



Towards EU climate neutrality

Progress, policy gaps and opportunities

Chapter 15: Labour, skills and capacity building

Assessment Report 2024

Contents

- 15 Labour, skills and capacity building 5**
- Key messages5
- 15.1 Workforce and skill needs in the net zero economy6
- 15.2 Construction and energy systems workers7
- 15.3 Fossil fuel workers and just transition8
- 15.4 Public administration9
- 15.5 Agriculture..... 10
- 15.6 Summary table..... 12

15 Labour, skills and capacity building

Key messages

The transition to net zero will require a profound shift in the structure of the labour force. Ambitious sectoral targets will create new employment opportunities in many sectors, although skills shortages are already acute in the European economy and will deepen if not addressed by tailored policy measures to train and upskill the workforce.

Needs. The transition to net zero will require a profound shift in the European labour market: new jobs will be created in some sectors, while existing jobs will require new types of skills and competencies. Labour shortages are already acute across Europe and may worsen without additional supply, particularly in the energy systems and construction sectors; while upskilling, certification, and cross-cutting digital and interpersonal skills will be required across the workforce. Policy development and climate investments will create additional demands on the skills and capacity of public administration, while a transition to sustainable farming practices also requires the provision of appropriate support, advice and training to farm managers.

Gaps. The EU has put in place programmes and funding to address skills shortages in priority sectors, and to improve skills and capacity in public administration; while the Farm Advisory System exists to provide training and advice to farm managers. Although design and implementation of education and training schemes is largely the responsibility of member states, there are some remaining policy gaps at a European level, particularly regarding workforce mobility and mutual recognition of qualifications in the construction sector (**policy gap**). Low participation in training in some key sectors (e.g. buildings, agriculture) also limits the opportunities to upskill and enhance knowledge exchange relevant to the transition (**implementation gap**).

Recommendation S1. Investments in education, training and skills should be targeted to upskilling and improved mobility in the construction, renewable energy systems sectors; as well as cross-cutting skills like digitalisation and interpersonal skills. The EU should also support – for example, through the Technical Support Instrument and other funding schemes – skills and capacity-building projects aimed at enhancing the ability of public administrations to implement climate policies and investments. Further efforts are needed to ensure that the national Farm Advisory Systems provide appropriate support, advice and training to farm managers regarding sustainable farming practices and mitigation measures; as well as to increase awareness and uptake of training opportunities among farmers.

Training and reskilling are important to support and provide opportunities to those who may be negatively affected by the transition, such as coal and fossil gas workers. While the EU provides support under the Just Transition Fund, doubts remain over whether the design and ambition of this mechanism fully reflect the scale of transition in some regions and sectors.

Needs. In parallel, well-funded and -tailored employment and reskilling programmes are needed for workers in fossil fuel sectors that may be negatively impacted by the transition; to minimise distributional and regional impacts, and to ensure that the employment opportunities presented by the transition remain open to all.

Gaps. The EU has put in place a Just Transition Fund to support regions and occupations whose workforce will be negatively impacted by the transition; however, experience of previous reskilling initiatives suggests that issues around the eligibility criteria, funding and limited systemic measurement

of outcomes has limited their impact (**ambition & implementation gap**). Transition schemes for workers in the fossil gas sector are also largely still absent at the EU level (**policy gap**).

Recommendation S2. Further efforts are required to address weaknesses identified in the design and implementation of just transition programmes: particularly in ensuring that eligibility criteria and funding are targeted towards those workers and regions at greatest risk; to improve measurement of impacts and outcomes; and to increase participation in training by affected groups.

15.1 Workforce and skill needs in the net zero economy

The EU's transition to net zero will require a workforce with both the capacity and skills to deliver on targets across a range of sectors, including in construction/buildings, energy systems and agriculture. European climate policies to date have already created growth in sectors associated with the transition like renewable energy systems, and although research generally suggests that aggregate employment levels in the European economy are not likely to increase significantly under the Fit for 55 targets, there will be a profound shift in the structure of the labour force between sectors, occupations, required skillsets and regions (EC, 2022ai; Borgonovi et al., 2023).

For sectors linked to the net zero transition, workers will be required in a range of operational, manufacturing, installation, engineering and research roles (Eurostat, 2023f). Employment in wind energy is expected to grow from 300 000 in 2022 to 450 000 in 2030 (WindEurope, 2022). Direct employment in solar is also expected to increase from 200 000 in 2021, to almost 460 000 by 2030 under REPowerEU's target of 750GW (SolarPower Europe, 2022b), while the battery sector requires approximately 800 000 workers to be retrained or upskilled by 2025 (EC, 2023ah). More technicians and craftspeople will be needed to renovate millions of buildings to zero-emission standard (D'Agostino et al., 2021b; EASAC, 2021b), with an estimated 4 million construction workers needing to develop energy efficiency-related skills according to European Construction Sector Observatory (2020) ⁽¹⁾.

The European Commission lists skills shortages among the key barriers to the EU's net zero transition, notably the locally-available labour force and its skills, including digital literacy (EC, 2022m, 2022ah). The EU already faces a shortage of skilled workers in the construction sector, which is expected to worsen 'as a consequence of green transition'. In addition, demand and supply for renewable energy technicians (including those with software skills) is imbalanced across the EU (ELA, 2023). For instance, up to 30 % of companies in offshore renewables reported experiencing skills shortages in 2020, primarily in research, engineering and technician roles (EC, 2020c). The uniqueness of net zero transition jobs may make them difficult to fill at first due to the small size of the dedicated occupational labour market (ELA, 2023; IPCC, 2022g). It will also be important that EU employment policy measures remain adaptive and anticipate market needs, e.g. in terms of innovation and circular use of materials given that recycling, remanufacturing and reuse offer greater employment opportunities than landfilling or incineration (IRENA, 2022a).

⁽¹⁾ As much as 60 % of expenditure on home energy efficiency retrofits could go towards labour creating 12–18 jobs per million euro of investment, more than in other areas of energy policy (IEA, 2020). For instance, according to JRC, if 'renovation rate increased to 3 % within 10 years and maintained thereafter (...) the associated impact on employment would be approximately 55 millions of full-time equivalent job places' (JRC, 2020a). Moreover as highlighted in the Renovation Wave strategy decarbonisation of buildings requires also public administration to develop the necessary skills in the area (EC, 2020h)

Beyond specific occupations, there is also a need for cross-cutting skills to drive and manage the adoption of new technologies, with a particular emphasis on improved digital and interpersonal skills. For instance, public engagement is increasingly important for energy and engineering workers during the planning and permitting processes for RES developments, while construction workers play a more active role in advising consumers and encouraging them to make more sustainable choices (e.g. the choice of a heat pump vs. a fossil heating system). Improving the advisory, communication, and digital skills of the existing workforce can therefore be an important enabler for wider societal change (Borgonovi et al., 2023; EGFSN, 2021).

15.2 Construction and energy systems workers

The EU has put in place several programmes to address the skills shortages in the construction and energy systems sectors, and the ambition of the Green Deal industrial plan in addressing the skills gap is promising in this respect. Further investments in upskilling, improved workforce mobility and mutual recognition of qualifications between Member States can help to address skills shortages in these sectors.

In July 2023 there have been 13 EU funding instruments for upskilling and reskilling (EC, 2023aa), notably the European skills agenda (EC, 2020o), the Just Transition programme, the REPowerEU plan (EC, 2022m) with its sectoral strategies (e.g. EU Solar PV Industry Alliance under the EU (EC, 2022o)), the RRF, the Just Transition Fund, the InvestEU programme, BUILD UP skills initiative, the European Social Fund Plus (EC, 2023ad) and Erasmus+. The European Year of Skills 2023 also aimed to address skills shortages with an ambition to 'give a fresh impetus to lifelong learning, empowering people and companies to contribute to the green and digital transitions, supporting innovation and competitiveness' (EC, 2023ae).

The European skills agenda supports large-scale skills partnerships in strategic sectors under the Pact for Skills. Launched in 2020, the Pact for Skills is a shared engagement model for companies, workers, national, public authorities, social partners, cross-industry and sectoral organisations, education and training providers, chambers of commerce and employment services. The European skills agenda is complemented by the European Education Area (Council of the European Union, 2021) including the digital education action plan (EC, 2020m). 'Enhancing skills' is also one of the four pillars in the European Commission's Green Deal industrial plan, which contains several proposals to address skills shortages and improve workforce mobility in strategic industries (EC, 2023u).

The revised EPBD (EC, 2021ac), in line with the renovation wave strategy (EC, 2020h), also addresses workforce skills in the context of decarbonising the buildings sector. It requires Member States to put in place measures and financing to promote education and training to ensure 'a sufficient workforce with the appropriate level of skills corresponding to the needs in the building sector' (EC, 2021ac). Moreover, reskilling and up-skilling of workers, education, job-seeking initiatives are explicitly mentioned among funding areas for the Member States to use the revenues from emission trading under the revised EU ETS Directive (EU, 2023c). The 2023 Net-Zero Industry Act proposal sets out workforce-related measures for net zero technologies (EC, 2023ao).

While it is still too early to assess the impact of these initiatives, there are barriers to increasing participation in upskilling and training among construction workers, including the time and mode of training, the predominance of small and medium-sized enterprises with low training budgets in the sector, and low consumer demand (ECSO, 2020). In the construction sector roundtable organised as part of the Pact for Skills in 2020, participating stakeholders indicated that 'high mobility of the construction workforce can help address local skills shortages' (EC, 2020q); yet they pointed out that mobility is hindered by the lack of mutual recognition of qualifications amongst EU Member States, due to

differences in training systems and legislation. As a way forward the stakeholders suggested 'a uniform assessment of workers and an automatic recognition of qualifications on a voluntary basis' (EC, 2020q). Currently the EU directive on the recognition of professional qualifications (EU, 2005) does not explicitly target construction workers, as they depend on national policy. Further EU support to Member States for reinforcing qualification recognition and facilitating the mobility of professionals in the construction and related sectors could help to address the skilled workforce gap (European Construction Sector Observatory, 2018).

As part of the REPowerEU chapters in recovery and resilience plans, EU Member States can include 'an accelerated requalification of the workforce towards green and related digital skills' (EU, 2023i). Moreover, building capacity of local authorities to streamline permitting for renewable energy projects is one of the RRF flagships providing technical support to the EU Member States (EC, 2022ak). The RED III aims at facilitating mutual recognition of installer skills, identifying skilled workforce shortages, and creating a database of trained certified installers of renewable technologies and demand response and storage systems (EU, 2023f). The database is expected to help increase public trust in such interventions. The REPowerEU plan (EC, 2022m) dedicates special attention to skills for the hydrogen economy, announcing a launch of a large project in this area supported by EU funding streams. There are positive signals under the EU action plan on digitalising the energy system (EC, 2022k), that incites the Member States to use the funds through available EU programmes to support upskilling and reskilling of the workforce for the digitalisation of the energy value chain, including through university-level upskilling programmes and partnerships.

15.3 Fossil fuel workers and just transition

Training and reskilling is also important to support and provide opportunities to those who may be negatively affected by the transition, such as coal and other fossil gas workers. While the EU provides support under the Just Transition Fund, doubts remain over whether the design and ambition of this mechanism fully reflect the scale of transition in some regions and sectors.

Employment increases and skills shortages in these sectors contrasts with declining employment in sectors negatively impacted by the transition, particularly the coal sector. Based on industry data between 2010 and 2018, coal jobs in the EU decreased by 32 % from 239 400 to 161 930 (JRC, 2021d), and employment in the 'mining of coal and lignite' sector is projected to fall by a further 89 % under the Fit for 55 targets. Such jobs, including coal mining, are estimated to cover around 5 % of employment in the EU (EC, 2022aj). While employment growth in other sectors could provide job opportunities for coal or other fossil fuel workers, there are substantial challenges that must be overcome to ensure that these workers can avail of these opportunities. These include a relative dissimilarity between existing job profiles and those required in other sectors, low participation in education/training schemes, and spatial mismatches between where jobs are gained and lost (Borgonovi et al., 2023). These challenges in the coal sector are compounded by more general trends, where the shift to renewable energy is associated with declining demand for manual workers and greater demand for technical and professional workers (Marin and Vona, 2019).

In line with the principles of a just transition, efforts to phase out fossil fuels must be accompanied by investments in workers and communities that are likely to experience a contraction in labour demand or significant structural change. However, the geographic concentration of the coal sector often requires a broader focus: since renewable jobs are often outside of coal regions, a straightforward reskilling and reemployment of coal workers in renewable energy sector may not be possible, and a just transition may also require support for broader economic and regional development (IPCC, 2022g). Therefore, the effectiveness of these investments depends on strong social dialogue processes and coordination

between government, economic actors and civil society; necessary not only from an equity perspective and to ensure that appropriate support is provided to communities, but also to maintain wider public support for the transition (Anadón et al., 2022; ILO, 2015; IPCC, 2022g).

At the EU level, the Just Transition Fund (EU, 2021b) provides retraining opportunities to workers who bear the costs of the structural transformation (Marin and Vona, 2019), particularly coal, shale and peat workers. However, the ECA has found that EU support to coal regions to date has had a limited focus and impact on job creation, and observed lower levels of participation in training initiatives among affected workers than initially targeted. They also highlighted weaknesses in data collection and impact measurement, which made it difficult to assess the impact of investments (ECA, 2022a). These challenges also reflect some of the issues discussed in Chapter 11 (Whole of Society Approach) and Chapter 14 (Climate Governance), particularly the lack of systematic assessments of the socioeconomic impacts of EU climate policies and weaknesses in participatory decision-making. For example, an evaluation of the Just Transition Fund, taking into account lessons learned from its predecessor Initiative for Coal Regions in Transition, found remaining weaknesses in its current design and targeting. In particular, the study highlighted the eligibility criteria for potential Just Transition Fund projects and stakeholders, the restrictive nature of which was found to be 'inadequate for determining the worst-off' in the transition; insufficient and volatile funding; and differences in administrative capacity between regions as limiting factors of the current Just Transition Fund (Moesker and Pesch, 2022). As a result, there are doubts about whether the design and ambition of these initiatives match the scale of the transition required.

Transition schemes for workers in the fossil gas sector are also largely still absent at the EU level. The gas industry, along with public service and trade unions, have recently called to create 'momentum that ensures a Just Transition for gas workers across Europe' (Eurogas et al., 2023). The EU should address the declining fossil gas activities and any resulting employment impacts (Cedefop, 2023) in an open and proactive fashion (in line with the findings and recommendations regarding gas in chapter 4), and aim to create upskilling and reskilling opportunities for high-quality jobs in non-fossil fuel (and preferably even energy transition) activities.

15.4 Public administration

Effective and efficient public administration is crucial for the implementation of climate policies. This rapid policy development can place additional demands on member states' public administrations, while skills and capacity shortages also constrain public climate investments.

Effective and efficient public administration is an enabler of the transition to a climate-neutral society, and the policies discussed throughout this report will place significant demands on public administration at the local, national and European levels: from energy and infrastructure permitting (Chapter 4 'Energy supply') and spatial planning policies (Section 7.5 under 'Enabling condition: urban and spatial planning'); to public investment, procurement (Chapter 12) and climate governance (Chapter 14). Increased funding for climate-related investments will also create additional demands on the public sector to plan and deliver projects, meaning that capacity or skills shortages can constrain the effectiveness of these investments. These challenges have already been highlighted in relation to local government: for example, 69 % of municipalities in the EIB's 2022 Municipalities Survey reported skills shortages to be a barrier to their investments in climate mitigation and adaptation infrastructure, with particular shortages highlighted in relation to environmental and climate assessment, engineering, legal and digital skills (EIB, 2023c). The European Commission has identified a need for 'a multidisciplinary approach to policymaking, strong coordination and planning capacities across all levels of public administration' (EC, 2023o), while other studies have highlighted skills shortages in the planning systems and legal systems as barriers to implementing climate investments and policies (EGFSN, 2021).

The EU provides direct support to some Member States for capacity building and skills in public administration under the cohesion policy, and more widely via the Technical Support Instrument (TSI), which responds to requests from member states with tailored advice and technical support for climate and other reform policies. Member states can also request funding for public sector skills and digitalisation projects under various funding streams, including the RRF, Horizon Europe and the Digital Europe Programme (EC, 2021aj). The European Commission's recent communication on 'Enhancing the European Administrative Space' (ComPAct) also aims to support member states in enhancing capacity in public administration, and contains a pillar dedicated to supporting public administration in delivering on climate policies (e.g. provision of technical support and guidance, disseminating best practices, exchange and peer-learning opportunities for administrators) (EC, 2023o), although the impact of these proposals has yet to be assessed.

15.5 Agriculture

Although the CAP 2023–2027 contains more ambitious targets for training and knowledge exchange among farm managers than its predecessor, available insight so far shows that more effort is needed to increase interest in and uptake of these initiatives. With greater emphasis on sustainability, the Farm Advisory System can support farm managers in the transition to net zero.

The transition to more sustainable farming systems and the implementation of mitigation practices (see Chapter 8 'Agriculture') will require investment in skills, training and innovation for farmers and agricultural workers. Agriculture remains a large employer within the EU, with 8.7 million people working directly in agricultural production in 2020 (Eurostat, 2022b), although employment in agriculture has been falling since 2005. The agricultural workforce's unique demographic and socioeconomic characteristics presents additional challenges in the sector's resilience and ability to adapt to the transition. The agricultural workforce is older than sectors, with just 11 % of farm managers under the age of 40 in 2020. There is also a significant gender imbalance, and only 32 % of farm managers in 2020 were women (27 % of farmers under the age of 30) (EC, 2023bj). Finally, just 32 % of farm managers in 2016 have received agricultural training (9 % with full agricultural training), although this percentage represents an increase over the previous decade (EC, 2020n).

As one of its objectives, the 2023–2027 CAP recognises that 'support for knowledge exchange, training, advice and innovation is key for securing smart and sustainable agriculture, forestry and rural areas', and the current CAP builds on the instruments established in the 2014–2020 period, particularly the requirement for Member States to put in place Farm Advisory Systems to provide hands-on advice and training on a range of financial, technical and environmental topics. The CAP continues to promote the agricultural European Innovation Partnerships (EIP-AGRI), supplemented by funding from Horizon Europe. This supports collaborations between farmers, foresters, scientists and rural businesses aimed at developing and testing innovative solutions to socioeconomic and environmental challenges, including the development/adoption of sustainable farming practices and agri-environment schemes. The European CAP Network has been established alongside these as a forum to disseminate research, examples of best practice and lessons learned from EIP-AGRI projects across Europe. The European Commission's review of Member States' CAP strategic plans for 2023–2027 highlighted and welcomed member states' ambition for fostering the agricultural knowledge and innovation systems: 6 million targeted participants in different knowledge and training initiatives over the period (up from the previous target of 2.9 million), as well as a threefold increase in agricultural European Innovation Partnerships to 6 600 (EC, 2023b). Within the wider sector, the Pact for Skills partnership for the agri-food industry was launched in 2022 to address skills challenges in the wider agri-food sector. These challenges include global value chain disruptions, increasing competition, climate change, urbanisation, changing consumer demands, and generational renewal (EC, 2022ah).

However, the European Commission's evaluation of the previous CAP programme highlights several challenges that may continue into the current implementation period. Due to slow implementation of the previous programme, just 23 % of the amount planned for knowledge exchange and training measures in the previous plan was spent by 2020, while only 1.22 million farmers (42 % of the 2020 target) ultimately availed of these initiatives. Interest in training was reportedly low among farmers, with the time and opportunity cost of participation identified as a major barrier to uptake, along with poor awareness or promotion of available initiatives. In particular, the evaluation highlighted very limited engagement by "hard-to-reach" farmers with these initiatives, a category which often includes the types of smaller and less-profitable farms that are least resilient in the transition to net zero (EC, 2022e). Other authors have similarly identified long working hours among European farmers as a barrier to their participation in training, as well as to their willingness to adopt new farming practices or additional mitigation measures (Murphy, 2022).

While the European Commission's review of CAP strategic plans for 2023–2027 (EC, 2023b) welcomes the emphasis from member states on practical and interactive knowledge exchange mechanisms (e.g. on-farm demonstrations, peer-to-peer learning, EIP-AGRI projects etc.), it expressed 'doubts on whether the overall level of support planned by Member States is in line with the increased ambition on knowledge sharing and innovation'. Upskilling in the sector, particularly in relation to climate resilience and adaptation, will require a more concerted effort to reach and engage farmers, particularly those "hard-to-reach" farmers who have not traditionally engaged with education and training systems before. As identified by the European Commission's evaluation of the previous programme, there also needs to be increased training of farm advisors themselves, particularly with regard to climate adaptation and mitigation practices required in the transition to net zero.

15.6 Summary table

Table 22 Policy consistency summary – labour, skills and capacity building

<p>Policy gaps</p>	<ul style="list-style-type: none"> – Implementation of education and training schemes is mainly a national competence, although some policy gaps remain at a European level, particularly with regard to workforce mobility and mutual recognition of qualifications in the construction sector – Transition schemes for workers in the fossil gas sector are largely still absent at the EU level.
<p>Ambition gaps</p>	<ul style="list-style-type: none"> – The EU has put in place a Just Transition Fund to support regions and occupations whose workforce will be negatively impacted by the transition; however, experience of previous reskilling initiatives suggests that issues with eligibility criteria, funding and limited systemic measurement of outcomes can limit their impact.
<p>Implementation gaps</p>	<ul style="list-style-type: none"> – Low participation in education/training schemes in some sectors (e.g. buildings, fossil fuel regions, agriculture) also limits the opportunities to develop skills and enhance knowledge exchange relevant to the transition



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