developing countries. The Green Centre of Excellence (CoE) Vocational College for Machinery & Irrigation in Vietnam is an example of this approach: instead of developing new green occupational profiles from scratch it uses German occupational standards in green construction technologies, sanitation and air conditioning and transfers these into the Vietnamese training system. This is being done by applying the following process:

The German training standard is "deconstructed" and integrated into a duty and task analysis that is based on the Vietnamese training standard in the relevant occupation. The process is based on the DACUM methodology[13] for review and validation of occupational standards. It involves representatives from Vietnamese industries to ensure proper adaptation to the Vietnamese context. In addition to the specific green content incorporated into all modules of the new qualification, generic modules for environmental awareness as well as energy and resource efficiency are developed and integrated into the curriculum and training programme. The training programme is designed in modules. These modules are used for skills-upgrading programmes for workers and workplace instructors from industry, for training of vocational teachers and for initial training. The modules on green mainstreaming content are developed in a digital format, so they can be used across the Vietnamese training system.[12]

Figure 5: Example process of greening a new occupational profile



[12] Developing a Curriculum (DACUM) is a process using a focus group in a facilitated process to define the major duties and related tasks included in an occupation. The final result is an occupational profile presented in a chart format, which describes a job in terms of specific duties and tasks that competent workers must perform. The validated profile and the task analysis can then be used to develop a curriculum.

Creating environmental awareness and environmentally friendly behaviour is essential for orienting TVET towards increased climate and environmental sustainability. In this regard, the mindset, behaviour and performance of TVET teaching personnel is crucial since in classrooms and workshops they serve as role models for trainees. Therefore, ESD as well as occupation related Green Skills must be firmly integrated in the initial and further training of TVET teaching personnel. Furthermore, regulations must be installed that facilitate ESD in all aspects of TVET delivery (cf. Thesis 5).

Small Hydro Power Promotion Project Nepal © GIZ / Dirk Ostermeier

4 Greening TVET: Recommendations for the Design of Development Cooperation Interventions for a successful Just Transition

The urgency for the greening of skills is increasingly reflected in the design of DC projects addressing the supply and/or the demand side of the labour market. However, the potentials for greening of skills in both the formal and informal economy are not yet sufficiently utilised. Interventions for greening skills will need to assume a greater role in the project portfolio of German DC through the adoption of appropriate project designs. Based on the considerations sketched out in the theses above, the first recommendations for the design of intervention measures have been developed. These refer to four different project types which have been identified in the interviews with relevant DC projects.

The approaches of German TC and FC projects pursuing a Green Skills agenda can broadly be categorised along two criteria, each with opposite characteristic levels: (1) Scope of the intervention (comprehensive system reform vs. focused support to specific sectors with medium outreach/impact); and (2) support of the demand side of the labour market vs. support of the supply side. Figure 6 below illustrates the criteria.

The following categories of DC project approaches can be identified along these two criteria:

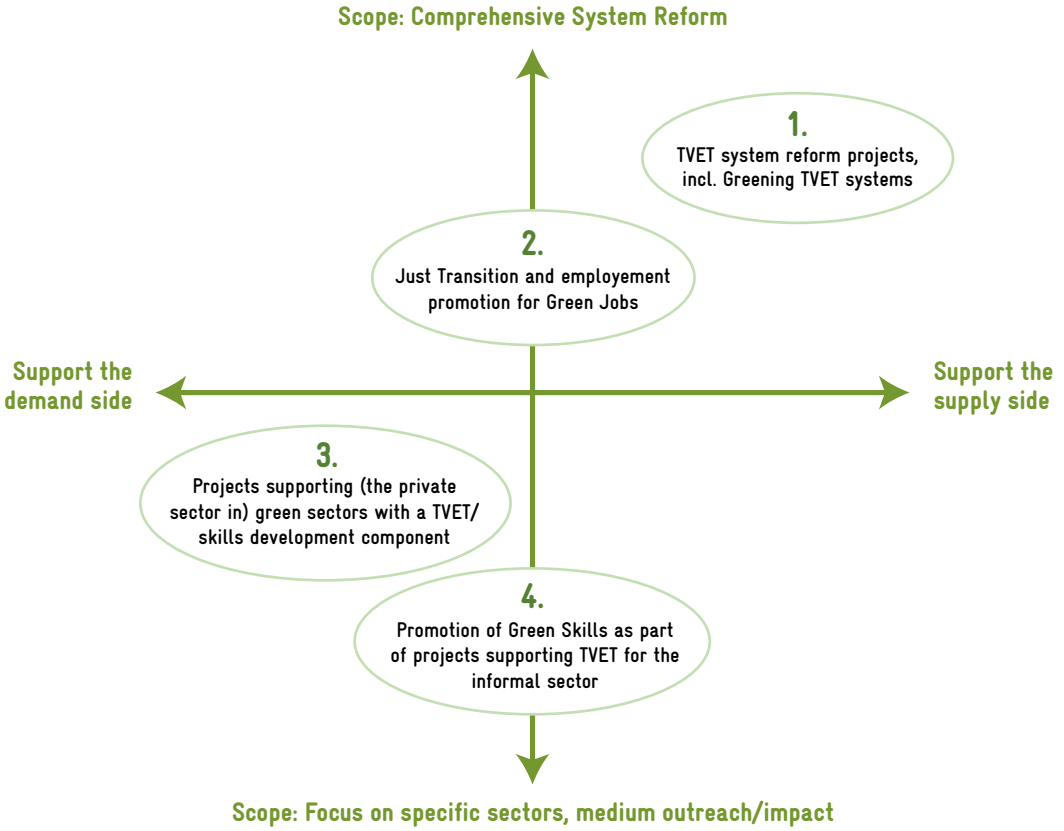
1. TVET projects that support **TVET system reforms** and system development, including the promotion of a Green Skills strategy in the context of modernising entire TVET systems, e.g. the below outlined DC programme *TVET in Jordan*; GIZ's TVET for Green Growth and Employment Project in Brazil; Programme Reform of TVET in Viet Nam I and II, implemented by GIZ and through KfW; GIZ's TC projects Indo-German VET Programme (IGVET) and Support to VET in the field of Green Economy in Moldova.

2. Projects with Green TVET/skills development components, promoting **specific sectors with greening potential** (e.g. energy, transport, manufacturing sector) through multiple strategies (regulatory frameworks, market development, supply of skilled workers) e.g. GIZ's Climate Smart Building Programme in India, GIZ's TC project Market Entry in Renewable Energies and Energy Efficiency for the Productive Sector in Ghana.

3. More recent project designs with an employment focus that begin to address a **Just Transition** as part of their employment strategies, e.g. by supporting re- or upskilling of workers affected by greening of economic sectors relevant for carbon reduction, e.g. GIZ's TC project *Career Path Development for Employment (*CPD4E*)* in South Africa.

4. Promotion of Green Skills as part of projects supporting skills development in the **informal economy**, e.g. the FC funded Ghana TVET Voucher Programme.

Figure 6: Categorisation of German DC Approaches



Source: FAKT Consult

4.1 TVET projects addressing the greening of skills through a system-wide approach

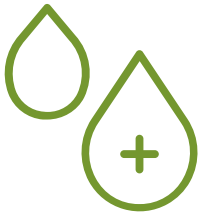
An increasing number of projects addressing TVET reforms and capacity development of TVET systems incorporate the greening of TVET as a priority. So far, the greening of TVET is the main objective for only a small proportion of existing TVET system reform projects. GIZ's TVET for Green Growth and Employment Project in Brazil is an example:

Text box 4: Skills Development for Green Jobs in Brazil

German DC with Brazil has traditionally had a green focus that is reflected by different projects promoting sectors with greening potential including renewable energy (RE), energy efficiency (EE) in buildings and green hydrogen* (e.g. GIZ's **H2Brasil - Green Hydrogen Expansion** project and the project **Energy Efficiency for Sustainable Urban Development**). Instead of each project including a skills component, the "TVET project" (GIZ's **TVET for Green Growth and Employment**) addresses skills development in different relevant sectors (energy, bio-economy and circular economy). The focus areas of the project are to identify the demand for skills in selected sectors, to develop occupational standards for relevant green occupations, to mainstream Green Skills in the training of TVET personnel and to promote the integration of Green Skills in the TVET reform agenda. Being closely linked to the sectoral projects addressing regulatory frameworks and market development in the sectors with greening potential, the TVET project is able to link its interventions with the demand side of the labour market. By applying a system-wide approach, the project is well-designed to anchor a skills development agenda for Green Jobs in the TVET system.

* Green hydrogen is hydrogen – a universal, light and highly reactive fuel – generated through a chemical process known as electrolysis using renewable energy sources.

Most existing TVET system reform projects focus on modernising TVET systems by improving the quality, outreach and labour market relevance of TVET. Skills development for Green Jobs is either addressed by a specific component or as a cross-cutting topic.
A stronger orientation of projects in the TVET sector towards Green Skills could be realised by (a) **integrating "Green TVET benchmarks"** in project agreements and success indicators and (b) the **explicit design of strategies for greening the TVET system**. The German DC programme *TVET in Jordan* with GIZ and KfW as implementing organisations is an example of such an integration of Green TVET benchmarks at the programme level:



Text box 5: Programme Indicators of the TVET Programme in Jordan as an instrument to integrate Green TVET benchmarks.

Programme objective: The attractiveness, labour market and employment relevance of TVET including the interfaces with general and higher education in Jordan are improved.

Programme indicators related to Green TVET:

- 2,500 out of 5,000 graduates (30% female and 20% people from marginalised groups) of reformed education and training programmes at German DC-supported TVET (incl. higher education) institutions found employment in a skills-related (**10% in an environment-related**) field of work six months after completing the training.

- Number* of the education and **training programmes** supported by German DC with a **significant share in the development of green competences have been sustainably integrated into the Jordanian TVET system** (e.g. through accreditation) (*will be specified in the near future).

The greening of TVET systems or elements thereof can be achieved by a range of DC interventions:

➜ **Greening selected occupational profiles and developing new occupational profiles** based on labour market and skill demand forecasting;

➜ **Mainstreaming of Green Skills** in occupational profiles and qualifications across sectors;

➜ **Building capacities of training providers** towards skills development for sectors with greening potential;

➜ Supporting initiatives for the development of Green Skills **at local level**;

➜ Supporting the **development of Green TVET policies and regulatory frameworks.**

4.1.1 Greening selected occupational profiles and developing new occupational profiles based on labour market and skill demand forecasting

In the absence of a guiding policy framework for greening TVET, the **selection of relevant individual occupational profiles and curricula is the most feasible entry point for greening TVET systems**. The selection of occupational profiles must be based on a systematic analysis of current and future skill demand (cf. Thesis 6). In addition, the greening of occupational profiles cannot be a stand-alone measure, but must be accompanied by measures for capacity development of TVET institutions.

Various TVET projects have started with the greening of occupational profiles in priority sectors which are relevant for the reduction of greenhouse gas (GHG) emissions and for which a growing demand for labour is expected: GIZ's TC project Cooperative TVET in Mongolia closely cooperates with GIZ's TC project Energy Efficient Building Refurbishment which promotes energy efficiency (EE) in buildings. While the latter has supported the development of new industry standards for the construction of energy efficient residential buildings, the TVET project supports the review of occupational standards in line with the new industry standards. From this juncture, other occupational profiles for greening will be identified for which labour demand is anticipated.

Cooperation with industry or trade associations and relevant sector skills bodies is central for ensuring demand orientation. For the German DC programme *TVET in Jordan*, greening selected occupational profiles based on labour market demand is one component of the programme's intervention approach. To ensure demand orientation: (a) coordination bodies of private sector and TVET representatives at national level (national sector skills councils) are supported to better match the skill demand of the labour market with the skill supply of TVET institutions; and (b) modernised training programmes are designed, implemented and certified with strong involvement of the private sector, particularly in the form of cooperative training programmes with well-structured in-company training phases.

4.1.2 Mainstreaming of Green Skills in occupational profiles and qualifications across all sectors and qualification levels of a TVET system

The greening of TVET systems should entail the mainstreaming of Green Skills in all occupational profiles across sectors (cf. Thesis 5). Mainstreaming means that all registered occupational profiles in a TVET system contain generic green content (e.g. environmental awareness) and include green occupation-specific skills elements. Such an ambitious endeavour must be based on a conducive TVET policy framework guiding this change process.

Awareness creation and capacity development for green mainstreaming in the TVET system need to address all relevant stakeholders: the bodies responsible for the development of occupational standards, the management of the national qualification, assessment and certification system, as well as institutions for training of TVET personnel (cf. Thesis 4).

4.1.3 Capacity development of training providers

The development of the capacities of training providers towards skills development for sectors with greening potential is a necessity for implementing skills programmes and curricula for Green Jobs. This can be achieved by (a) promoting model institutions for Green TVET, (b) integrating the greening of TVET programmes as one component in the support measures for TVET institutions, and (c) developing the capacities of TVET institutions to implement training in a green, i.e. resource-efficient and environmentally responsible way. Teacher training is a central element of all these measures (cf. Thesis 4).

The promotion of **model TVET institutions for Green TVET** (‚Centres of Excellence' – CoE) comprises the greening of TVET programmes offered by these institutions and the capacity development support to implement training in an environmentally responsible way in a very focused and exemplary manner. This measure is commonly implemented to promote industry-driven, high-quality TVET according to international standards. Various German TC and FC interventions have been implementing this approach, particularly in Asian countries (e.g. in Vietnam, Thailand, Indonesia, India), and less often in Africa and the Middle East. Many partner governments show a high interest in the establishment of CoEs which often assume a national pioneering role in upgrading TVET according to international standards. With a corresponding mandate, new training concepts (comprising modular initial and further training) can be piloted in close cooperation with the private sector (GIZ, 2016; KfW, 2018). CoEs can have an important leverage effect in promoting systemic reforms and can act as pilot institutions to promote Green TVET. Measures may include the promotion of locally adapted green technology and demonstration of how to organise training and work processes in a resource-efficient manner.

However, only a few TVET model institutions are currently promoted by German DC to establish CoEs for Green TVET. The GIZ promoted Jordanian-German CoE for Solar Energy in Mafraq, the establishment of a CoE for Green TVET at the Vocational College for Machinery & Irrigation (VCMI) in the Dong Nai province, Vietnam, supported by German FC and TC, and the CoE for Green Technologies at the Kumasi Technical Institute, which will be established with support by FC in Ghana, show promising starting points. The VCMI is currently being upgraded to a CoE for Green TVET to offer demand-oriented TVET programmes for sectors contributing to green economic growth by adhering to strict ecological and environmental standards.

Four main measures are particularly relevant in establishing such model institutions for Green TVET (UNESCO-UNEVOC, 2017; GIZ, 2013):

- Integration of green training content/Green Skills into existing occupational profiles;
- Development of new/green occupational profiles;
- Initiation or further development of partnerships with companies (if appropriate, industry associations) operating in the Green Economy;
- Greening the campus and institutional culture: introduction of resource-efficient operation of TVET centres, including training implementation by using solar energy, further training of teaching personnel for resource efficiency, etc.

Green CoEs have a strong focus on these measures. However, **such measures can easily be integrated in supporting TVET** institutions in general, which is further described in the fifth intervention approach (details are elaborated below).

Green TVET CoEs can be effectively promoted by a combination of FC and TC interventions. FC usually provides funding for infrastructure development and equipment while TC addresses the remaining capacity development needs, such as development of CoE concepts at national level, training of management and trainers as well as facilitating cooperation with industry. Infrastructure development is guided by sustainability principles such as resource-efficient building designs and use of RE as well as providing the adequate equipment for implementing green curricula.

4.1.4 Supporting skills development initiatives for Green Jobs at local level

Local development partnerships and initiatives are an effective way to leverage change processes at the local level which need to be implemented in cooperation with different stakeholders. This is particularly relevant for greening TVET. For a change towards a Green Economy and TVET at local level, an efficient cooperation of TVET institutions primarily with enterprises (as implementers of the Green Economy) and local administrations (as authorities that can define environmental standards and follow up on their compliance) is necessary. GIZ's Indo-German VET Programme (IGVET) is an example for this. Based on a cluster approach, TVET in India is supported in close cooperation with industry associations and the private sector at the regional and local level. The e-mobility cluster in Kolkata, for example, promotes skills development for e-mobility based on local regulations and measures to increase the share of e-mobility. In Kolkata, one goal is to electrify public bus transport. Via industry associations and the public sector that operates public bus transport, enterprises are approached by the project to promote

demand-oriented skills development for the e-mobility sector. The use of industry associations as intermediaries also applies in the RE cluster in Pune, where local industry associations play a key role in reaching and training existing workers of MSMEs as solar installers and system integrators.

4.1.5 Developing an effective green TVET policy and regulatory framework

Coherent regulatory frameworks (including policies, legal regulations such as laws and bylaws and related implementation guidelines, NQFs, occupational and qualification standards, as well as accreditation mechanisms) are an essential factor for effective TVET governance. Therefore, regulatory frameworks of TVET systems need to be further developed and aligned with the requirements of TVET for a Green Economy. This is particularly relevant for the above listed TVET system reform projects to leverage the effects of the above listed interventions. Beside a broad range of TC interventions, Green TVET policies can be promoted through financing instruments such as policy-based grants.

→ **The modernisation of TVET systems towards skills development for a Green Economy requires the integration of strategies and instruments for greening TVET into TVET system reform projects. They promote TVET systems as a whole, applying system-strengthening multidimensional approaches with a comprehensive set of instruments. These instruments can include, for example, the development of policies and implementation guidelines, as well as the promotion of coordination bodies and mechanisms between TVET institutions and the private sector. It needs to be considered that currently many partner countries of international DC prioritise the promotion of employment through TVET. Therefore, approaches to greening TVET must ensure that they lead to maximum employment effects.**

4.2 Projects promoting sectors with greening potential to apply a systematic Green Skills strategy

For projects promoting sectors with greening potential, skills development is usually one component supporting a Just Transition, not a stand-alone objective. These projects typically apply a multilevel strategy combining interventions at policy and administrative level, the demand side of the labour market in the respective sector and, to varying degrees, the supply side. Projects may consist of elements such as:

- Enhancing the policy, legal and institutional framework for a Just Transition in the selected sector including capacity development for enforcing regulations and implementing support programmes;
- Promoting technical innovations;
- Promoting public and private sector engagement and business development in the selected sector;
- Supporting human capacity development through skills training in areas that are central for a Just Transition in the selected sector.

TC projects intervening in sectors with greening potential have by design an advantage of linking skills components with components for support to sector institutions, private sector development and the promotion of labour demand. This necessitates a close interaction with employers in the relevant sectors, measures to assess demand for labour, and the use of this information for design and planning of training measures. GIZ's TC projects in India (Climate Smart Building Programme) and Mongolia (Cooperative TVET) addressing energy efficient construction provide support for the improvement of government regulations and incentives of the sector (e.g. requirements on EE levels of construction materials). This indirectly leverages the demand for skilled workers among companies (cf. Thesis 2). The training programmes supported vary in nature: they might be workplace-based or institution-based; they might be short-term and non-formal skills-upgrading modules, addressing immediate skills gaps, as well as formalised longer-term initial training programmes that need accreditation (UNESCO-UNEVOC, 2020b).

While this approach might be more demand driven and agile in planning and implementing skills training, the challenge is to align and institutionally anchor the skills training measures in the NQF. **The match of labour supply and demand is not achieved by default, but must be addressed by design, e.g. by projects taking explicit measures for the forecasting of skill demand and using this demand analysis for planning training programmes** (cf. Thesis 6).

Text box 6: The need to promote Green TVET as 'employment oriented TVET' in Ghana

An example for this intervention approach is GIZ's TC project **Market Entry in Renewable Energies and Energy Efficiency for the Productive Sector** in Ghana. The priorities of the Ghanaian government have favoured employment promotion rather than climate protection. Thus, political strategies are relatively unambitious and the expansion of RE combined with the creation of Green Jobs is more a political buzzword (cf. **latest NDCs**) than a specific goal of the state linked to concrete measures, financial resources and a joint coordination of governmental regulatory bodies. One component of the project is *TVET for Renewable Energy and Energy Efficiency,* mainly comprising the provision of further training to develop additional competences to employees in short-term training modules. It was highlighted that both the government of Ghana as well as the target groups (employees or unemployed youth to be further trained) are inclined to prioritise the creation of jobs and economic growth over climate protection.

Therefore, Green TVET needs to be promoted as employment oriented TVET. At the same time, greening of the economy and energy production needs to be labelled as an economic growth and modernisation strategy which helps to facilitate access to relevant markets such as the EU, and to save costs for companies and private energy consumers.

Small Hydro Power Promotion Project Nepal © GIZ / Dirk Ostermeier

4.3 Project designs focusing on a Just Transition and employment promotion through re- and upskilling

Projects with a focus on a Just Transition in the labour market are especially relevant in those countries which have a green economic transition agenda and a substantial share of GHG-intensive or other environmentally harmful industries. Sectors such as coal mining, automotive industries and environmentally unsustainable agriculture are likely to be subject to current or future downsizing or transformation (Gass et al., 2020). These projects are just emerging or may be evolving in the coming years in a variety of emerging economies such as South Africa, India and Indonesia, depending on the national policies regarding a Just Transition.

Project designs may cover all areas of the integrated employment approach of German DC[13] (demand for skills, matching, supply), with a substantial element of re- and upskilling of workers directly or indirectly affected by the transformation process. These programmes need to be embedded into a national policy for labour market transformation. Their main objective is to create alternative employment opportunities for those workers affected by the transition process. The new employment opportunities may be in Green Job areas but could also address employment and income opportunities in other related or unrelated sectors not subject to the green economic transition. For facilitation of the transformation process, other Active Labour Market Measures (ALMM) may be applied (cf. Thesis 4).

Solar Plant Sao Mai Corporation Vietnam © GIZ / Thomas Imo

[13] The integrated approach to employment promotion seeks to achieve improved employment effects by coordinating measures in the areas of labour demand (creating and improving jobs); matching in the labour market (information, orientation and placement); and labour supply (improving employability). Further details can be found here: GIZ, 2016

Text box 7: Skills development and Active Labour Market Measures to counter the effects of the transition in South Africa

South Africa is facing a substantial unemployment challenge due to a stagnating economy and continuous population growth. In addition, the transition to a less carbon-intensive economy will affect the key sector of the labour-intensive coal mining industry (Gass et. al., 2020). German TC aims to establish a pilot measure under the new TC project *Career Path Development for Employment (CPD4E)* addressing the rising demand for the reskilling of coal mine workers. The project approach will address all aspects of skilling, job placement for wage employment and promotion of self-employment in relation to government employment schemes. The project will embark on a tripartite cooperation with respective government entities, the coal mining industry and labour unions representing workers' interests. It will entail elements of participatory analysis of new employment opportunities and training needs of workers as well as the design and implementation of appropriate reskilling measures. The skills training will be linked to measures that facilitate placement in new job opportunities e.g. in new mining sectors not associated with carbon fuels, and the upskilling of workers in order to cope with technology change or to facilitate the transition into a new career in a new occupation or business.

4.4 Promotion of Green Skills as part of projects supporting skills development in the informal economy

More than 60% of the world's employed population – around two billion people – work in the informal economy (IMF, 2021). However, interventions that aim to improve TVET for target groups operating in the informal economy are rare in German DC.

Examples include GIZ's TC project Ghana Skills Development Initiative and KfW's FC Ghana TVET Voucher Programme, which focus on improving traditional apprenticeship training in the informal economy for conventional trades, such as construction or welding, automotive repair and garment making. These are not explicitly geared towards the Green Economy, but green content or rather development of Green Skills are planned to be integrated into the training programmes in the next project phase, provided there is a **convincing selling point to the owners of MSMEs why Green Skills are beneficial for their businesses**. These can be cost savings due to reduced energy and raw material consumption or improved business productivity through a cleaner work environment. In addition, it is planned to include the development of training programmes referring to „Green Jobs" in the upcoming project phase. As noted above, the work with and through informal economy associations is crucial for reaching out to informal businesses and to promote the greening of businesses through skills development.

‘Interventions must appeal to the wallet.’*

➜ **There are no well-researched concepts on how the greening of jobs and skills in the informal economy can be effectively achieved. One approach is to consistently include skill acquisition in the informal economy in the national TVET agendas and to address greening accordingly.**

Based on success factors identified, the following conclusions can be made for the design of DC interventions for the promotion of Green TVET:

- ➜ Green TVET needs to lead to employment, otherwise greening TVET activities will be less accepted by decision makers in the partner countries.
- ➜ Green TVET needs to be driven by policies. Therefore, the further development of the regulatory framework of TVET systems needs to be promoted, including the development of laws, implementation guidelines, incentive mechanisms, standards and accreditation mechanisms.
- ➜ Green TVET needs to be closely linked to companies; this can be promoted by capacity development for TVET institutions and companies as well as mechanisms to incentivise both TVET institutions and companies/private sector associations to collaborate.
- ➜ Green TVET must aim at greening of a broad range of occupations relevant for green economic transformation as well as developing new green occupations in line with the future demand for Green Jobs.

* Interview from DC project in India

5 Outlook

This discussion paper presents the first results of a process for the further development of approaches and DC projects operating in the context of Green Skills and a Just Transition.

The seven theses of this paper are to be understood as an impulse for further discussions in the institutions of DC, project partners, representatives and members of the professional community, practitioners, non-governmental organisations as well as national and international economic actors and academia. The results of these discussions and examples of good practice will be used to develop recommendations for action in policy dialogue and project design. These will be made available to the professional public in the coming months. They are intended to provide decision makers and practitioners in DC with inspiration for their own practice. In this way, we seek to ensure that TVET in DC responds to the challenges of a Just Transition and makes use of its opportunities.

In the next step, the theses will be incorporated into three sector studies (renewable energy, green building transition and sustainable mobility/transport) and linked to recommendations for DC interventions in a concluding vision paper that elaborates the longer-term potentials for the greening of jobs and skills.

While these studies and papers are being prepared, processes are underway to design and implement DC project measures with a greater emphasis on greening TVET systems, occupational profiles and TVET institutions. The topics discussed in this paper are already integrated in project designs and shall continue to do so in the coming years.

6 Bibliography

ADB (2018): Education and Skills for Inclusive Growth, Green Jobs and the Greening of Economies in Asia. Case Study Summaries of India, Indonesia, Sri Lanka and Viet Nam. Online [last accessed: 02/2022].

Allais, S. (2020a): Vocational education and inequalities in transitions from education to work in three African countries. In: D. Francis, I. Valodia & E. Webster (Eds.), *Inequality studies from the global south*. 143–160. Routledge. Online [last accessed: 02/2022].

Allais, S. (2020b): Skills for industrialisation in sub-Saharan African countries: Why is systemic reform of technical and vocational systems so persistently unsuccessful? *Journal of Vocational Education & Training*, 1–19. Online [last accessed: 02/2022].

Auktor, G. (2020): Green Industrial Skills for a Sustainable Future. UNIDO. Online [last accessed: 02/2022].

Benson, E. et al. (2014): Informal and Green? The forgotten voice in the transition to a green economy. IIED Discussion Paper. Online [last accessed: 02/2022].

Bertelsmann Stiftung (2016): 2050 - The Future of Work. Findings of an International Delphi-Study of The Millennium Project. Online [last accessed: 02/2022].

BIBB (2017): Netzwerk Qualifizierung Elektromobilität (NQuE) – Abschlussbericht. Online [last accessed: 02/2022].

BMZ (2022): Achieving the Sustainable Development Goals in times of multiple crises - G7 Development Ministers' Meeting Communiqué. Online [last accessed: 05/2022].

Brown, D., G. McGranahan & D. Dodman (2014): Urban informality and building a more inclusive, resilient and green economy. IIED Working Paper. Online [last accessed: 02/2022].

Buhl, A.; Blazejewski, S.; Dittmer, F. (2016): The More, the Merrier: Why and How Employee-Driven Eco-Innovation Enhances Environmental and Competitive Advantage. *Sustainability*, 8, 946. Online [last accessed: 02/2022].

Burger, A. & W. Bretschneider (2021) Umweltschädliche Subventionen in Deutschland - Aktualisierte Ausgabe 2021. Herausgeber: Umweltbundesamt. Online [last accessed: 02/2022].

CEDEFOP (2019): Skills for Green Jobs: European synthesis report - 2018 update. Online [last accessed: 02/2022].

Chambwera, M. (2012): The informal economy. Online [last accessed: 02/2022].

Chen, M. & D. Doane (2008): Informality in South Asia: A Review. WIEGO Working Paper. Online [last accessed: 02/2022].

ETF & CEDEFOP (2016): Developing skills foresights, scenarios and forecasts – Guide to Anticipating and Matching Skills and Jobs: Volume 2. Online [last accessed: 02/2022].

Gass, P., I. Gerasimchuk, J. Kuehl, J. Roth & P. Wooders (2020): Employment, Economic, and Social Consequences of the Transition to an Ecologically Sustainable Economy in Developing Countries (Just Transition to a Green Economy). International Institute for Sustainable Development. Commissioned by GIZ. Online [last accessed: 02/2022].

GIZ (2019): Das Toolkit Lernen und Arbeiten in der informellen Wirtschaft. Online [last accessed: 02/2022].

GIZ (2016): Greening TVET in Viet Nam. Online [last accessed: 02/2022].

GIZ (2013): TVET for a Green Economy. Online [last accessed: 02/2022].

Hattie, J. (2012): Visible learning for teachers: maximising impact on learning. Abingdon: Routledge. Online

Hattie, J. (2009): Visible Learning: A synthesis of over 800+ Meta-Analyses Realting to Achievement. Online [last accessed: 02/2022].

Helmke, A. (2021): *Unterrichtsqualität und Lehrerprofessionalität. Diagnose, Evaluation und Verbesserung des Unterrichts*. 8. Auflage. Seelze: Klett-Kallmeyer.

ILO (2020a): The impact of the COVID-19 on the informal economy in Africa and the related policy responses. Online [last accessed: 02/2022].

ILO (2020b): COVID-19 and the world of work - Jump-starting a green recovery with more and better jobs, healthy and resilient societies. Online [last accessed: 02/2022].

ILO (2019a): Skills for a Greener Future: A Global View. Based on 32 Country Studies. Online [last accessed: 02/2022].

ILO (2019b): Greening TVET and skills - Mapping the response to green transition. Online [last accessed: 02/2022].

ILO (2018a): World Employment and Social Outlook 2018: Greening with jobs. Online [last accessed: 02/2022].

ILO (2018b): Just transition towards environmentally sustainable economies and societies for all - ILO ACTRAV Policy Brief. Online [last accessed: 02/2022].

ILO (2018c): Women and Men in the Informal Economy: A Statistical Picture. Online [last accessed: 02/2022].

ILO (2017). How to measure and model social and employment outcomes of climate and sustainable development policies. Online [last accessed: 05/2022].

ILO (2015): Anticipating skill needs for green jobs - A practical guide. Online [last accessed: 02/2022].

ILO (2011): Skills for a Greener Future: A Global View. Online [last accessed: 02/2022].

IMF (2021): The Global Informal Workforce: Priorities for Inclusive Growth. C. Deléchat & L. Medina (eds.). Online [last accessed: 02/2022].

Impact Taskforce (2022). Time to deliver: mobilising private capital at scale for people and planet. Online [last accessed: 02/2022].

IPPC. (2021). Climate Change 2021 - The Physical Science Basis. Contribution to the Sixth Assessment Report. Online [last accessed: 02/2022].

IRENA (2021): Renewable Energy and Jobs - Annual Review 2021. Online [last accessed: 02/2022].

Kawakami, T. & T. Khai (2010): Work Adjustment for Recycling and Managing Waste. ILO. Online [last accessed: 02/2022].

KfW (2018): Ansätze zur Förderung von Berufsbildung und Beschäftigung. Leitfaden für Vorhaben der Finanziellen Zusammenarbeit. Online [last accessed: 02/2022].

Koirala, S. (2019): SMEs: Key Drivers of Green and Inclusive Growth. OECD Green Growth Paper. Online [last accessed: 02/2022].

Langthaler, M.; McGrath, S., Ramsarup P. (2021): Skills for green and Just transitions. Reflections on the role of TVET for sustainable development. ÖFSE Briefing Paper No. 30. Online [last accessed: 02/2022].

Leicht, A. (2021): The role of education to fight the climate crisis and promote sustainable development. Unpublished Presentation at *GIZ Thementag* 2021.

Marty, C. (2016): The Urban Informal Economy: Towards more inclusive Cities. Online [last accessed: 02/2022].

McGrath, S. (2011): Where to now for vocational education and training in Africa? *International Journal of Training Research, 35-48*. Online [last accessed: 02/2022].

OECD (2008): Is Informal Normal? Toward More and Better Jobs. Policy Brief. Online [last accessed: 02/2022].

Oketch, M. (2007): To vocationalise or not to vocationalise? Perspectives on current trends and issues in technical and vocational education and training (TVET) in Africa. *International Journal of Educational Development*, 27, 220-234. Online [last accessed: 02/2022].

Pavlova, M. (2019): Emerging environmental industries: impact on required skills and TVET systems. *International Journal of Training Research*, 17. Online [last accessed: 02/2022].

Raworth, K., S. Wykes & S. Bass (2014): Securing social justice in green economies: A review and ten considerations for policymakers. IIED Issue Paper. Online [last accessed: 02/2022].

UNESCO (2021): Skills development and climate change action plans: Enhancing TVET's contribution. Online [last accessed: 02/2022].

UNESCO (2004): The Bonn Declaration. Online [last accessed: 02/2022].

UNESCO-UNEVOC (2020a): The Future of TVET Teaching. Online [last accessed: 02/2022].

UNESCO-UNEVOC (2020b): Skills development for renewable energy and energy efficient jobs. Discussion Paper. Online [last accessed: 02/2022].

UNESCO-UNEVOC (2017): Greening Technical and Vocational Education and Training - A practical guide for institutions. Online [last accessed: 02/2022].

UN-PAGE (2017): Green Industrial Policy: Concept, Policies, Country Experiences. Online [last accessed: 05/2022].

Van der Ree, K. (2017): Mainstreaming green job issues into national employment policies and implementation plans: a review. ILO Working Paper. Online [last accessed: 02/2022].

Deutsche Gesellschaft für
Internationale Zusammenarbeit (GIZ) GmbH

Registered offices
Bonn and Eschborn, Germany

Friedrich-Ebert-Allee 32 + 36
53113 Bonn, Germany
T +49 228 44 60-0
F +49 228 44 60-17 66

Dag-Hammarskjöld-Weg 1 - 5
65760 Eschborn, Germany
T +49 61 96 79-0
F +49 61 96 79-11 15

E info@giz.de
I www.giz.de

On behalf of

Federal Ministry
for Economic Cooperation
and Development