

5 Skills for the green transition

KEY FINDINGS

Some countries have been successful in integrating skills development with environmental policy, particularly in key priority sectors such as renewable energy and energy efficiency. Most countries, however, have not established sound linkages between their environmental sustainability plans and skills policies.

In the majority of countries surveyed (21 out of 27), skills mismatches are identified as major obstacles to the greening of the economy. The lack of knowledge of the environment–skills nexus, the absence of regularly conducted employment projections and of financial mechanisms to promote investments in skills development for the green transition and the sluggish participation of social partners are still hindering the achievement of an effective transition.

There are signs of emerging policy coherence in some countries, where environmental sustainability policies make explicit reference to skills and/or human resource development or fully fledged skills development policies and legislation for green transition are set up. However, these references are often limited to specific areas such as skills needs identification and initial Technical and Vocation Education and Training (TVET).

Most of the countries surveyed (22 out of 27) have established platforms to anticipate skills needs and adapt TVET systems in general. Of these 22 countries, 19 have addressed issues related to developing skills for the green transition. Four of the sample countries have established specific bodies to consider the question of skills for the green transition. Discussions on skills for the green transition tend to be led by governments, with some involvement of employers, and to a lesser extent of trade unions. The involvement of social partners improves the matching of skills demand and supply, and equity outcomes, including gender equality.

Policies and programmes on skills for the green transition tend to adopt a sectoral approach. Skills interventions in renewables and energy efficiency have been implemented, based on the legal requirements for vocational certification and training set out in the regulations. They highlight the relevance of the regulatory framework to integrate environmental and decent work outcomes, as discussed in Chapter 3. Other sectors with green potential have been promoted through more ad hoc skills development projects, often relying on international support.

The evolving nature of skills for green transition, the absence of consensus on the definition of green jobs and the lack of labour market information and analysis make it difficult for policy-makers to devise a long-term and economy-wide skills policy portfolio.

The sustainability of policies requires coordination among stakeholders and overall political stability at the national level. Social dialogue and good governance are therefore imperative. In addition, raising awareness of environmental issues among the general public and policy-makers is required to ensure the sustainability of policies in the medium to long term.

Introduction

Both the Sustainable Development Goals (SDGs) and the ILO *Guidelines for a just transition towards environmentally sustainable economies and societies for all* (ILO, 2015a) are vehicles to mainstream and advance decent work and environmental sustainability. Alongside an integrated legal framework (see Chapter 3) and social protection (see Chapter 4), skills development is a key component of a response to environmental challenges that also promotes decent work. Skills development can promote innovation, investment and competitiveness, which in turn feed back into social development, thus creating a virtuous cycle (ILO, 2010). Through green jobs (see Chapter 2), skills development can accelerate the transition to a green economy.

The transition to a green economy entails changes in the production system on a scale equivalent to an industrial revolution. Advancement in technologies, innovation and changes in production processes are major drivers of green transition, thus their implications for the world of work attract the attention of policy-makers around the world. As noted in Chapter 2, jobs will be created in certain sectors and destroyed in others, while those that remain will also change dramatically, as in any structural transformation. The anticipation and monitoring of skills needs, the provision of the right set of skills and the recognition of workers' skills will help workers to move more easily to sectors with employment growth, and also to better jobs, hence increasing their resilience to potential job displacement and income losses resulting from economic change (OECD, forthcoming), including the transition to a green economy.

Skills are key to making the transition to a green economy that advances decent work. Our survey of regulations and policies pertaining to skills for green transition in 27 countries identified a number of policy challenges, such as the lack of capacity to collect data on skills for green transition, the low level of awareness of environmental sustainability and the weak institutional mechanisms for policy-making and social dialogue that prevent skills development from playing a stronger role in the just transition.

With a view to contributing to effective formulation and implementation of skills development measures, this chapter conducts a global review and assessment of regulations, policies and programmes implemented in 27 countries around the world, representing various levels of development and environmental challenges. It takes stock of the existing measures through country studies, updating the information on the 21 countries¹ analysed in a study conducted by the ILO and the European Centre for the Development of Vocational Training (Cedefop) in *Skills for green jobs: A global view* (Strietska-Iliina et al., 2011), and adding information on six other countries² (see Appendix 4 for methodological details).

The chapter is organized in three sections. Section A analyses the integration of regulations and policies pertaining to economic growth, environmental sustainability and skills development at the national, local and sectoral levels since 2010. Section B then takes a closer look at individual programmes, including the activities carried out to implement the regulations and policies introduced in section A, as well as other ad hoc initiatives. Two types of programmes are discussed, namely skills needs identification and training provisions. Section C analyses institutional mechanisms that facilitate or hinder regulatory and policy coherence and programme implementation. It also highlights successful factors as well as obstacles. The chapter concludes by evaluating the current state of skills development measures against the objective of promoting a just transition, and offers policy recommendations.

1. The research on these 21 countries consists of 15 studies coordinated by the ILO (Australia, Bangladesh, Brazil, China, Costa Rica, Egypt, India, Indonesia, the Republic of Korea, Mali, Philippines, South Africa, Thailand, Uganda and the United States) and six coordinated by Cedefop (Denmark, Estonia, France, Germany, Spain and the United Kingdom). See Appendix 4 for more details.

2. These six countries are Barbados, Guyana, Kyrgyzstan, Mauritius, Montenegro and Tajikistan.

A. Skills development regulations and policies

As indicated in Chapter 1, environmental sustainability is key for the world of work, just as – through general economic activity and green jobs – the world of work is key for the achievement of environmental sustainability. The transition to a low-carbon and resource-efficient economy requires environmental policy, but also a change in modes of production that directly affect the world of work through job creation, job destruction and occupational change. These changes lead to an important shift in skills requirements across the economy, making skills policy a pivotal element for a successful transition (Bowen, Duff and Frankhauser, 2016; Bowen and Kuralbayeva, 2015; ILO, 2012; Strietska-Ilna et al., 2011). In order to inform policy discussions, this section illustrates the current state of skills development regulations and policies at national, regional and sectoral levels, revealing patterns observed in the countries surveyed.

There has been much progress at the national level in advancing environmental sustainability, but progress in developing skills for the transformation lags behind

In comparison with 2010, more countries have formulated comprehensive environmental policies.³ As in 2010, however, most of these policies in the countries surveyed make no explicit reference to skills development at the national level. Barbados, China, Costa Rica and Kyrgyzstan are examples of countries that commit to environmental sustainability, but without any mention of the skills development required to achieve their goals. The same is true of Mali, Mauritius and Tajikistan.

In Barbados, for example, a strong partnership between the four main stakeholder groups is promoting the transition to a green economy. These are government agencies (including ministries, the Barbados TVET Council and national training institutions), private sector companies, international institutions and NGOs. Despite the effective action for transition, Barbados lacks national skills development policies targeting green jobs or skills development for a just transition, and institutions to translate the effect of strong partnership to the skills training in workplaces. And yet, although there is no policy initiative at the national level linking environmental sustainability and the corresponding skills development, this is happening at the sectoral level (see the section on sectoral policies).

China has made considerable efforts to formulate environmental policy, strategies and regulations over the past decade. However, skills development is largely absent from these efforts which focus mainly on “capacity building” for adaptation, as shown in Chapter 3, without an explicit reference to skills.

Costa Rica has adopted a vision of becoming the “Green Hub” of Central America, where decarbonization is a strategy to strengthen national competitiveness. To that end, the National Apprenticeship Institute (INA) undertook a series of skills needs assessments in environmental management, carbon neutrality management, and environmentally friendly transport sectors.⁴ Yet no specific skills policies or strategies have been formulated to conduct assessments for other sectors relevant for the transition or to adapt training provision based on the skills needs identified. Thus, the country is still in the process of establishing skills policies and systems for green transition. A similar situation can be observed in Kyrgyzstan, where the orientation towards sustainable development has led to the adoption of the “Concept of Ecological Safety” and the “National Strategy for Sustainable Development 2013–2017” (Djakupov et al., forthcoming), although the linkages between those strategies and skills development programmes are limited. Similarly, the National Council for Job Skills Development, established in 2012, makes no reference to environmental sustainability or skills development for a just transition. Lastly, in Tajikistan, a number of regulations, concepts and programmes have been adopted with a view to achieving sustainable development focusing on rational uses of land, water and other natural resources. Recent instruments include the “State Environmental Program of Republic of Tajikistan for the period 2009–2019” and the Law of the Republic of Tajikistan “On Environmental Education of the Population”. However, skills development for the occupations that are relevant to green transition is not explicitly recognized as the priority in these instruments (Saidmurodov and Mahmud, forthcoming).

3. For example, the National Environmental Policy (NEP), 2013 in Bangladesh, which integrates environment issues in the development agenda; the Bangladesh Water Act, 2013, which makes provision for the development and protection of water resources (Mondal, forthcoming); the Law on Environmental protection, 2011 in Tajikistan, complemented by laws at sectoral level in forestry, water, fisheries, and radioactive waste management (UNECE, 2017); and the Climate Resilience Strategy and Action Plan (CRSAP), 2015 in Guyana, which identifies climate resiliency actions across 15 sectors (Small and Witz, 2017).

4. For example, see Sánchez Calvo and Alfaro Trejos, 2014.

The Philippines Green Jobs Act of 2016

The Green Jobs Act (GJA) is the Philippines' first legislation designed to generate and sustain green jobs. The Act contains clauses promoting skills for green jobs through initiatives such as identifying skills needs, maintaining a database of green careers, formulating training regulations, skills assessment and certification, curriculum development, and the implementation of skills training programmes and fiscal incentives to encourage the provision of training by enterprises. The Implementing Rules and Regulations (IRR) of the GJA, adopted in 2017, were based on extensive consultation and the involvement of the tripartite constituents.

The Act mandates the Technical Education and Skills Development Authority (TESDA) and its Green Technology Center (GTC), established in 2015, and the Professional Regulation Commission (PRC) to develop

training regulations and a qualifications framework, respectively. The Climate Change Commission issues training certificates, in collaboration with other bodies. The GTC is a new training centre created in 2015 and offering training courses in skills for green transition to cater for the needs for emerging green jobs. It is responsible for developing and delivering quality green TVET programmes; developing models of a green working environment and workplaces; developing training regulations¹ for green sectors; promoting green technology research and adaptation through the establishment of networks of institutions and researchers and the hosting of green events, while serving as a hub for entrepreneurs in green sectors. The Centre provides TVET training in such areas as photovoltaic systems, hydroponics, vertical gardening, landscaping, inverter technology and e-trike (an electric three-wheeled vehicle) servicing (Usman, 2015).

¹ Training regulations are TESDA-promulgated documents that define the competency standards for a specific national qualifications and how such qualifications can be gained, assessed and recognized. They serve as the basis for the development of competency-based curricula, training materials and competency assessment tools. As of 2017, a total of 26 green training regulations have been developed (TESDA, 2011).

Despite slow progress overall, there are signs of policy coherence between environmental sustainability and skills development in certain countries

In countries such as Denmark, Estonia, France and Germany, as well as in India, the Republic of Korea, the Philippines and South Africa, a number of environmental policies and national development strategies make reference to skills development for the green transition. Similarly, in some of these countries, skills development strategies, Technical and Vocational Education and Training (TVET) policies and their implementing institutions are acknowledging the rising demand for skills required for greening the economy.

Since 2010, the Philippines has adopted a number of regulations and policies at the national level for the transition to a green economy, many of which explicitly recognize the role of skills development in the transition (see, for example, the Green Jobs Act (GJA) of 2016, described in [box 5.1](#)). The Philippines recently adopted its Development Plan 2017–2022, which emphasizes the need for TVET programmes to meet international standards and match skills demand through quality training provision and certification (NEDA, 2017). The Development Plan will integrate green requirements into the curriculum and training system as part of the implementation of the GJA. In addition, the National Green Jobs Human Resource Development Plan is currently being developed, focusing on 12 key economic sectors: agriculture, construction, forestry, fisheries, renewable energy, manufacturing, transportation, solid and wastewater management, tourism, wholesale and retail trade, health and IT (Fernandez-Mendoza and Lazo, forthcoming).

In France, a number of environmental policies and complementary instruments have been introduced since the adoption of the Grenelle Environment Roundtable commitments in 2007. The governments (national and regional⁵), workers' and employers' representatives and NGOs have been participating in the development and implementation of those policies and instruments, and facilitating the integration of labour market and skills issues (Cedefop, forthcoming b). In 2010, a fully fledged skills development strategy was established, a mobilization plan for green jobs was launched, and the National Observatory of Jobs and Skills in the Green Economy (Onemev) as well as regional observatories were created in order to monitor employment trends. The observatories bring together various institutions to

5. France is divided into 18 administrative regions.

Box 5.2

Nationwide survey of renewable energy jobs in India

India has set itself the goal of generating 175 gigawatts of electricity from renewable sources by 2022, which corresponds to around half of its total electricity production. The Council on Energy, Environment and Water (CEEW) and the Natural Resources Defence Council (NRDC) have estimated the sectoral employment impact of this change. Using surveys of solar and wind companies, developers and manufacturers, the study finds that over 300,000 workers will be employed in the solar and wind energy sectors to meet the 2022

target (CEEW, NRDC and SCGJ, 2017), against 154,000 in 2009 (IRENA, 2011). To meet the target, the number of workers required by ground-mounted solar, rooftop solar and wind power projects, will need to increase. Table 5.1 shows the additional jobs required for 2017–18, disaggregated by occupations. The potential for employment creation is conditional on the domestic capacity of solar module manufacturing and the establishment of vocational training programmes and certification schemes.

Table 5.1

India: Estimated additional workforce required in solar and wind energy sectors, 2017–18

Occupations	Sectors			Total
	Ground-mounted solar	Rooftop solar	Wind power	
Business development	99	765	36	900
Design and pre-construction	395	4425	66	4886
Construction and commissioning	5330	6920	360	12610
Operation and maintenance	3835	250	3000	7085
Total number of jobs	9659	12360	3462	25481

Source: CEEW, NRDC and SCGJ, 2017.

analyse occupations and employment shifts in the green economy, based on the definitions of green occupations accepted by all the actors. Most key actors involved in skills identification include in their activities a component on trends in jobs and skills related to the green economy. Skills curricula are frequently renewed or adapted to take account of developments in the green economy. Many diplomas and certificates now include awareness-raising on issues related to environmental sustainability, and some have undergone more advanced and specific adaptation to the techniques, knowledge and skills required by the ecological transition. The role of skills has been integrated into environmental regulations such as the 2016 Act on reclaiming biodiversity, nature and landscapes, which includes support for vocational training, research and education, as well as for innovation by SMEs.

India has made environmental sustainability a central objective of its development strategy in its twelfth Five-Year Plan (2012–17) and set up a comprehensive framework for skills development for green transition at the national level, targeting key sectors. Several institutions were created as a result, including the Skills Council for Green Jobs in 2015, with the backing of the Ministry of New and Renewable Energy (MNRE) and the Confederation of Indian Industry (CII). The objective of the Council is to identify skills needs in the areas of renewable energy, energy efficiency and waste and water management (see box 5.2). Based on the identification of skills needs in these sectors, 26 new TVET courses have been developed for occupations ranging from water treatment plant helper to solar PV project manager and improved cooking stove installer (NISTADS, forthcoming). Private institutions have also developed 70 courses oriented towards environmental sustainability (for example, in apparel and footwear manufacture and banking).

In the Republic of Korea, environmental regulations and policies have also to some extent taken into consideration the importance of human resource development. This may have facilitated various skills needs identification and anticipation surveys and expert consultations carried out by the government ministries in charge of environment, labour, trade and industry and energy. As a result, the 3rd Environmental Technology Manpower Development Plan (2013–2017) was established, with a strong focus on highly skilled labour. In addition, new National Technical Qualifications have been developed in some specific green sectors with a view to supporting the national effort to meet the environmental targets. However, the country still lacks a comprehensive skills development policy specifically targeted at strengthening TVET for the green transition, identifying skills needs, adapting the training curriculum, creating teaching materials and developing incentives for private initiatives.

In South Africa, the central government and some national government departments have adopted several policies and strategies relating to environmentally sustainable development. The 2011 National Climate Change Response White Paper recognizes the role of the labour market in the green transition and pays special attention to youth (DEA, 2011).

In Estonia, qualification standards have been updated for the existing occupations linked to the transition (e.g. energy auditors and steelworkers) or added to reflect the emergence of new occupations (e.g. biogas technology technician). This shows that the relevant skills are being integrated into the country's skills development system. However, the country lacks a comprehensive framework to develop skills for the green transition (Cedefop, forthcoming c). In Denmark, new TVET programmes have been developed to reflect the demand for new skills, such as training for wind turbine operators in 2010 and environmental technologists in 2013 (Cedefop, forthcoming d). Finally, in Germany, skills for the green transition are integrated into initial and continuous vocational training, under the "Education for Sustainable Development (ESD)" framework. The national platform "Education for Sustainable Development", which brings together 37 representatives from politics, science, industry and civil society, in 2017 adopted the national action plan called "Education for Sustainable Development". However, despite the efforts on mainstreaming environmental sustainability to the country's education system through the ESD, Germany has developed no specific strategies on skills for green transition (Cedefop, forthcoming e).

In countries which have curtailed progress towards environmental sustainability, the promotion of skills for the transition has also slowed down. This is the case in Australia, Brazil and the United States. However, in Australia and the United States, local governments and the private sector still recognize the value of environmental sustainability and the development of the respective skills policies and programmes (Fairbrother et al., forthcoming; Garrett-Peltier, forthcoming; Rabe, 2002; Saha and Muro, 2016).

Local government plays a key role in integrating skills and environmental policy

In countries such as China, France, the Republic of Korea, the United Kingdom and the United States, local government integrates skills needs into policy formulation and implementation, due to its familiarity with the regional economy and labour market (for France and the United Kingdom, see Cedefop, forthcoming a). Indeed, the local government's autonomy and mandate for policy-making in the area of skills development can be important in facilitating a just transition to a green economy.

In the United States, the State of California adopted a Clean Energy Jobs Act in 2013, covering a five-year period. Government agencies and training institutions were involved in its design and implementation.⁶ The Act introduces a fiscal reform under which corporate income tax is channelled into the California General Fund and the Clean Energy Job Creation Fund, generating up to US\$550 million annually (CEC, 2017), which has been invested in energy efficiency and renewable energy. This investment could produce a significant increase in demand for inputs from the renewable energy and energy efficiency sectors, which would in turn generate both direct and indirect jobs in the energy and construction sectors (Zabin and Scott, 2013). To meet the demand for skills created by the Act, three- and five-year state-certified apprenticeship programmes have been implemented, largely self-funded by employers and workers. In addition, pre-apprenticeship programmes have also been introduced so that trainees without the required skills levels can also enter the apprenticeship programmes. For quality assurance of the pre-apprenticeship programmes, the Department of Labor has set the standards based on which training and curricula are approved by the registered apprenticeship partners. In the Republic of Korea, the Seoul Regional Council for Human Resource Development⁷ has formulated and implemented policies on the green transition and TVET which have resulted in new training programmes. The United Kingdom takes a decentralized approach to skills development for the transition to a green economy by shifting the decision-making power from the central government to the local governments. This localized approach is adopted so that local governments work closely with businesses through local bodies such as Local Economic Partnership in England, Scottish Enterprise and Invest Northern Ireland, and skills development measures become more demand-led (Cedefop, forthcoming f).

6. To implement this Act, the California Energy Agency collaborates with the State Department of Education, the Community Colleges Chancellor's Office, the Conservation Corps, the Public Utilities Commission, the Workforce Development Board, the Department of Industrial Relations and the Division of the State Architect in the Department of General Services.

7. The Seoul Regional Council for Human Resource Development is one of 16 regional councils in the country.

Despite the positive roles played by local governments, decentralization can also give rise to regional disparities and fragmentation if it is not accompanied by effective mechanisms for the integration of local approaches into the national context. In China, for instance, local governments face difficulties in establishing a well-constructed skills development policy framework for a green transition due to the lack of consensus on the definition of green jobs (IUES, forthcoming). Similarly, without a unified national approach, the local governments in the United Kingdom have developed different approaches to meet the standards set out by EU directives; as a result, different definitions and classifications of skills for transition are utilized in different sources and skills anticipation activities are structured in different ways (Cedefop, forthcoming f).

Progress in skills policy formulation for the transition is more visible at the sectoral level, particularly in energy, waste management and resource efficiency

As highlighted in Chapter 1, the energy sector is one of the major contributors to greenhouse gas (GHG) emissions. Countries have adopted policies, strategies and regulations focusing directly on the energy sector, many of which make specific reference to skills development. Yet, as shown in [table 5.2](#), and as further examined below, sectoral efforts are not restricted to the energy sector.

Barbados recently adopted its National Energy Policy 2017–2037, which recognizes the contribution of skills to the development of the renewable energy sector. The policy outlines specific elements of skills development such as qualification standards; curricula at various educational levels, with strong emphasis on innovation; TVET programmes; information-sharing systems between educational institutions and the energy sector; and scholarship programmes related to energy in general, as well as to sustainability in the oil and gas sector.

The United Kingdom has established the Energy and Utilities Skills Partnership (2017). This partnership is a platform for developing sectoral strategies and skills assessment mechanisms in the renewable energy sector, which is in turn expected to make the sector more attractive to workers (Cedefop, forthcoming f).

In addition to policies and strategies, regulatory instruments can also promote environmentally sustainable behaviour on the part of firms and consumers, and contribute to mitigation efforts. Skills development contributes to the implementation of regulations in the energy sector, since compliance with energy regulations requires specialized skills and knowledge, as well as heightened awareness of environmental sustainability. In fact, all of the 27 countries surveyed have adopted regulations on renewable energy or energy efficiency, including rules on qualifications, skills certification and/or the training of professionals. These rules are often targeted at specific occupations, such as energy auditors, inspectors, assessors, energy managers, installers and operators of equipment and buildings. Some regulations are more elaborate than others in their description of implementation mechanisms, including the establishment of authorities (with defined functions and responsibilities), training institutions and funds.

For instance, Indonesia requires energy users that consume more than 6,000 tonnes of oil equivalent a year to implement an energy management system. In accordance with this regulation, in 2010 the Ministry of Energy and Mineral Resources established the Mandatory Competency Standard for Energy Manager in Industry. These developments have led to additional regulations on the Standard Work Competence of Indonesia for energy managers and energy auditors, adopted by the Ministry of Manpower and Transmigration. Against this backdrop, skills development and certification in the energy sector have been promoted by two Professional Certification Institutes (*Lembaga Sertifikasi Profesi* (LSP)).

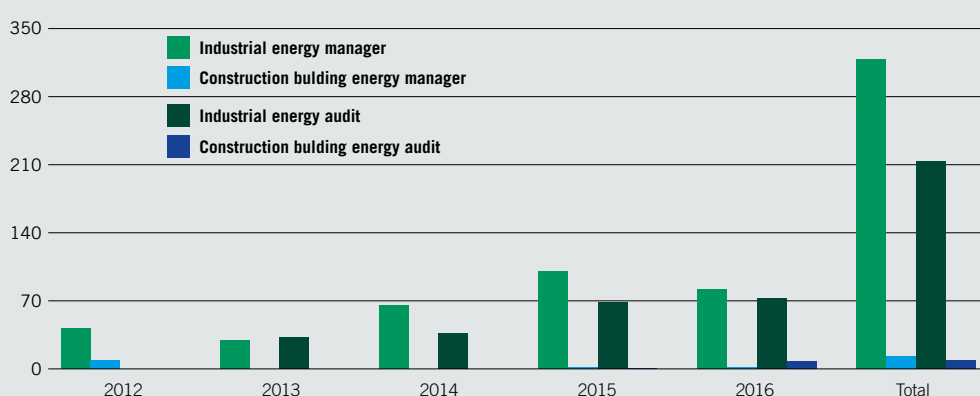
Although the impact of skills development measures on energy use is difficult to quantify, there is some evidence that when regulations are well targeted and their certification and training measures are well implemented, countries tend to see an increase in the number of qualified professionals and a reduction in energy use. For example, in Indonesia, one of the Professional Certification Institutes, the Association of Energy Conservation Experts (*Himpunan Ahli Konservasi Energi* (HAKE)), has administered an increasing number of competency tests for energy managers and auditors since 2012, and had awarded certification to about 550 workers as of 2016 ([figure 5.1](#)). Likewise, in Australia, the Building Energy Efficiency Disclosure Act 2010 established the Commercial Building Disclosure (CBD) programme and sets a legal requirement for the disclosure of information on energy efficiency for buildings of over 2,000 m². The Act contains detailed rules on the training and accreditation of energy assessors and establishes an auditing authority. In addition, training materials and online examinations

Table 5.2

Priority sectors and occupations affected by the transition to a green economy

Country	Sectors most relevant for the green transition	New occupations identified/greening of old occupations (examples)
Bangladesh	Energy, waste management, construction (brick manufacturing), transport, telecommunications (introduction of eco-friendly cell phones), agriculture, fishery (shrimp) and forestry	In brick manufacturing, chimney kiln operators
Barbados	Renewable energy	Electricians, electrical and mechanical engineers, solar PV designers, site assessors, PV installers, energy auditors, energy conservation and efficiency specialists, plumbers, specialists in construction standards, trainers for project managers, health and safety trainers
China	Agriculture, manufacturing, energy, building and construction, transport, environmental protection and pollution treatment, services	Wind turbine manufacture, equipment operators, renewable energy management, research and training, engineering, power technology, solar power generation, wind power generation, eco-design for buildings, construction labourers, building retrofitting workers, electricians, roofers, building inspectors, E-vehicle manufacturer, high-rail construction workers, metro and e-vehicle bus drivers, recycling and waste management, waste management, coal washing and preparation, desulfurization and denitrification equipment manufacture, research and training, energy conservation services, financial consultant
Costa Rica	Agriculture, food, construction, lithographic, wood, metalworking, plastics, chemicals, textiles, services	Environmental engineers, food scientists and technologists, environmental civil engineers, environmental designers and nanotechnologists, sustainability specialists, electromechanical technicians, software developers, commercial and industrial designers, industrial engineering technicians, agronomists, biotechnologists, biologists, forest engineers, veterinarians
Egypt	Renewable energy/solar and wind energy, energy efficiency, waste management, agriculture, manufacturing/leather	Solar installers, solar service technicians, solar plant managers, electricians with solar expertise, plumbers, heating ventilation and air conditioning technicians, wind turbine technicians, wind plant managers, quality engineers, energy efficiency managers, energy efficiency auditors, plant managers for cleaner production, cleaner production auditors, technicians, supervisors, waste management specialists, organic farm auditors and certifiers, pesticide operators, machine operators (bio-fuel generators)
Estonia	Agriculture, forestry, industry, waste and the circular economy, construction, renewable energy and maintenance, technology development, geomatics, transport, education sector, green public procurement	Engineers, technicians, construction specialists, green architects and designers, harvesters, forwarder operators, woodworkers, personnel dealing with ozone-depleting substances, biology teachers and scientists
Guyana	Biodiversity, agriculture, energy, water, solid waste management, environmental education, climate change education, disaster risk management	New occupations identified in the energy sector and for the Guyana Energy Agency
Indonesia	Energy, construction	Industrial energy auditors and managers, construction building energy managers and auditors
Kyrgyzstan	Agriculture, construction, mining, metalworking, ecotourism	Agronomists, agricultural engineers, machine operators, estimating engineers, welders, crane operators, mining engineers, shotfirers, metalworkers, moulders, steel-melters
Mauritius	Renewable energy, tourism, private sector/green business, public sector	Technicians, PV installers, energy auditors, eco-tourism operators, eco-guides, eco-entrepreneurs, green public officers
Montenegro	Tourism, agriculture and energy sectors	Production and installation of energy-efficient windows and doors, organic production, mountain guides
Philippines	Public sector/green procurement, solid waste management and garbage collection, renewable energy, tourism	Green procurement managers, operators of sanitary landfills, project engineers, environmental and social safeguard focal persons, renewable energy experts, hydrologists, wind, solar and biomass experts, biologists, chemists and disposal officers, solar PV fitters, aerospace technicians, wind-turbine technicians, offshore oil/wind maintenance technicians
Spain	Forestry, waste, services, energy	Forest and environmental agents, qualified workers in hunting activities, forest fire workers, qualified workers in forestry and natural environmental activities, prevention of labour and environment risk agents, waste classification workers, environmental and forest technicians, vehicle cleaners, sweepers, power plant technicians, electricity technicians
Tajikistan	Renewable energy/ hydro, agriculture, ecotourism, construction	Organic farmers, managers, energy auditors, engineers, operational and maintenance specialists in hydro, solar and biomass energy, solar panel installers; tour operators, eco-guides
Thailand	Energy	Carbon-related project analysts, green marker officers, public relations officers, green engineers, green architects
Uganda	Agriculture, industry, energy, cities/transport	Production and processing of organic products, soil fertility management, weeding and post-harvest handling

Source: ILO compilation based on country studies.

Figure 5.1**Indonesia: Number of graduates certified as energy managers and energy auditors, 2012–16**

Source: LSP HAKE, 2017.

have been developed and utilized. An impact assessment concluded that the regulation was effective in reducing energy consumption and GHG emissions and generating economic benefits between 2010 and 2014 (ACIL Allen Consulting, 2015). Renewable energy and energy efficiency regulations therefore show how environmental sustainability and skills development can be integrated. Policy-makers are encouraged to consider a similar approach in other sectors, such as agriculture and waste management.

In Egypt, the Waste Management Regulatory Authority (WMRA) was established in 2015, with the responsibility to identify environmental challenges and enforce laws in all governorates and municipalities. As such, the WMRA provides training in waste management, hazardous waste management, hazardous waste compliance, the handling and disposal of waste, the operation of waste facilities, waste to energy conversion, chemical waste management, waste management regulation, waste management in health care and the tracking and transport of waste (Amin, forthcoming). Set up in 2005, the Egypt National Cleaner Production Centre (ENCPC) coordinates and promotes cleaner production, waste management, innovation and energy efficiency issues for Egyptian industry. As part of its capacity-building activities, the ENCPC provides training in waste tyre management and recycling and is developing an accredited capacity-building programme to train energy managers in energy efficiency. Two other providers, the Regional Center for Renewable Energy and Efficiency (RCREEE) and the Industrial Modernization Centre (IMC) also offer professional certification programmes for energy experts and managers.

Although the sectoral approach has many benefits, including the relative ease of stakeholder coordination and the identification of specific skills needs (Strietska-Ilna, 2017), it is not sufficient for ensuring comprehensive skills development for green transition (Cedefop, 2015; Strietska-Ilna et al., 2011; OECD, 2014). From an economy-wide perspective, not only priority sectors, but all sectors have the potential for greening (ILO, 2013). Such a perspective allows stakeholders to identify skills needs arising out of both direct and indirect job creation along supply chains, and in turn to design and implement training programmes for a wide range of sectors and jobs at all skill levels.

In practice, the implementation of an economy-wide approach is more challenging than a sectoral approach. Cross-sectoral coordination is often seen by stakeholders as being “too costly”, as it often gives rise to conflicting and overlapping priorities (Watson, Brickell and McFarland, 2013).⁸ Because of these difficulties, there are few examples of good practices. As a result, policy-makers and other actors have not yet developed a good understanding of what is required for successful cross-sectoral coordination.

Despite the difficulties, some countries (such as Denmark and France) provide good examples (Cedefop, forthcoming a). These countries are characterized by several common factors, including: (1) a high level

8. On the other hand, some argue that cross-sectoral coordination would lead to a reduction in transaction and implementation costs compared to the cost of separate sectoral initiatives (ibid.).

of public acceptance of environmental sustainability; (2) provision for skills development for the green transition in policies at the national level; and (3) the existence of institutional mechanisms for cross-sectoral coordination on skills for green transition. The high level of public acceptance of environmental sustainability issues may have facilitated cross-sectoral coordination and consensus building with an economy-wide perspective. Thus, raising awareness of environmental issues is a powerful tool for the development of skills for the greening of the economy as a whole, and not only in priority sectors. One policy tool to increase environmental awareness is to incorporate “core skills”⁹ into education systems at all levels (Strietska-Iliina et al., 2011). Core skills are non-vocational and non-technical competencies that are needed to perform at work and in society (Gregg, Strietska-Iliina and Büdke, 2015) and which, in the context of green transition, include “environmental awareness and willingness to learn about sustainable development” (Strietska-Iliina et al., 2011, p. 107). Core skills can facilitate shifts in consumer behaviour towards environmentally sustainable goods and services. They can also improve the employability of workers across multiple sectors or occupations, thus contributing to the resilience of workers in the face of possible job displacement and income losses during the transition to a green economy.

Supranational or regional initiatives can bring about economies of scale

Establishing regional policies on skills certification and training provision may increase investors’ confidence in the regions’ skills base. In addition, regional agreements on the recognition of qualification help ensure that migrant workers with certified skills can contribute to a green economy in the region whether they are in home or destination countries. Since 2010, there has been an increase in policies on environmental issues and skills development at the supranational/regional level. For example, the ASEAN Green Hotel Standard, adopted in 2016, establishes the qualification and experience requirements for green hotel inspectors. In Africa, the Economic Community of West African States (ECOWAS) adopted regional Energy Efficiency Policy and Renewable Energy Policy in 2013, with strong emphasis on developing a harmonized framework for qualification standards and skills certification.

Policy coherence is emerging, but more needs to be done

In summary, this section has shown that the regulatory and policy coherence between skills development and environmental sustainability is certainly emerging in some countries, but the majority of the sample countries are still at the initial stage of their efforts to achieve such coherence. In many countries, environmental law reforms introduced since 2010, especially in the areas of energy, building and construction and waste management, have led to the establishment or revision of professional qualification standards. This has, in turn, led to changes in certification systems. Both public and private institutions have responded to these policy changes by developing training curricula and carrying out skills assessment tests. Regulatory instruments have been a major driver in setting, formulating and implementing skills policies, although it may be difficult to adapt them to changing skills needs.

There are some issues that warrant the attention of policy-makers. First, spatial challenges may arise if green economy jobs are created in locations other than those that suffer the bulk of job losses. Education and training efforts therefore need to be linked with economic development strategies and just transition policies. In the United States, employment in coal (with the potential for job loss) and most employment in solar and wind power are located in different states. China, the world’s largest coal producer, expects to lay off 1.8 million coal and steel workers (15 per cent of the workforce) in the coming years. Efforts to strengthen skills training for the workers affected will be part of the measures taken by central and local governments to smooth the transition (IUES, forthcoming). In this regard, granular assessments of skills and competences at the company, community and sub-provincial levels may provide useful tools for facilitating equitable structural transformation in China (see, for example, Caldecott et al., 2017).

Second, in smaller countries, the limited size of the market may be insufficient to develop traditional forms of specialized training. In Montenegro, for example, skills development for the green transition to promote ecotourism (e.g. mountain guides) might be difficult to organize, at least given the current size of the market for ecotourism (Djuric, forthcoming). Another deterrent, for example in Guyana, is the emigration of skilled labour.

9. See Gregg, Strietska-Iliina and Büdke (2015) for the definition, and ILO (2011) for specific examples of core skills in the context of green transition.

Lastly, when environmental sustainability is not deeply rooted in the national growth strategy, policy debate can be shifted away from long-term issues in the face of economic downturn and weak labour market performance. The de-prioritization of environmental sustainability in national growth strategies has had a concrete impact at the policy level, in some cases leading to the relaxation of restrictions set out in or enforcement of environmental laws or a significant reduction in the public funding allocated for climate change policies. Even when national policy supports environmental sustainability and the transition to a green economy, the importance of skills tends to be overlooked, signalling insufficient levels of awareness among stakeholders regarding the role of skills in this respect.

B. Skills development programmes and initiatives for greening the economy

Following the examination of regulatory and policy coherence in Section A, this section takes a closer look at the micro level and analyses the details of implementing programmes in the areas of skills needs identification and training provisions. In so doing, it highlights overall trends in programme implementation in terms of the actors involved as well as administrative levels, sectors and types of target audience.

Identifying skills needs is a key first step in meeting labour market needs

The assessment of skills needs can be both quantitative and qualitative. The green transition comes along with the changes in the number of workers in different occupations (hence the need for quantitative assessment), as well as the changes in the skills required for a particular occupation without changing the number of jobs (hence the need for qualitative assessment) (Gregg, Strietska-Illina and Büdke, 2015). The 27 country studies conducted for this chapter show that the latter is more common. This can be due to various reasons, such as qualitative shifts in skills needs (e.g. greening existing occupations) being deemed more relevant, or quantitative data not being available.

Since 2010, many countries have continued their efforts to identify the skills needed for the green transition at the national, local and sectoral levels. These efforts are often embedded in broad economy-wide efforts, but in recent years various ad hoc initiatives have responded to the increasing and specific needs of the transition to a green economy (for example, in Costa Rica, Thailand and the United Kingdom). Ad hoc initiatives are also common in countries with limited financial resources and know-how to carry out structural reforms of their skills development measures (for example, a survey conducted in Barbados by Sault College and Samuel Jackman Prescod Polytechnic in 2014).

Several countries have established regular systems for the identification and anticipation of skills needs throughout the economy (OECD, 2016; Strietska-Illina et al., 2011). For instance, a list of occupations in high demand, including occupations related to green sectors, is published regularly in South Africa. In France, the National Observatory of Jobs and Skills in the Green Economy (Onemev) conducts regular assessments on the employment trends in green economy and publishes the results in activity reports and other publications (Cedefop, forthcoming b). Finally, Thailand's *Occupational Trends* report, regularly published by the Department of Employment (DOE) under the Ministry of Labour, also identifies the demand for occupations, including those related to green sectors.

Skills identification efforts are also emerging at the local/regional and sectoral levels, with a growing role for employers

In Thailand, the Climate Change Technology Needs Assessment estimates skills needs in some priority sectors (i.e. agriculture, modelling, and water resource management) (Bhula-or, forthcoming; STI and URC, 2012). In addition, the demand for labour is often identified in private companies by human resources or business strategy divisions. The employers' organization participates by organizing meetings and drawing up a list of training courses based on the needs identified by private companies. The needs identified and the list of training courses are then communicated to government bodies, such as the Department of Skills Development (DSD).

In Costa Rica, the Chamber of Industry has carried out a study covering 100 of its 800 members to identify their skills needs for the green transition (INCAE Business School, forthcoming). In the United Kingdom, employers' organizations play an increasingly important part in the skills needs assessment conducted by the Sector Skills Councils (Cedefop, forthcoming f). In the United States, despite the roll-backs at the federal level, there are environmental rules and regulations at state level, and some state governments are active in identifying skills needs for the green transition. One example is MassCEC's annual Massachusetts Clean Energy Industry Report, which contains information on skills needs in the clean energy sector.

The inclusion of skills for green transition into the formal vocational training system is still in its early stages in many countries

In the majority of countries analysed in this report, skills for green transition are not yet part of the TVET curriculum. This is often due to the disconnect between TVET systems, environmental policies and national development strategies, as well as between TVET institutions and industry. In many cases training for the green transition is provided by employers, mainly because they are directly exposed to changing skills needs, and partly because of the insufficient development of such training through formal TVET systems. By filling this gap, the private sector is playing a key role in providing opportunities for work-based learning, such as apprenticeships, and in creating closer links between training institutions and companies. Communication between the private sector and the formal TVET system is crucial in helping the latter to adapt to skills needs in the longer term.

When skills for green transition are incorporated into the formal education system, the programmes are often provided at the level of post-secondary education, and include associate degrees at community colleges and Bachelors, Masters, PhD and postgraduate degrees at universities.

The Republic of Korea has seen many developments in the greening of its vocational education and training system since 2009. National Competency Standards (NCS) in skills for green transition have been determined for jobs in the environmental energy, transport and machinery sectors in collaboration with industry experts and with financial support under the National Strategy for Green Growth (2009–2050). The New National Technical Qualification in skills for green transition has been established, as well as many courses and programmes at TVET institutions and university departments. Within the framework of the National Strategy for Green Growth, the Government has invested in research and development in green technologies. In addition, vocational colleges, such as poly-tech colleges, now offer associate degree programmes and non-degree vocational training courses, allowing mid-career professionals to improve their skills without completing full degree programmes. The Ministry of Employment and Labour (MOEL), which oversees TVET institutions, has supported curriculum and textbook development based on the NCS. And TVET institutions, such as poly-tech colleges, have actively implemented dual work–learning programmes, which allow workers to receive work-related training, for example on environment and energy, at their workplace or in regional training centres.

Thailand offers another example of good practice in skills development through formal education. In 2011, the Thailand Professional Qualification Institute (TPQI), a public institution, was set up to develop skills and occupational standards. This has led to extensive coverage of skills standards, including skills for the green transition. TPQI's skills and occupational standards are developed to reflect the skills needs expressed by the private sector, and are in line with national strategies for the promotion of the digital sector (i.e. Thailand 4.0) and an environmentally friendly economy.

Public institutions affiliated with ministries usually provide both initial and continuous training

Government agencies, often in accordance with sector-specific mandates, carry out the provision of both initial and continuous training. In the Republic of Korea, the Ministry of Environment and the Ministry of Land, Transportation and Construction provide training directly through their training institutions for professionals and new entrants to the labour market (Jin, forthcoming).

In South Africa, the National Cleaner Production Centre of South Africa (NCPC-SA) offers a six-month internship programme to strengthen the employability of young engineers by providing them with training and experience in greener production in various sectors: clothing, textiles, footwear and

leather; chemicals, plastics, cosmetics, pharmaceuticals; automotive; and agro-processing. The combination of training, mentoring and workplace experience is effective in promoting the employability of trainees, suggested by the employment rate of interns at 83 per cent between 2010 and 2013 (OneWorld Sustainable Investments, forthcoming). In 2010, the NCPC-SA launched the Industrial Energy Efficiency Improvement Project (IEE project), which offers training courses in energy management systems and energy systems optimization. The IEE project is implemented through collaboration between the Department of Trade and Industry, the Department of Energy, the Department of Environmental Affairs, Business Unity South Africa (BUSA) and international cooperation with UNIDO and Switzerland's State Secretariat for Economic Affairs (SECO).

Private training institutions also play an important role...

With a view to improving its quality through market competition, some training is provided by private training institutions. A number of these institutions are funded by the government, with training being outsourced, while others are totally privately funded. However, some country studies refer to concerns regarding the quality of training delivered by private TVET providers when the training is publicly funded. For example, in Australia, where publicly funded TVET has been contracted out to private colleges, the Skills Quality Authority has identified some weaknesses in endeavouring to ensure high-quality training based on competition between private providers. This is due, first, to the inadequate specification of standards relating to the volume, duration and quality of training. Second, there is information asymmetry between training providers and students, who are often unaware of the real quality of training. Third, market forces can potentially induce private training institutions to invest in factors other than the quality of training, such as enhanced brand image through advertising.

... as do local government initiatives

As noted above, local governments play a major role in designing and implementing the provision of training, largely due to their familiarity with local economies and labour markets. Local skills development programmes can be quite extensive, but without coordination at the national level, they may give rise to regional disparities and inefficiency.

In the Republic of Korea, the local government of the city of Seoul, in collaboration with the Northern Technical Training Centre, which is part of the Ministry of Employment and Labour, provides training courses in renewable energy and green car maintenance. The training is provided free of charge, together with job placement and counselling services. However, Seoul's initiative is fairly exceptional and is related to the fact that the city accounts for at least half of the economic activity, jobs and population of the Republic of Korea, and that it has much greater financial capacity than the other 16 local governments in the country (Jin, forthcoming).

Employer-led initiatives can also give rise to training opportunities...

Employers also design and provide training, especially short training programmes. These can be more timely and responsive to changes in the labour market. In Thailand, for example, private companies play an important role through public-private partnerships, not only in identifying and anticipating skills needs, but also in providing training for the green transition. The employers' organization sometimes organizes paid training seminars on topics such as energy saving and environmental awareness, which are open to members and non-members alike. When instructors are not readily identifiable in the country, they are invited from abroad.

Financial incentives can expand the scope of training provided by employers. Since 2010, an increasing number of employees have received training on skills for green transition supported by such incentives. In Spain, for instance, employers who offer training benefit from reductions in social security contributions. Between 2009 and 2016, the number of employees who received training for the green transition under this system doubled from 30,382 to 61,984 (Cedefop, forthcoming g). SMEs tend to face greater barriers in accessing the system, due to their lack of necessary knowledge, the administrative burden involved and their lack of trust in the system. In order to lower these barriers, the State Foundation for Training for Employment (Fundae) and the Spanish Confederation of Employers' Organizations (CEOE) organize guidance workshops and provide other assistance to SMEs.

The provision of TVET can also respond to direct demand from the private sector, for instance once a substantial number of companies are operating in the green economy or have created a “green cluster” in a region. In Spain, enterprises manufacturing electric cars in Castilla y León, a region with an automotive industry cluster, were able to persuade the regional government to invest in 2009 in a higher automotive technician diploma (Cedefop, forthcoming g).

Collaboration between a government agency and a specific enterprise can also lead to the provision of TVET. In Thailand, for example, the Department of Skills Development (DSD) started cooperating in August 2017 with a private company, DAIKIN, and the German Agency for International Cooperation (GIZ) to develop skills standards and competencies for air-conditioning technicians working on refrigerators using natural refrigerants. The collaboration will result in courses, curricula, assessment tools and training equipment at DSD training centres (Bhula-or, forthcoming).

In Bangladesh, a waste management company produces organic fertilizer using fruit and vegetable waste from the markets of Dhaka. Composting all the organic waste in Dhaka could create new jobs for 16,000 people from lower socio-economic backgrounds. The company has set up a Regional Recycling Training Center, in collaboration with the municipal government (Mondal, forthcoming).

In Brazil, the sugar cane sector employs a relatively large number of workers, with half the production being concentrated in the State of São Paulo. However, most of the jobs are damaging to the environment, as pre-burning causes serious atmospheric pollution. Mechanization avoids pre-burning and provides better working conditions, but for a smaller number of workers. In accordance with the Agro-Environmental Protocol of the Sugar and Energy Sector to end burning in sugar cane plantations, signed by the Secretariats of the Environment and Agriculture of São Paulo and the Union of the Sugar Cane Industry (UNICA), there was a 41 per cent drop in the workforce employed in the sugar energy sector between 2007 and 2014 (UNICA and FERAESP, 2015).

An important training initiative for displaced sugar cane cutters was introduced in 2009. Known as Projeto RenovAção (“Project RenovAction”), it is based on an agreement between UNICA, the National Industrial Training Service of São Paulo (SENAI) and several other educational institutions and partners. Training is provided for workers in new occupations in the sugar energy sector itself, and various courses are also offered to develop skills required in other sectors. Through the RenovAção project, workers can dedicate themselves to the courses, receiving monthly wages and other benefits (such as social contributions), as if they were working. The training initially targeted a quota of 20 per cent women participants, and was based on social dialogue. There is a specific teaching module for illiterate and semi-literate workers (the “Pre-RenovAção”), leading to a qualification consisting of basic subjects (reading, writing, mathematics, general knowledge, citizenship), which enables the workers to subsequently take part in Projeto RenovAção training courses. Most of the courses entail over 300 hours of training, with a total of 6,650 workers receiving training between 2010 and 2015 (ibid.; Young et al., forthcoming).

There are many examples of enterprises cooperating with universities and training centres for the development of curricula to address specific skills gaps, such as training for the installation of photovoltaic cells and the installation and use of solar water heaters in Barbados (University of the West Indies, forthcoming) and skills in the cement industry in Indonesia (IBCSD, forthcoming).

Finally, capacity building based on networks of enterprises and the principles of the circular economy can enhance resource productivity and the environmental performance of SMEs, as in the case of Mauritius (Sultan, forthcoming).

... and workers’ organizations are increasingly involved

There are examples of workers’ organizations involved in training for the green transition, such as Green Masonry Training in the Philippines in 2012, which was the result of collaboration between the Association of Construction and Informal Workers and the National Union of Building and Construction Workers and other partners (Fernandez-Mendoza and Lazo, forthcoming). Similarly, in the United Kingdom, trade unions have increased their involvement in skills development for green transition through an organization called Unionlearn. The University and College Union (UCU) has established “Greener Jobs Alliance” in order to step up trade union activities in localities and regions with the aim of influencing school curriculum (Cedefop, forthcoming f).

Training programmes often focus on specific sectors

Energy

In the United States, the Department of Energy (DOE) plays an active role in providing skills training for the energy sector, both at the national and local government levels. Over recent years, it has proposed 22 workforce training programmes through its Office of Energy Efficiency and Renewable Energy (DOE EERE), targeting a wide audience including professionals, students, entrepreneurs, industry stakeholders, jobseekers and the general public.

In Mali, the Ministry of Energy and Water promotes renewable energy loans to facilitate access to credit by consumers interested in installing solar equipment. To advance this programme, the Agency for Renewable Energy in Mali (AER-Mali) and the Support Fund for Vocational Training and Learning (FAFPA) are currently working together to develop training modules for bank sales managers.

In Egypt, with a view to harnessing solar power, an NGO called Solar Energy Development Association (SEDA) offers several short-term intensive training courses for professionals on such topics as photovoltaic grid connected (on-grid) systems, solar water pumping and comprehensive photovoltaic systems.

In developing countries there is a large potential to increase energy efficiency in household consumption. About half the world's population use solid fuels, such as wood and coal, to meet their cooking needs (UNDP and WHO, 2009). As in the case of Uganda (box 5.3), access to training in the use of more efficient stoves can improve energy efficiency and contribute to local development.

Box 5.3

Training in the use of improved cooking stoves in Uganda

In Uganda, open fire is the major cooking method used by 94 per cent of rural households, while charcoal stoves are common in urban areas (MEMD, 2016). The use of inefficient cooking methods is a contributing factor to poverty, as low-income families spend up to 15 per cent of their income on charcoal or wood, and the search for wood can take up to six hours a day, which could have been used to earn income through paid work. However, about 10 per cent of the population uses improved charcoal or wood stoves, which reduce fuel consumption by an average of 36 and 58 per cent, respectively (Kabasa et al., forthcoming).

In rural areas, many local stove projects use resident artisans to manufacture stoves adapted to local needs and train them in specialized ceramic skills so that they can enhance the functionality of the stoves.

Training of artisans in the production of improved stoves is usually organized by the private sector with informal curricula, which are not approved by the Directorate of Industrial Training (DIT). Fees range between 200,000 (US\$55) and 500,000 (US\$140) Uganda shillings for four weeks. This training could be mainstreamed in the vocational training

system at a later stage if the curriculum is approved by the DIT. "Energising Uganda" has trained more than 500 rural artisans since 2014 to produce and sell rural firewood stoves. Other support is provided to the artisans to ensure the sustainable growth of supply. User training, which is usually offered free-of-charge by the enterprises that sell the stoves, is key to the successful adoption of more efficient cooking methods.

The production of improved cooking stoves is an income-generating activity which could also have indirect employment effects. To maximize the benefits, the certification of training and the development of quality production is important. For example, the acquisition by small enterprises of production and distribution franchises from large producers can help to improve quality, reputation and consumer satisfaction. Keeping the cost of improved stoves affordable is still a challenge, and skills development could help to make the product more competitive. Training provided in trade fairs and during the Energy Efficiency Week could be scaled up and could inform consumers of the health benefits that improved cooking devices bring by mitigating indoor air pollution.

Source: Based on Kabasa et al., forthcoming.

Agriculture

Skills programmes in the agricultural sector are generally oriented towards food production efficiency rather than promoting the adoption of environmentally sustainable production systems. Weak coordination, the failure to identify skills needs, the sluggish involvement of the social partners and poor working conditions are all key challenges to overcome if agriculture is to go green.

In Mauritius, since 2016 over 3,200 farmers have benefited from the Compost Subsidy Scheme and the Sheltered Farming Scheme to shift from using chemicals to organic inputs (Sultan, forthcoming). The Food and Agriculture Research Extension Institute (FAREI) provides training for farmers, particularly in horticulture, agro-processing and agri-business. Participants can obtain MauriGAP certification in bio-farming. In addition, the FAREI Farming Training School offers bio-farming courses in collaboration with the Mauritius Institute of Technical Development (MITD). MITD provides a rainwater harvesting course in techniques for the reuse of plastic containers. Occupational safety and health components are integrated into all the training provided by MITD (ibid.).

In Mali, agriculture – and particularly cotton and food production – is a major sector for socio-economic development. It is also the sector most vulnerable to climate change, including erratic weather and water supply (Nyetaa, forthcoming). Firms exporting agricultural products need to have specific skills, such as knowledge of certification rules and international trade standards, organic farming, composting and food standards. Farmers producing for the domestic market lack training in sustainable agriculture, although some progress has been made. For example, a five-year project in the cotton-growing regions of southern Mali, which includes awareness-raising and training on key sustainability issues, has been able to reduce the use of chemical pesticides by 90 per cent (IFC et al., 2015).

Uganda has the largest farm area under organic management in all of Africa, with employment estimates ranging from 200,000 to 400,000 farmers. The National Organic Agriculture Movement (NOGAMU) is an NGO which brings together training institutions, national and international agencies and the private sector to support the development of organic farming in the country. NOGAMU has identified skills needs in the production and processing of organic products, and training needs for farmers interested in sustainable pest and disease management, soil fertility management, weeding and post-harvest handling. NOGAMU offers a range of training services in collaboration with education and training institutions, such as the College of Veterinary Medicine of Makerere University and the Uganda Martyrs University.

In other countries too there are many examples of training for organic agriculture or small-scale farming through non-formal courses and training programmes implemented on a project basis (e.g. Bangladesh, Egypt, Mali) or through formal training (e.g. Barbados, Costa Rica, Kyrgyzstan). Guyana offers and supports climate-resilient agricultural techniques in hydroponic production.

Forestry

The Guyana Mangrove Restoration Project (2010–13) aimed to create employment and support skills development to increase carbon sequestration, strengthen coastal resiliency and reduce the risk of floods (Small and Witz, 2017). Skills were provided for the planning, harvesting and maintenance of mangroves, as well as creating awareness of the role of mangroves in protecting the environment and enterprise development. A few enterprises were created in agro-processing and ecotourism. The project, which created 1,000 jobs, adopted an innovative approach to the sustainability of mangrove forest improvement. In exchange for enterprise development services, participants were requested to actively monitor the restoration and use of the mangrove forest in collaboration with local and regional institutions and the Ministry of Agriculture. In 2014, the project unit was integrated into the Ministry of Agriculture, which should facilitate the extension of the project across Guyana's mangrove forests and its application to other sectors, such as forestry.

Ecotourism

The Philippines Department of Environment and Natural Resources (DENR) has recognized ecotourism in designated areas and provided guidelines for ecotourism planning and management. In 2013, a gender-responsive toolkit on ecotourism planning and management was developed by the Philippines Commission on Women in partnership with the DENR. The toolkit contains training sessions on ecotourism planning, trail resources and monitoring for protected area officers and ecotourism guides, and marine resources monitoring for ecotourism (GREAT and PAWB, 2013).

Skills for green transition in waste management and recycling: The potential for decent work?

The waste management and recycling sector employs over 500,000 people in Brazil (CEMPRE, 2010; ILO, 2011), 62,147 in South Africa (DEA, 2012; OneWorld Sustainable Investments, forthcoming) and some 400,000 to 500,000 in Bangladesh (Mondal, forthcoming). Most of these workers are in the informal economy, primarily in urban areas, and often play an important role in increasing the level of recycling, while reducing the amount of landfill. However, they face serious decent work deficits, such as work-related hazards, low earnings and long working hours; they are often not legally registered (hence the exclusion from labour legislation and social protection) and are socially stigmatized (ILO and WIEGO, 2017; Schenck, Blaauw and Viljoen, 2012). In response to these challenges, cooperatives and other social and solidarity economy organizations have been set up in countries such as Brazil, Colombia, India and South Africa to increase the recognition and collective voice of waste pickers (ILO, 2014). According to Green Fund (2016), scaling up the potential of waste management and recycling to integrate low-skilled informal workers into the formal economy, while at the same time promoting an economy with fewer waste is key to improving working conditions in the waste sector and the environment in South Africa.

However, the important question remains regarding the role of skills development in

ensuring the transition of informal waste pickers to formal employment and to better working conditions. The development of the circular economy (recycling products, giving a new life to old products) involves the need for sorting, which requires a good knowledge of waste issues, suggesting the need to extend training to workers in the informal waste management sector.

There are some initiatives that address this skills gap. In France, the Professional Federation of Recycling Companies (FEDEREC) brings together 1,300 companies in the sector. The branch benefited from public co-financing to make a prospective inventory of its needs and skills, which led to the creation and implementation of five new qualifications: manual sorting operator, mechanized sorting operator, industrial team leader, industrial equipment operator, and industrial maintenance operator (Cedefop, forthcoming b). In Bangladesh, a private company, Waste Concern, has developed two training modules for community-based solid waste management and resource recovery (Mondal, forthcoming). Similarly, ILO and WIEGO find that waste picker cooperatives covered by their recent study¹ provide or facilitate access to training in the areas of legal recognition and technical skills related to waste management, while training in the area of OSH is largely overlooked (ILO and WIEGO, 2017).

¹ A total of 29 cooperatives from Argentina, Brazil, Colombia, India, South Africa and Turkey were surveyed. See ILO and WIEGO (2017) for details on the research design.

Waste management

Efforts to develop the skills of workers in waste management have also been made in a large number of developed and developing countries with a view to reducing the amount of landfill and increasing recycling (box 5.4).

Programmes organized by target group

Adult workers

Adult training for the greening of occupations and retraining of displaced workers can take the form of short courses. In Denmark, for example, a four-day course on environmental care is provided for property caretakers (Cedefop, forthcoming d). In many developing and emerging countries (e.g. Bangladesh, India and Uganda), on the other hand, adult training is less common. This may be due to the fact that in lower-income countries lower-skilled occupations make up a large share of employment, and skills may be considered as being relatively more transferable among those occupations even without training. For example, in Uganda, no training was provided when motorcycle taxis (*bodaboda*) were replaced by the city bus service, and many of the workers who lost their jobs have become touts and conductors to direct passengers to the buses.

Persons with disabilities

By focusing on training for persons with disabilities in developing skills for the green economy, it is possible to contribute to reducing inequality in access to education and employment. In Indonesia, nearly half of persons with disabilities have not completed primary education, and their employment share in urban areas is low (ILO, 2017a). Evidence from other countries suggests that such programmes can generate positive outcomes at the village level or in coastal areas in countries with a high level of outward migration. In Bangladesh, for instance, 200 persons with disabilities (mainly women) were trained in organic mushroom production and marketing in partnership with eight mushroom cooperatives (Mondal, forthcoming). The key success factor was the creation of partnerships between skills councils and the private sector in targeted sectors, with a commitment to a 5 per cent admission quota for persons with disabilities in TVET institutions. In Guyana, a project launched in 2014 provided training in hydroponic agriculture to almost 100 deaf students, 12 teachers and some parents (Small and Witz, 2017).

Indigenous and tribal peoples

Although indigenous people are vulnerable to climate change, they can play an essential role in sustainable policies and programmes as change agents for addressing environmental degradation (ILO, 2017b). Article 29 of the Indigenous and Tribal Peoples Convention, 1989 (No. 169), emphasizes the importance of skills development to ensure their full participation in the national economy. The provision of skills to indigenous people can support climate change mitigation through payments for ecosystem services (PES) schemes (see Chapter 4) and ecotourism. More importantly, indigenous and tribal peoples' knowledge about sustainable natural resource management (in forests, fisheries, wildlife, agriculture) can be streamlined into skills development programmes and adopted more widely to enhance the sustainability of these sectors.

In Australia, over 250 indigenous people in the Warddeken Indigenous Protected Area were provided with accredited training courses in 2010–11 to deal with the tasks of fire management, feral animal management, weed control and the monitoring of endangered species. The project has achieved 901,075 tonnes of CO₂eq in carbon abatement, which is worth US\$4.4 million (Fairbrother et al., forthcoming). Other impacts were reported, such as increased confidence and better health and well-being among the participants (ibid.).

The involvement of indigenous communities and the use of indigenous technologies in maintaining ecological balance can support clean local development, such as ecotourism in the Himalayas and the Western Ghats mountain range in India. Recognizing the multiple challenges faced by indigenous women, the “Moco-Moco” programme in Guyana is a female entrepreneurship initiative to alleviate the negative effects of natural disasters in indigenous communities of Region 9 (Upper Takutu-Upper Essequibo) by improving cassava and flour production for food security. It has improved the financial independence of the participants (Small and Witz, 2017).

Reducing gender inequality

Gender equality is central to sustainable human development and is one of the fundamental principles for the effective greening of economies. However, the absence of equal opportunities in access to decent jobs and training hinders the full contribution of women to the green economy (ILO, 2015b). Gender mainstreaming in skills development could enable women to move from low-skill and entry-level positions to high-skilled jobs and would enhance their livelihoods and independence. However, without conscious efforts, women's participation in the green economy will not increase rapidly enough to close the existing gender gap (von Hagen and Willems, 2012).

There are examples of good practice in the national studies in achieving gender equality. For example, the Australian Gas Light Company (AGL) promoted and assigned over half of its non-traditional roles to women under its Workplace Gender Equality Agency definition. The AGL is committed to increasing the number of women in the Senior Leadership Pipeline to 40 per cent by 2019 (Fairbrother et al., forthcoming). In Guyana, Ruppuni Essence is a cosmetics firm that relies on single mothers to grow lemongrass and promotes business opportunities through cooperatives (Small and Witz, 2017). In the Philippines, rural women are offered training in organic farming to empower them and improve their income (Fernandez-Mendoza and Lazo, forthcoming).

As illustrated in Chapter 2, the renewable energy sector has great potential for employment generation. Achieving gender equality in the renewable energy sector is crucial, as women are under-represented in this sector; their share in renewable energy employment stands at around 20–25 per cent in some advanced economies (Baruah, 2016). The gender gap is narrowing, albeit slowly. In the United States, the share of women in solar employment has grown to 28 per cent in 2016, although their skills levels are lower than in other national industries (Garrett-Peltier, forthcoming). In France, the proportion of women working in the production and distribution of energy and water has risen from 15 per cent in 2008 to 21 per cent in 2012 (Cedefop, forthcoming b). In developing and emerging economies, informal training provision plays an important role in promoting women's skills development in solar engineering and their participation in the sector. For example, the Barefoot College, an NGO active in India, has pioneered skills training of women in non-electrified rural villages in the field of solar electrification, and has successfully replicated the training provision model in Latin America and Africa (von Hagen and Willems, 2012; Enel, 2017).

C. Mapping the institutional structure of skills policies and programmes

Sections A and B have examined current efforts towards regulatory and policy coherence, as well as in the implementation of skills development programmes in the countries surveyed. This section focuses on institutional mechanisms that may facilitate or hinder those efforts, with an aim to draw attention to common successful factors and bottlenecks. In particular, the analysis highlights the challenges associated with promoting social dialogue on skills development for green transition.

Institutional mechanisms and social dialogue are key for effective policy formulation, identification of skills needs and development of training provision

The coordination across public agendas is essential for an effective design and implementation of public policies in general, but in the case of environmental sustainability it is absolutely vital. Indeed, conflicts of interest among issues such as environmental sustainability, economic growth and employment can be difficult to overcome when a country's economic activity and employment are largely reliant on environmentally harmful industries (van de Ree, 2017). Unsuccessful coordination of interests would hinder the promotion of skills development for the green transition.

Given this challenge, a well-functioning set of institutions and decision-making mechanisms (hereinafter "institutional mechanisms"), which can integrate a wide-range of public agendas, such as economic growth, public finance, social inclusion, education and employment, is essential for successfully promoting skills development for green transition. Such institutional mechanisms include not only those that are traditionally concerned with skills development issues (e.g. sector skills councils, advisory committees for vocational training), but also the ones that address environmental concerns (e.g. round tables on environment and sustainable development). In addition, the active participation of governments, social partners and other interested bodies in the process of designing and implementing skills development measures is imperative, as stipulated in the Human Resource Development Convention, 1975 (No. 142), and encouraged by the Human Resource Development Recommendation, 2004 (No. 195).

The experience of the 27 countries surveyed shows that the engagement among national governments, local governments and the social partners in the design of skills policies has led to the adoption of fully fledged policies dedicated to developing skills for the green transition or the incorporation of green skills into TVET policies. In particular, roundtables, advisory councils and skills councils are shown to be effective for tripartite involvement.

Mapping of policies reveals two types of institutional approaches to devising skills development measures for green transition, namely, establishing new bodies or councils specifically dedicated to skills for green transition, and mainstreaming environmental sustainability into the existing mechanisms for

Table 5.3

Institutional mechanisms to anticipate skills needs and adapt training provision (27 countries)		
Policy questions	Are skills for green transition addressed through existing institutional mechanisms to anticipate skills needs and adapt training provision?	Is there a specific body or council to address skills development for green transition?
Australia	Yes	–
Barbados	Yes	–
Brazil	Yes	–
China	Yes ¹	–
Costa Rica	Yes	–
Denmark	Yes	–
Estonia	Yes	–
Germany	Yes	–
Guyana	Yes	–
Mauritius	Yes	–
Indonesia	Yes	– ⁵
Republic of Korea	Yes	–
Spain	Yes	–
Thailand	Yes	–
United States ²	Yes	–
Philippines	Yes	– ³
India	–	Yes
France	Yes	Yes
South Africa	Yes	Yes
United Kingdom	Yes	Yes ⁴
Bangladesh	–	–
Egypt	–	–
Kyrgyzstan	–	–
Mali	–	–
Montenegro	–	–
Tajikistan	–	–
Uganda	–	–
Total (number)	19	4
Total (percentage)	70.4	14.8

¹ Institutional mechanisms exist at the provincial and municipal levels, but not at the national level. The 2015 edition of the Dictionary of Occupations identifies 127 green occupations but provides no description of the criteria used for the categorization. It also acknowledges that those 127 occupations are only part of all the green occupations that enjoy a high degree of social acceptance. ² The Green Building Council Indonesia (GBCI) Association offers several types of training programmes in environmentally sustainable building. ³ In the United States, the responsibility for governing education systems is decentralized and given to each individual state. The United States data are only for the state of California. ⁴ The Philippines Green Jobs Act 2016 mandates the Technical and Skills Development Authority (TESDA), Green Technology Centre and the Professional Regulation Commission (PRC) for the development of training regulations and qualifications framework pertaining to green jobs. ⁵ Unionlearn, the learning and skills organization of the Trade Union Congress, has established "Green Skills Partnership", which involves unions, employers, local councils, environmental organizations, education providers, community groups and state agencies.

Source: ILO compilation based on country reports and consultations with ILO specialists.

skills development in general (table 5.3). These approaches are not mutually exclusive; some countries, such as France, South Africa and the United Kingdom, use them simultaneously. Of the 27 countries surveyed, four have set up specific institutional mechanisms to address skills for the green transition, focusing on a few priority sectors. Much more commonly, 22 out of 27 countries had already established institutional mechanisms for skills development issues in general, and 19 of them address skills for green transition. This means that skills for green transition are not always addressed through the existing mechanisms. In some developing and emerging economies, institutional mechanisms for skills development in general are yet to be set up (e.g. Egypt and Mali), or have just been launched and are active only when there are donor-funded projects with specific sectoral coverage (e.g. Bangladesh), hence the lack of systematic platforms to regularly address skills development for green transition. In other countries, skills for green transition are addressed only through ad hoc surveys with employers (e.g. Costa Rica). Thus, developing and emerging economies have relatively weaker institutional capacity for integrating skills and environmental sustainability.

In addition to the institutional mechanisms, the participation of employers' and workers' organizations is also a key determining factor for effective skills needs identification and training provision. Employers can enhance the efficiency of skills development policies by identifying trends in the competencies required by the enterprises, improving the matching of skills demand and supply – including for migrant workers (ILO, 2017c), and linking technological innovation with the creation of employment and skills development opportunities.

On the other hand, workers' organizations can ensure that the equity concerns are taken into consideration, by addressing issues such as equitable access to training by workers of different skills levels, migration status, gender and contractual forms (TUAC, 2016; ILO, 2016), as well as translating skills development into higher pay and recognizing skills acquired on the job.

A positive link between the involvement of trade unions and the development of training provision¹⁰ has been identified in studies of advanced economies such as France (Le Deist and Winterton, 2012) and the United Kingdom (Stuart and Robinson, 2007) and of emerging economies such as Argentina, Hong Kong (China) and the Philippines (Bridgford, 2017; Smith, 2014). This is also the case in Denmark, where stakeholders, including employers and trade unions, meet in the Advisory Council on Initial Vocational Training (REU) (Cedefop, forthcoming d). In light of this evidence, policy-makers and other stakeholders are encouraged to consider various ways in which trade unions can become more involved in skills training, such as the development of skills-based collective agreements at the sectoral level and the inclusion of training arrangements in collective bargaining at the enterprise level (Bridgford, 2017).

The 27 country studies show that skills development policies, including those for green transition, are led by governments based on their primary responsibilities for education and pre-employment training. The governments often engage with employers in an aim to achieve better matching of skills supply with demand, while trade unions are less likely to be involved (e.g. Bangladesh, China, Costa Rica, India and the Republic of Korea). Limited trade union participation carries the risk that inadequate consideration will be given to the needs of workers disadvantaged on the grounds of disability, gender, skill level, migration status, or age. For these reasons, and as specified in ILO Recommendation No. 195, governments should strengthen their support for social dialogue (Paragraph 5(h)(i)) and collective bargaining (Paragraph 9(c)) in relation to training at all levels, including the national, sectoral and enterprise levels. Furthermore, social partners are encouraged to increase their participation in designing and implementing skills development measures for green transition.

Public funding arrangements are instrumental in supporting the provision of training through the formal education system

Funding arrangements are one of the key drivers for the effective implementation of policies for the transition to a green economy. National studies find that public financial support has led to the creation of new channels for the provision of training, including departments at universities and graduate schools, and training programmes in TVET institutions (e.g. Republic of Korea). Importantly, public financial support has enabled disadvantaged groups to participate in training programmes free of charge. However, the sustainability of public funding remains a concern, suggesting the need for complementarity with a market-based approach and employer-led initiatives.

Fiscal instruments have generated strong incentives for employers to provide training

Fiscal reforms in the form of tax exemptions and social security rebates have proved to be a successful incentive for the provision of training by employers in the area of skills for green transition. When such fiscal incentives are in place, the number of employees receiving such training is seen to go up (Cedefop, forthcoming g). However, the experience of some countries (e.g. Spain) shows that, while the number of employees trained has doubled, the average duration of each training action has halved, suggesting the need for quality assurance mechanisms.

10. See Bridgford (2017) for a review of the literature.

The absence of national or sectoral policies can undermine the sustainability of training programmes

In developing countries, training programmes are often implemented with the support of international development agencies and tend to be discontinued when the projects come to an end. A country-led approach is an effective way of ensuring the sustainability of these programmes and their progressive application to more sectors of the economy. In addition to sustainability, the training of trainers is a challenge. The development of new training techniques, especially through the use of information technology, may offer opportunities for improvement.

The lack of consensus on the definition of green jobs at the national level hinders skills development for green transition in many countries

The 27 country studies show that most of the sample countries have not yet reached consensus on the definition of green jobs.¹¹ In countries such as Denmark, France, the Philippines, South Africa, the United Kingdom and the United States, official definitions of green jobs exist – and yet even in those countries the debate over what should be defined as green jobs is still ongoing. This lack of consensus on the definition of green jobs is an obstacle to the systematic design and implementation of skills strategies, skills needs identification and training provision. In 2013, progress was made towards establishing an operational definition of green jobs at the 19th International Conference of Labour Statisticians (ILO, 2013). However, implementation of the definition largely depends on country-specific contexts and capacity, and many of the sample countries face challenges in this regard. In order to support its member States, the ILO has conducted pilot projects for generating statistics on green jobs based on the 2013 operational definition in Albania and Mongolia, which led to initial identification of green jobs by sex, level of education, occupation and main economic activity (Stoevska, Elezi and Muraku, 2014; Oyunbileg and Stoevska, 2017). In addition to surveys, other data sources such as input–output tables can also be used for projecting the employment impact of the green transition. In this regard, the Green Jobs Assessment Institutions Network (GAIN) published a training guidebook in 2017 (GAIN, 2017).

Conclusions

This chapter has examined the formulation and implementation of existing policies and programmes in the area of skills development for the green transition in terms of their policy coherence with broader environmental sustainability policies, and identified success factors and obstacles.

There are signs of emerging policy coherence between skills development and environmental sustainability policies. However, the scope and degree of this emerging policy coordination tends to be limited to specific policy areas, target groups, sectors and regions. Among the success factors, regulatory instruments (e.g. energy law reforms) are often found to be effective in initially setting in motion skills policy formulation and implementation. However, in view of the prescriptive nature of regulatory tools, such as the vocational qualification and training requirements set out in energy regulations, the adaptability of training to changes in skills needs is still unproven. Policies and regulations have to achieve the right balance between flexible adjustment to the skills needed in the market, the establishment of qualification standards and the mainstreaming of skills for green transition in formal TVET systems over the longer term. National experience reveals a wide range of challenges faced by policy-makers, social partners and other relevant stakeholders. These challenges include the absence of consensus on the definition of green jobs, lack of capacity at the national level to collect, disseminate and analyse relevant data, and the evolving nature of skills needed for the green transition.

11. See van de Ree (2017) for a review of the various definitions.

Given the current pace of progress, there is a risk that some of the commitments made in nationally determined contributions (NDCs) and the SDGs will not be met by the target year. In light of the *Guidelines for a just transition to environmentally sustainable economies and societies for all* (ILO, 2015a), there are a number of areas in which greater efforts are needed. Consideration of the following areas is particularly important in ensuring decent work and social inclusion.

First, gender mainstreaming needs to be strengthened in many skills development policies and programmes. The ILO (2017d) finds that there are considerable gender inequalities in the form of occupational and sectoral segregation. However, the 27 country studies show that gender equality is not mainstreamed in key policy documents on skills development for the green transition. Without a clear recognition of and efforts to narrow the gender gap in terms of sectoral/occupational segregation and access to training, there is a high risk that the transition to a green economy will only perpetuate the existing situation. For example, women are under-represented in the science, technology, engineering and mathematics (STEM)-related fields, and over-represented in recycling and waste collection, which are characterized by low pay and poor working conditions (Strietska-Illina, 2017). Consequently, current efforts to narrow the gender gap in entry, retention and advancement rates during vocational training programmes in STEM fields, as well as those aimed at promoting working conditions in waste management sectors, need to be stepped up.

Second, global and regional partnerships need to be strengthened in the area of skills development for a green transition. In this regard, international and technical cooperation in human resource development should promote national capacity building to reform and develop training policies and programmes.¹² The research conducted for this chapter confirms that there is strong demand from lower-income countries for the sharing of good practices, in terms of both the formulation and implementation of policies and regulations. Cross-border knowledge-sharing can promote regional and international approaches to skills development for the green transition, which can in turn address the competitiveness concerns of individual countries.

Finally, most of the policies and programmes identified in this chapter are targeted at semi-skilled and skilled jobs, with the latter being concentrated especially in the energy sector and other sectors closely related to environmental protection. In terms of support for the transition of low-skilled workers, some examples of short or ad hoc training have been identified, but hardly any more systematic active labour market policies to support disadvantaged groups in the development of appropriate skills. In developing and emerging countries, low-skilled workers might benefit from social protection measures and programmes to formalize employment, in addition to skills development. It should be recognized that training in environmental hazard management and environmentally friendly techniques could make a significant contribution to workers' health and well-being (Chapter 4).

The challenges described in this chapter suggest that there is an urgent need to improve understanding of the mechanisms through which a country-specific policy mix can have an impact on skills development for the green transition. In recognition of this need, the ILO will follow up on the analysis undertaken in this chapter with a view to developing detailed policy recommendations for each country that could lead to technical assistance to the countries surveyed.

12. Paragraph 21 of Recommendation No. 195.

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