# Policy brief: Shaping inclusive digital and green transitions in working life. A policy review

*Figure 1 Adobe Stock photo*

## Introduction

The digital and green transitions offer a unique opportunity to reshape our societies and economies in a more sustainable, just and inclusive way. As these transitions progress, they are intersecting and influencing each other, giving rise to what is increasingly known as the "twin transitions". The digital and green transitions are transforming working life, from the demand for new skills to changes in how workers interact with one another and with technology, as well as introducing new opportunities and risks for labour inclusion. Understanding the implications of these changes is crucial to ensuring a sustainable, just and inclusive future.

This policy brief provides insights into the policy dimension of these transitions, examining key themes discussed in policy documents in relation to the digital and green transitions, and their interactions, in the context of working life. The analysis was conducted at the Norwegian, European and global levels, covering nine European and international organisations (Box 1).

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*JustTransform: Enabling a sustainable, just, and inclusive green and digital transformation*

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JUST TRANSFORM

This policy brief is part of the *JustTransform: Enabling a sustainable, just, and inclusive green and digital transformation* research project. The project examines how working life is affected by the green and digital transitions, and how to enable sustainable, just and inclusive transformations. The project is led by the Western Norway Research Institute (Vestlandsforsking) in collaboration with Cambridge Industrial Innovation Policy (IfM Engage, University of Cambridge) and NORCE.

## What are the digital, green and twin transitions (DGTT)?

The digital transition is generally understood as the adoption of digital technologies across various structures and processes. It is described as primarily led by the private sector and driven by factors such as the increased accessibility of digital technologies, rising global competition, changing customer behaviour and skills shortages.

In comparison, the green transition is defined as the shift towards resource-efficient economies and societies, including reducing greenhouse-gas emissions and circular economy practices. It is discussed as being primarily led by the public sector and driven by changes in regulations and other policy instruments aimed at decoupling economic growth from resource use.

The term "twin transitions" is increasingly used to refer to the capacity of the two transitions to reinforce each other. In discussions about "twin" transitions, the digital transition is usually portrayed as enabling the green transition.

## How are the DGTT changing working life?

Five key themes emerged from the document review on how the DGTT are transforming working life:

- ***Evolving skills demands.*** Skills are the most discussed theme. Skills development is portrayed as a means of ensuring that diverse population groups can access the benefits of these transitions, while minimising the associated social costs. However, evidence suggests that the green and digital transitions are outpacing the changes and participation rates in education and training.

**Box 1. Methodology**

The analysis was conducted at the Norwegian, European and global levels, covering nine European and international organisations:

- the European Agency for Safety and Health at Work (EU-OSHA)
- the European Foundation for the Improvement of Living and Working Conditions (Eurofound)
- the European Centre for the Development of Vocational Training (Cedefop); the European Commission (EC)
- the European Parliament (EP)
- the International Labour Organization (ILO); the Organisation for Economic Co-operation and Development (OECD)
- the United Nations Industrial Development Organization (UNIDO) and
- the World Economic Forum (WEF).

Key informant interviews and a policy webinar complement these findings, involving a total of 38 participants from European and international organisations, academia and industry.

We reviewed 107 policy-related documents published between 2014 and 2025. The documents were identified from the Policy Commons platform and organisations' search engines, using the following keywords: "digital", "green", "twin", "jobs", "work", "transition", "transformation", "inclusion", "automation", "net zero", "circular economy" and "sustainability". These were complemented by documents shared by interviewees representing different European and international organisations. The documents reviewed included policy reports, briefs and papers, skills assessments, foresight reports, guidelines, strategies, action plans, council recommendations, regulations, declarations and governing body notes, among others.

Documents were coded using NVivo, first following a deductive process that focused on key themes discussed in relation to working life and the digital, green and twin transitions, and then using an inductive approach that added nodes for emerging themes.

***In the Norwegian context***, similar challenges are emphasised, alongside the broader societal importance of skills development. The *Challenges for the Green Transition in the Labour Market* report, by the Norwegian Committee on Skill Needs, highlights that skills development remains particularly low among workers with limited formal education, those in sectors with low unionisation rates, and in industries most vulnerable to changes driven by the green transition.[1]

- ***Labour shifts across sectors, including job displacement and creation.*** Early discussions about the digital transition and job automation sounded alarms about widespread job displacement. However, recent debates have shifted towards skills development and the growing polarisation of the labour market, where high-skilled workers tend to benefit the most and low/medium-skilled workers bear the brunt of the negative impacts. By contrast, labour shifts associated with the green transition are expected to be smaller in scale and more localised. There is also an emerging view that the growth of green mid-skill jobs could help to offset some of the decline in mid-skill occupations resulting from the digital transition.

  ***In the Norwegian context***, a key shift discussed in the documents reviewed is the increasingly blurred distinction between manual workers and office staff. For example, the *Green Industrial Initiative* notes: "Today, highly qualified skilled workers often perform work that foremen, planners and engineers did in the past – and engineers participate in direct production. The changes that are coming in technology and the green transition will reinforce this development."[2]

- ***Reconfiguring the workplace and work relationships.*** The debate on this topic primarily centres on changes in the workplace, work patterns and work relations driven by the digital transition. Opportunities arising from these new configurations include work flexibility and autonomy, reduced entry barriers, flatter organisational structures, and e-activism. Risks are also acknowledged, including precarious work conditions, increased work intensity and stress, digitally enabled surveillance, data extraction, deepening power asymmetries, and undermining the role of social dialogue actors. Box 2 presents examples of how collective agreements are addressing the impacts of the green and digital transitions.

  ***In the Norwegian context***, a key change discussed in the documents reviewed is reconsidering the distinctions between skilled and professional employees in collective agreements. In 2022 an important agreement was reached between the Federation of Norwegian Industries and the United Federation of Trade Unions. The agreement expands the Industry Agreement to include previously excluded office positions, such as engineers, technicians, programmers, inspectors and supervisors.[3]

- ***New risks and opportunities in occupational health and safety.*** As the workplace evolves, workers are increasingly exposed to new machines, equipment and materials. In the context of the twin transitions, the discussion focuses on the potential of digital technologies to reduce workers' exposure to hazardous substances and physical workloads in green jobs. However, the combined physical and psychosocial impacts of these transitions may affect workers, including increased cognitive workload and exposure to new materials and processes.

[1] Based on an automated English translation of Kompetansebehovsutvalget (2023). *Utfordringer for grønn omstilling i arbeidslivet*. Oslo.

[2] Norwegian Ministry of Trade, Industry and Fisheries (2024). *The Green Industrial Initiative. Roadmap 2.0*., p. 87.

[3] Ibid.

***In the Norwegian context***, key issues emphasised include safety challenges related to using new energy sources and leveraging digital technologies to improve health and safety.

- ***Inclusion and exclusion dynamics.*** Overall, the discussion about inclusion in the digital transition emphasises workplace accessibility and removing barriers to employment, whereas the green transition adopts a broader perspective, addressing social justice and regional impacts. However, similar job polarisation is expected from both transitions, with higher-skilled workers benefiting the most from both transitions and low/medium-skilled workers facing the negative impacts.

  ***In the Norwegian context***, the dynamics of inclusion and exclusion in the workforce are primarily discussed in terms of labour market participation while highlighting the related social costs and benefits. The Norwegian model, based on three mutually reinforcing pillars (economic governance, public welfare and an organised labour market), is recognised as both helping to create quality jobs and a potential barrier for individuals with low skills or health issues trying to access the labour market.[4]

  Figure 2 summarises the key findings from the policy review on how international organisations frame the digital and green transitions, and their interactions, and their impacts on working life.

**Box 2. Collective agreements in the digital and green transitions**

Collective agreements play a key role in ensuring the workforce is adequately prepared and protected. The following examples illustrate how collective agreements are being used to navigate the complexities of the green and digital transitions:

- In Germany the "compass for digitalisation" developed by IG Metall, a metalworkers' union, is used by workers' councils to guide the digital transition process considering workers' interests.
- In Denmark the collective agreement for the transport sector acknowledges the changes the sector will experience as a result of automation and introducing self-driving vehicles; it provides supplementary employee training.
- In Sweden two national agreements were signed between the Confederation of Blue-collar Workers (Landorganisation, LO-SE), the Council of Negotiation PTK for White-collar Workers, and the Confederation of Swedish Employers (Svenskt Näringslivet). These agreements give workers, employed or between jobs, the right to financial support for shorter or longer training courses to develop green skills.
- In the Netherlands the Royal Dutch Touring Club (ANWB) collective agreement stipulates that employees will receive compensation not only when they travel for work but also when they work from home. ANWB's hybrid scheme is designed to reward workers, through higher compensation, for environmentally friendly decisions about travelling (or not) for work.

Source: EC (2023). *Fair Green Transition*; EP (2022). *Unionisation and the twin transition*; Eurofound (2023). *Living and working in Europe 2022*; Eurofound (2022). *Moving with the times*.

[4] Based on automated English translation of Kompetansebehovsutvalget (2023). *Utfordringer for grønn omstilling i arbeidslivet*. Oslo.

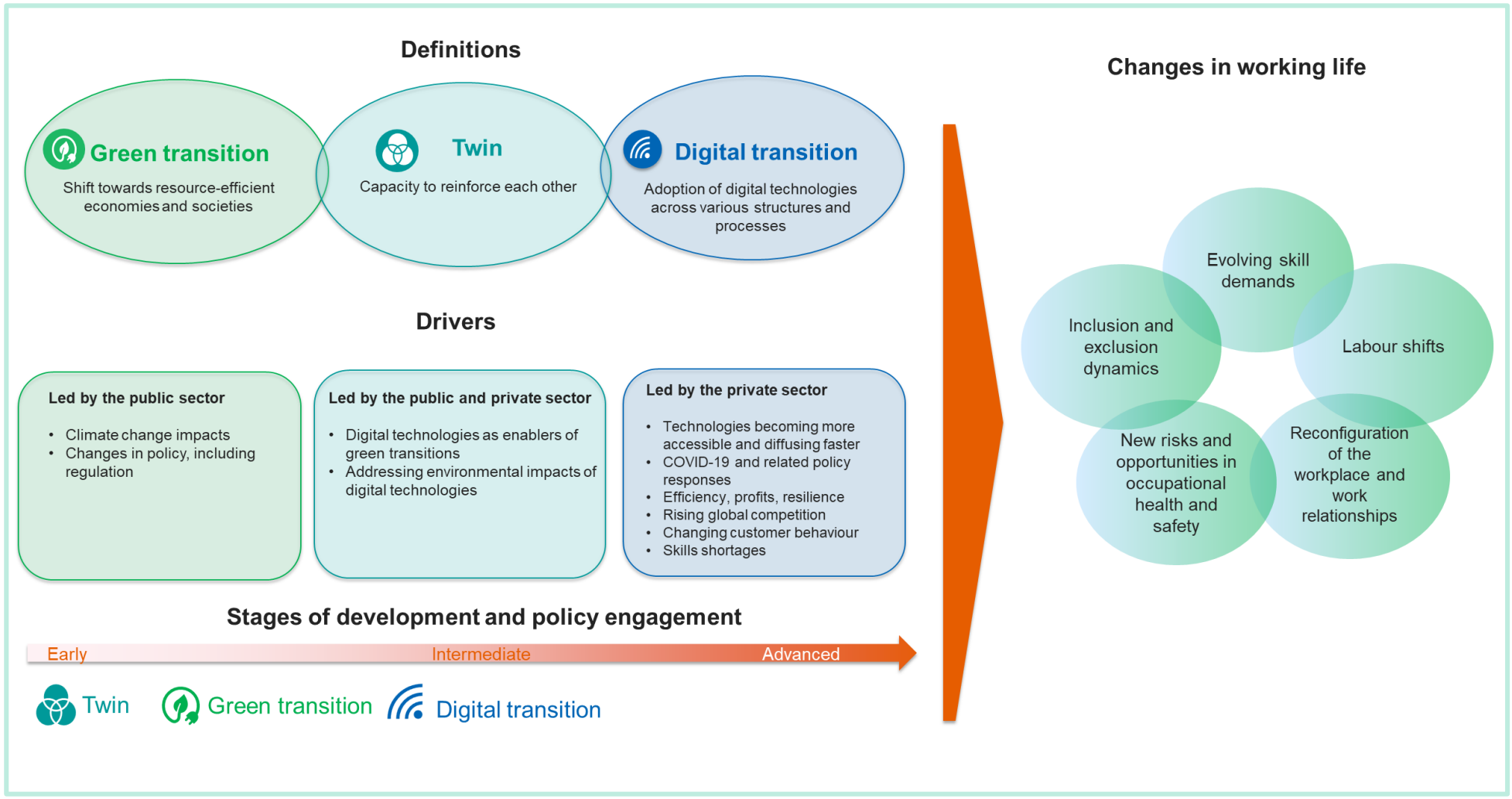


*Figure 2 The digital, green and twin transitions in working life*

## Policies for inclusive and sustainable transitions

Policymakers recognise the need for decisive government action and collaboration among employers, workers, trade unions and the government to ensure that the digital and green transitions foster an inclusive and sustainable future. The uncertainty and complexity involved in these transitions and their interactions call for a comprehensive policy mix. Based on the document review, four key areas of policy action were identified:

1. *Understanding observable and potential impacts.* Analysis and capacity development to enhance our understanding of the observable and potential effects of the transitions. Examples of policy instruments include: systematic labour market and skills monitoring; foresight analysis; sector- and occupation-specific gender-disaggregated data; and distributional impact assessments.

2. *Direct support to address challenges and opportunities.* Direct support for individuals, households and businesses. Examples of policies in this area include: active labour market policies, skills development; entrepreneurship and business support; and social protection (see Box 3).

3. *Ensuring initiatives include diverse voices.* Social dialogue to ensure all stakeholders' voices are heard. Examples of initiatives include: skills and advisory councils; framework agreements; collective agreements; and best-practice sharing (see Box 4).

4. *Creating an enabling environment.* Developing and updating infrastructure, regulations and policy frameworks to create an enabling environment for inclusive and sustainable transitions. Examples of policy instruments include: standards and regulations; investment in infrastructure; policy coordination; policy frameworks; and new measures of country progress.

**Box 3. Examples of good practice – Slovenia: wage subsidies for green jobs**

In Slovenia the Ministry of the Environment and Spatial Planning, through its Climate Change Fund, launched a pilot employment incentive scheme called Green Jobs. The programme offers employment subsidies to employers who hire unemployed individuals for permanent green jobs.

*Approach*

The scheme provides funding to enterprises operating in green or greening sectors. Employers receive a subsidy of €340 per month for 2 years, amounting to €8,160 per employee, for hiring unemployed individuals in full-time green jobs. To qualify for the subsidy, employers must offer permanent employment contracts. Employers can receive up to ten wage subsidies, depending on the number of green jobs created.

*Challenges*

A key challenge during the project was the absence of a widely accepted definition of a green job. This was addressed by engaging a range of stakeholders to create a definition of "greenness" based on four key criteria: (i) occupation and activity; (ii) workplace activities; (iii) certificates and qualifications needed; and (iv) production and services.

Source: ILO (2023). The role of active labour market policies for a just transition; OECD (2023). Job Creation and Local Economic Development 2023: Bridging the Great Green Divide.

**Box 4. Examples of good practice – Canada: the Coal Workforce Transition Program**

Alberta was one of Canada's most carbon-intensive provinces, with coal providing nearly 55% of its electricity in 2017. However, as part of its climate change strategy, the Government of Alberta announced plans to phase out coal power plants by 2030.

*Approach*

To mitigate the impact on workers as coal is gradually phased out, the provincial government established the Coal Workforce Transition Program in 2018. This programme offers career counselling services and financial assistance for re-employment, retirement and training.

Career counselling services support workers in their job search, assisting with cover letters and résumés and preparing for interviews. They also guide workers towards publicly funded retraining programmes. For instance, the Coal and Electricity Transition Tuition (CETT) Voucher offers up to CA$12,000 to help workers pursue post-secondary education and retrain for new careers.

The programme also provides financial support to alleviate income loss during the job search, up to CA$5,000 for relocation expenses, and a relief grant covering up to 75% of earnings for workers aged 53 and older who are nearing retirement.

*Lessons learned*

A key strength of Alberta's approach is establishing Alberta's Climate Change Advisory Panel and the Coal Transition Coalition. These bodies ensure that the voices of unions, farmers, Indigenous communities, academia, public health advocates, environmental NGOs and industry representatives are considered. However, the delay between announcing Alberta's coal phase-out and the consultative process led to unease and discontent among coal workers and communities. Another limitation is the uncertainty surrounding long-term resources.

Source: Government of Alberta (2024). *Support for Albertans affected by coal phase out*; OECD (2023). Job creation and local economic development; World Resources Institute (2021). *Alberta, Canada: Supporting Both Workers and Communities to Ensure a Just Transition*.

Appendix A describes in more detail these policy areas and the related instruments.

***In the Norwegian context***, examples of policy initiatives addressing the challenges and opportunities of the digital and green transitions include:

- Strengthening the understanding of skills needs through business surveys, experimental job advert data and cooperation with education stakeholders.
- Skills development reforms, programmes and incentives, such as the tripartite industry programme for competence development (Box 5), regional competence pilots, and including sustainability content in curricula from early childhood education.
- Initiatives to increase recruitment in STEM fields in education and work, including under-represented groups such as girls and women.
- Cooperation between county municipalities and the Labour and Welfare Administration to facilitate the qualification of people outside the labour market.
- Establishing a Green Industry Council chaired by the Minister of Trade and Industry, with the participation of social partners, industry actors, the environmental movement and research and development actors.
- Setting a 30% target for green public procurement.
- Continued support for the Green Platform scheme, created in 2020, which provides funding for enterprises and research institutes engaged in green growth and restructuring driven by research and innovation.

**Box 5. Examples of good practice – Norway: The Tripartite Industry Programme for Competence Development**

The tripartite industry programme for competence development supports workers' employability and addresses businesses' skills gaps. It is part of the *Lære hele livet* [Lifelong learning] educational reform and was established with the objective of increasing participation in continuing and further education, especially among employees with few formal skills.

The programme operates on a cost-sharing basis, where the state funds education and training across all levels, while companies and individual employees contribute their time. The available courses are short and flexible, enabling participants to complete them alongside their work commitments. Industry determines the training needs and identifies the most relevant courses.

Initially, the tripartite industry programme was aimed at the municipal health and care sector and the manufacturing and construction industries. Funding was first granted in 2019, and the training options were scheduled to be established in the spring of 2020. The programme was re-launched in 2022 and expanded to other fields, including batteries, offshore wind, hydrogen and carbon capture and storage.

Through this programme, several vocational colleges have received support to develop vocational training for the battery industry. Other relevant training areas include offshore wind, hydrogen and carbon capture and storage. The tripartite industry programme is managed by the Norwegian Directorate for Higher Education and Skills on behalf of the Ministry of Education and Research.

Source: Fafo (2022). *Evaluation of the tripartite industry programme for competence development*; Norwegian Ministry of Trade, Industry and Fisheries (2024). *The Green Industrial Initiative. Roadmap 2.0*.

## Moving forward: opportunities for inclusive and sustainable working lives

Six key opportunity areas have been identified to strengthen existing policy approaches in response to the evolving challenges in working life arising from the digital and green transitions and their interaction:

1. *Skills vs structural barriers.* Skills are a central theme in discussions about the digital and green transitions and their interactions, often seen as tools for inclusion and mitigating negative impacts. However, an overemphasis on skills risks neglecting the structural barriers that sustain inequalities, including marginalisation of under-represented groups in labour markets and policymaking processes.

2. *Preventing inequalities vs transforming societies and economies.* The prevailing discourse focuses on upskilling, reskilling and implementing social protection measures to mitigate inequalities. However, a more ambitious and forward-looking approach could position the DGTT as catalysts for societal and economic transformation.

3. *Business as usual vs creating new economic models.* Current discussions mostly emphasise supporting workers and businesses in adapting to and leveraging the opportunities created by the DGTT. They do not focus enough on how the existing economic model perpetuates climate change and social inequalities. In contrast, alternative approaches may include reshaping business incentive structures and creating new economic models.

4. *Just transitions vs global justice and solidarity.* Justice and inclusion are frequently framed within the context of national or regional boundaries, neglecting the broader global dimensions of inclusion and social justice. In contrast, a global justice and solidarity perspective underscores the unequal distribution of the costs and benefits of these transitions, particularly the disproportionate burden borne by developing countries.

5. *Controlled futures vs navigating uncertainty.* The prevailing discourse focuses on expert-led

risk assessment and impact prediction as a way to address the knowledge gaps on the DGTT and their effects. While the importance of this work in preventing risks is undeniable, particularly in the context of occupational health and safety, where lives are at stake, it is equally crucial to acknowledge the limitations of our understanding. In comparison, navigating uncertainty requires flexible, adaptive systems rooted in local action, co-produced knowledge and commitments to solidarity and care.

6. *Twin transitions vs a systemic understanding.* The term "twin transitions" is often used technocratically, emphasising digital facilitation of the green transition while overlooking the distinct characteristics and heterogeneous impacts. A more nuanced approach would consider the differences between these transitions, and their interplay with context-specific characteristics and other socio-economic transformations, such as demographic shifts, land-use-change conflicts and increasing inequality.

As the digital and green transitions continue to unfold, they are reshaping working life and the relationship between technology, sustainability, and inclusion. The findings of this policy review highlight both the promise and the pitfalls of current policy approaches, calling for a shift from narrowly framed solutions towards more systemic, forward-looking strategies.


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## Conflicts of interest

There are no competing interests or financial conflicts related to this work.

## References


Policy brief based on the report: *Shaping inclusive digital and green transitions: a policy review*

## Appendix A. Policy areas and instruments for inclusive and sustainable digital and green transitions

| Policy | Rationale | Type of instrument |
|---|---|---|
| **Understanding observable and potential impacts** | | |
| **Labour market intelligence** | Anticipate skills needs and population groups most affected | • Systematic labour market and skills monitoring<br>• Foresight analysis<br>• Sector- and occupation-specific gender-disaggregated data<br>• Distributional impact assessments |
| **Addressing the challenges and opportunities of individuals, households and businesses** | | |
| **Active labour market policies** | Facilitate job transitions while supporting individuals to engage in the labour market | • Apprenticeship support<br>• Public employment services (labour market information, job search and matching assistance, career counselling, hiring practices advice)<br>• Skills development for employability<br>• Reskilling and upskilling incentives<br>• Wage subsidies<br>• Self-employment support and entrepreneurship promotion<br>• Awareness-raising campaigns and training on workplace bias<br>• Programmes targeted at young, elderly workers, women, people with disabilities and other under-represented groups<br>• Gender-transformative and disability inclusive approaches |
| **Skills development** | Ensure workers have the right skills to prosper in the digital and green transitions | • Support schemes for apprenticeships<br>• On-the-job training programmes, including paid traineeships and job shadowing schemes<br>• Voucher training programmes and other forms of financial support<br>• Investing in education and training systems<br>• Lifelong learning systems, including universal entitlements<br>• Updating curricula and adapting education and training systems to a changing landscape<br>• Establishing specific bodies to develop green and digital skills<br>• Including workers and trade unions in programme design<br>• Retraining programmes<br>• Leveraging online and other digital learning applications<br>• Career guidance<br>• Developing worker-centred adult learning systems<br>• Programmes targeted at young, elderly workers, women, people with disabilities and other under-represented groups<br>• Gender-transformative and disability inclusive approaches |
| **Entrepreneurship and business support (including for social enterprises)** | Enhance economic diversification and stimulate the creation of quality jobs | • SME support for capital investment (grants, loans, equity)<br>• Advisory services<br>• Investments in industrial facilities<br>• (Green) public procurement<br>• Programmes targeted at young people, women, people with disabilities and other under-represented groups<br>• Gender-transformative and disability inclusive approaches |
| **Social protection** | Provide income replacement and prevent poverty and vulnerability as a result of the transitions | • Cash-transfer programmes<br>• Public employment programmes<br>• Payments for ecosystem services<br>• Unemployment insurance<br>• Redundancy and bankruptcy compensation<br>• Early retirement<br>• Adapting social security schemes to cover workers on non-standard labour contracts<br>• Gender-transformative and disability inclusive approaches<br>• New models of welfare provision, including universal basic income programmes and universal basic services programmes |
| **Ensuring initiatives include diverse voices** | | |
| **Social dialogue** | Include diverse voices in the design and implementation of initiatives enabling the digital and green transitions, and counter power imbalances | • Consultations<br>• Skills and advisory councils<br>• Framework agreements<br>• Collective agreements<br>• Best-practice sharing |

| Policy | Rationale | Type of instrument |
|---|---|---|
| **Creating an enabling environment** | | |
| **Standards and regulations** | Facilitate transitions while protecting workers | • Workplace risk assessments<br>• Flexible working regulation<br>• Updating and enforcing OSH and social security regulation<br>• Leveraging OSH monitoring solutions to increase accessibility of some occupations<br>• Accessibility regulations and guidelines<br>• Regulating the use of AI in the workplace<br>• Training and awareness-raising campaigns on new standards and regulations for employers and workers<br>• Regulation on algorithm use in the workplace<br>• Ethical frameworks<br>• International collaboration in developing regulations and guidelines, including standards harmonisation |
| **Investment in infrastructure** | Address regional inequalities | • Social infrastructure (health, child- and elderly-care facilities)<br>• Training centres<br>• Telecommunications infrastructure |
| **Policy coordination** | Bridge the gap between environmental, technology, skills and inclusion policies | • Coordination mechanisms across ministries and from local to transnational levels<br>• Capacity building |
| **Policy frameworks** | Address the specific features of regions and sectors and set a just transition vision for them | • Sectoral strategies<br>• Sectoral social dialogue<br>• Place-based transition strategies<br>• Local coalitions |
| **Sustainable and inclusive incentives** | Change business and household incentives towards sustainable and inclusive production and social reproduction | • Using alternative measures to GDP growth, such as indicators of human development, to monitor countries' progress<br>• Accounting for the impact of transition policies on third countries<br>• Global partnerships<br>• Supporting changes in lifestyle and patterns of consumption<br>• Prioritising social innovation |

This policy brief examines the policy dimension of the impacts of digital and green transitions, and their interactions, in the context of working life. It focuses on the discourses shaping policy documents at Norwegian, European and global levels, and identifies opportunities for driving more inclusive and sustainable transitions. This policy brief is part of the *JustTransform: Enabling a sustainable, just, and inclusive green and digital transformation* research project, led by the Western Norway Research Institute, in collaboration with Cambridge Industrial Innovation Policy (IfM Engage, University of Cambridge) and NORCE. For more information, visit: https://justtransform.no/