ECONOMIST IMPACT

Green skills:

driving the transition to a more sustainable future



Supported by Iberdrola

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About this report

As the need to accelerate the green transition gains urgency in order to help tackle the climate crisis and enhance energy security, it is increasingly important to understand the demands that this transition will place on the labour market. To this end, Economist Impact has undertaken a programme of research—supported by Iberdrola—exploring the global outlook for green skills and the labour market impacts stemming from the green transition. In doing so, we have paid particular attention to trends across four sectors of the economy that will play a central role in enabling the green transition: energy, IT and technology, construction and infrastructure, and transport and logistics.

In summarising the key findings of this research programme, we hope that this report will serve as a useful resource to understand the challenges and opportunities inherent in the green transition of the world's labour market.

Our programme has drawn upon several strands of research: a scoping literature review and data audit; a global survey of 1,000 business leaders; four sector-specific workshops; and the convening of an advisory board of subject-matter experts. We would like to express our gratitude to all of the participants in our workshops and advisory board for the invaluable role that they have played in our research. These include the following (listed alphabetically by surname):

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Foreword



The transition to net zero is a revolution for the whole economy. Every sector will need to change, leaving behind their dependence on polluting and fossil fuels, and adopting clean energy and new ways of doing business. The scale of this shift is huge, but it is one we must all make.

Energy must play a pivotal role in this process. As of today, 75% of global greenhouse gas emissions are energy-related, but green electrification can drive the massive change required to reach climate goals. We have the natural resources, the technology and the access to financing—and the evidence from early movers shows that power systems based on renewables can meet the highest standards of energy security and competitiveness.

We are facing this decisive moment in the midst of global economic uncertainties. But where many see only challenges, we believe this is also an opportunity: investments in renewables, networks, storage and green hydrogen can create new industries and thousands of sustainable jobs around the world.

In fact, people—and the skills they bring—are the key to making the most of the transition to a greener economy. Those countries, sectors and regions that can support workers in gaining new skills will be at the forefront of the transition.

The International Labour Organization estimates that the transition will create 100m "green jobs" by the end of the decade. Engineers, offshore and onshore construction workers, electricians and battery chemists are just some of the professions poised for a surge in demand.

At Iberdrola, we can talk about the advantages of this transformation from our own experience. Our track record over the last two decades shows that reaching net zero is also an opportunity for innovation, investment and economic growth.

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Today our emissions are just 59 grams per kWh—75% lower than those of our competitors in Europe—and we expect to reach zero emissions in our power generation plants as soon as 2030.

Changing how we do business creates highly skilled green jobs, generates opportunities for new businesses and helps to revitalise sectors and regions that have suffered from industrial decline. For example, in the UK we have closed coal plants to focus on generating 100% green electricity. As part of this shift, we have helped oil rig workers to transfer their skills and develop additional skills as they move into building offshore wind farms, thus avoiding any compulsory redundancies.

In Spain and France, thanks to our investments, we have helped traditional shipbuilding companies to equip themselves with the skills and knowledge required to fabricate components for offshore wind projects, allowing them to expand their services globally and reposition their business models in order to take advantage of the opportunities that the transition will offer.

Throughout this journey, we have invested over €150bn in just two decades in new wind, solar and hydro energy, electricity networks and energy storage, multiplying the size of our business sevenfold and becoming the largest European utility by market capitalisation and one of the two largest worldwide. This is enabling us today to pioneer new clean energy solutions for the future, such as floating wind farms and green hydrogen. All these activities translate into wider social, economic and environmental benefits, with Iberdrola directly employing over 43,000 people in skilled jobs and supporting 400,000 more across our supply chain.

But this revolution has just started. If we want to maximise these new green job opportunities, we need to ensure that people are equipped with the right skills and training. In 2023 Iberdrola launched Global Green Employment, a new digital platform with the ambition to become the world's largest hub for guidance, training and green employment opportunities. In time, we want Global Green Employment to become a key reference point for people who want to work in the green economy, offering training options and job vacancies while also providing businesses with access to the talent they need to achieve their own transitions.

This initiative builds on our longstanding work with universities, and the reskilling and training programmes we deliver as a company across the world. Our firm commitment to personal development resulted in more than 70 training hours per employee in 2023, far above the European average.

Launching this report is another step in our commitment to leading the transition. It brings together data and insight from over a thousand business leaders across the world working in four critical sectors of the economy to identify both the skills we will need to succeed and the barriers we all need to overcome.

Ignacio Galán
Executive Chairman, Iberdrola

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Executive summary



Intersecting environmental crises pose an unprecedented threat to human wellbeing and planetary health. Averting the worst impacts of climate change and delivering energy security will require a systemic transformation of the global economy, a process known as the green transition. Although definitions of the green transition vary, it broadly entails the move towards low-carbon and environmentally sustainable economies and societies, encompassing decarbonisation, development of circular economies, and protection of nature and biodiversity. This transition presents opportunities, including for companies. Adopting greener business models can prove instrumental in increasing corporate profitability—for example, by improving efficiency to reduce emissions as well as costs.[1] Enterprising businesses will also profit from growing demand for green products and services—from electric vehicles (EVs) to green finance. However, seizing the opportunities of the green transition will also entail challenges. In particular, it will necessitate significant changes in the global labour market, from the movement of jobs to new economic sectors and activities, to shifts in the skills that employers will require of their employees.

This report explores the impacts of the green transition on the labour market, with particular focus on trends in demand for—and supply of—green skills. It pays close attention to trends in green skills across four sectors of the economy that will play a central role in the green transition: IT and technology, construction and infrastructure, transport and logistics, and energy. In doing so, this report arrives at the following key findings:

1. The green transition is threatened by business leaders' failure to develop and source green skills. Although respondents to our survey were near-unanimous in affirming that green skills are (or will soon be) important to their businesses' operations and objectives, only 55% are currently implementing (or planning to implement) green skills

[1] https://www.mckinsey.com/capabilities/sustainability/our-insights/opportunities-for-uk-businesses-in-the-net-zero-transition

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programmes among their existing workforce. This leaves a large fraction of the workforce without crucial skills training, which risks obstructing progress in the green transition. The yawning skills gap is borne out in LinkedIn's data on US "green job" postings. Those postings were up by 20% in 2022, but were matched by only an 8.4% increase in available green talent.[2] Such shortages are having an impact: 62% of respondents to our survey agreed that shortages in green skills are going to create bottlenecks that slow down the green transition.

2. The majority of business leaders are optimistic about the impacts of the green transition, although perceptions of its challenges are somewhat clearer in regions where the transition is more advanced. The majority (nearly 80%) of respondents agree that the green transition presents more opportunities than challenges for their organisation—with just 5% disagreeing. Business leaders across all regions in our survey are largely optimistic; however, their views are somewhat more cautious in Europe. This likely reflects the more advanced stage of Europe's green transition, including changes in the energy mix and the move towards a more service-based economy, where the challenges ahead may be more evident. For example, whereas the British and French economies produce just 0.1 and 0.082 tonnes of carbon per dollar of GDP (by purchasing power parity, PPP), respectively, the Brazilian economy produces 0.13 tonnes and China more than 0.45.[3]

3. The green transition is expected to have an overall net-positive impact on job creation, with benefits seen in clean energy, electrification, energy efficiency and research and development (R&D). However, it is also likely to cause significant shifts between sectors and occupations as well as disruption to existing employment, particularly in resource-intensive sectors. Among the respondents to our survey, 73% believe that the green transition will create more jobs than it eliminates, and 81% agree that it will result in the creation of higher-quality jobs. For example, the International Labour Organization (ILO) estimates that the green transition could result in the net creation of jobs in the energy sector by 2030. This, however, also encompasses 6–7m jobs lost in "legacy" occupations, such as coal mining and petroleum extraction.[4] The scale of the job creation and losses will vary across segments of the labour market, sub-sectors of the economy and geographies. This can lead to significant disruption to those communities in which losses are concentrated, if they are not replaced by new green jobs.

4. The green transition will require most workers to acquire green skills—not just those working in explicitly green jobs or functions. This finding was borne out in both our global survey, with 76% of survey respondents in agreement, and our four sector-specific workshops. For example, Kevin Nilsen, president of ECO Canada, a workforce-solutions firm focusing on green jobs and training, emphasised how "all individuals [in the workforce] will need to acquire green skills—if a person doesn't have basic green literacy skills, they won't be able to effectively carry out their role." According to our workshop participants, the need to equip workers with green skills also applies to those sectors where core technical skillsets remain relatively unchanged through the green transition, such as and IT and technology. In these sectors, a number of soft skills and competencies—such as creativity and environmental awareness—will be critical to ensuring that firms can play a role in enabling the broader green transition of the economy.

[2] https://kanebridgenews.com/americas-green-skills-gap-raises-concerns-about-energy-transition/#:~:text=In%202022%2C%20the%20number%20of%20U.S.%20LinkedIn%20profiles,from%20LinkedIn%20provided%20to%20The%20Wall%20Street%20Journal.
[3] These figures refer to the carbon intensity of the economy, expressed in tonnes of carbon per US$ of GDP (PPP). https://databank.worldbank.org/reports.aspx?source=2&series=NY.GDP.MKTP.CD&country#
[4] https://www.ilo.org/global/about-the-ilo/newsroom/news/WCMS_823759/lang--en/index.htm#:~:text=Indeed%2C%20IRENA%20and%20ILO's%20work,six%20and%20seven%20million%20jobs

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5. Bridging emerging gaps in green skills will require innovative strategies on the part of governments, educational institutions and the private sector. The private sector will need to adjust its approach to talent development—for example, by engaging untapped pools of labour and integrating green skills in on-the-job learning. Meanwhile, governments will have a key role in creating an enabling environment that facilitates the transition towards a greener economy overall, and in establishing systems of collaboration and support to manage the disruption, particularly when it comes to vulnerable communities—for example, through the establishment of partnerships between businesses and educational institutions, which can ensure that students are equipped with the green skills demanded by the labour market. A promising example of this can be found in Singapore's Green Skills Committee, which has successfully brought industry and educators together under the auspices of the government.

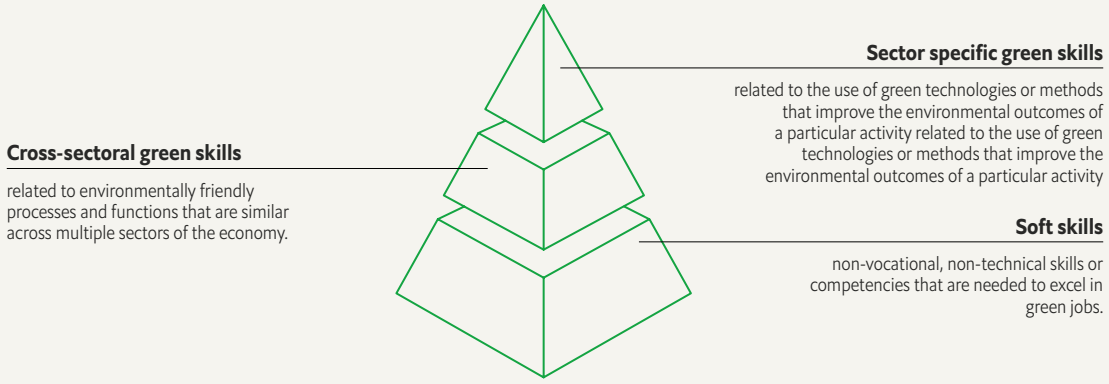
Defining "green skills"

In spite of their importance, "green skills" remain a challenging concept to define. There is particular ambiguity around whether the term should refer only to those skills explicitly related to green processes or functions (such as environmental restoration), or whether it should also include more universal skills that can be applied to green ends (such as green software engineering). The UN Industrial Development Organization, the EU and the Institute of Environmental Management and Assessment, a sustainability-focused professional body, all settle on the latter, broader definition—as does this report.[5,6,7]

Given the ambiguity implicit in a broad definition of green skills, making precise statements relies on a clear framework that differentiates between the different types of green skill. As such, a working definition of green skills that distinguishes between three broad categories is set out as follows.

Green skills: the knowledge, competencies, values and attributes needed to develop and support a sustainable, low-carbon and resource-efficient society. We distinguish between three broad categories of green skill:

- **Soft skills:** non-vocational, non-technical skills that are needed in order to excel in green jobs. For example, creativity or environmental awareness.
- **Cross-sectoral skills:** skills necessary to carry out environmentally friendly processes and functions that are similar across multiple sectors of the economy. For example, sustainability reporting or environmental impact assessment.
- **Sector-specific skills:** skills related to the use of green technologies or methods that improve the environmental outcomes of a particular activity. For example, solar panel installation or green retrofitting.



[5] https://www.unido.org/stories/what-are-green-skills: "the knowledge, abilities, values and attitudes needed to live in, develop and support a sustainable and resource-efficient society."
[6] https://esco.ec.europa.eu/system/files/2023-07/Green%20Skills%20and%20Knowledge%20-%20Labelling%20ESCO.pdf: "the knowledge, abilities, values and attitudes needed to live in, develop and support a society which reduces the impact of human activity on the environment."
[7] https://www.iema.net/resources/blog/2022/04/28/ema-defining-green-skills: "the technical skills, knowledge, behaviours, and capabilities required to tackle the environmental challenges we face. While specific jobs and roles might not be directly framed in terms of delivering sustainable or environmental outcomes they are, nonetheless, capable of contributing to those outcomes."

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Chapter 1: The impacts of the green transition

Mounting environmental challenges have coalesced to pose an unprecedented threat to human wellbeing and planetary health. The climate crisis—the impacts of which include rising temperatures, unpredictable weather patterns and rising sea levels—has already begun, with the summer of 2023 marked as the hottest on record.[8] The rapid depletion of scarce natural resources, from phosphorus to fresh water, has jeopardised the social and economic wellbeing of future generations.[9] Moreover, pervasive environmental degradation has accelerated a global biodiversity crisis, imperilling public health and global food security.[10] Overcoming these challenges will require a global green transition towards low-carbon and environmentally sustainable economies and societies, encompassing decarbonisation, development of circular economies, and protection of nature and biodiversity.

As economies evolve to address the climate crisis and enhance energy security, the workforce will need to evolve in tandem. The adoption of greener models of production and consumption will lead to growth in green occupations, from solar panel technicians to conservation scientists. It will also lead to the loss of jobs in legacy industries such as coal mining. Finally, it will necessitate the incorporation of green functions into existing occupations—for example, accountants engaging more with green finance. These trends will have wide-ranging impacts on the global labour market, influencing the volume and composition of jobs available to workers, as well as altering the qualifications and skills required of them.[11] In turn, the pace and success of the green transition will be contingent on the labour market's ability to supply the economy with the right types of worker, in the right locations, with the right skills.[12]

The impacts of the green transition on business

The impacts of the green transition on businesses will vary drastically between sectors and business models, with some industries set to benefit and others likely to struggle. In order to gauge perceptions of the impacts of the green transition across businesses worldwide, we conducted a global survey of over 1,000 business leaders across our sectors of interest. Survey respondents

[8] https://www.nasa.gov/news-release/nasa-announces-summer-2023-hottest-on-record/#:~:text=The%20summer%20of%202023%20was%20Earth%E2%80%99s%20hottest%20since,meteorological%20summer%20in%202023%20%28June%2C%20July%2C%20and%20August%29
[9] https://www.researchgate.net/publication/365429175_The_12_Most_Pressing_Global_Environmental_Issues_Environmental_problems_humanity_needs_to_resolve_before_2050/link/6374d79b54eb5f547cd9f6ed/download
[10] https://www.nytimes.com/2020/09/15/climate/biodiversity-united-nations-report.html
[11] https://www.oecd-ilibrary.org/sites/302d43f1-en/index.html?itemId=/content/component/302d43f1-en
[12] https://ied.eu/blog/sustainability-blog/what-are-green-skills-and-why-do-we-need-them/

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were encouragingly optimistic. In fact, almost four in five—78.8%—agreed that the green transition would present more opportunities than challenges for their organisation. This finding was echoed by participants in our workshops. With respect to the construction and infrastructure sector, for instance, Ermal Kapedani, head of innovation and sustainability at Ghelamco Group, highlights the immense business opportunities that stem from "the very large number of undesirable existing buildings that need to be renovated and upgraded to meet new sustainability standards". Similarly, for IT and technology firms, Ben Logan, global technology lead at UBS Evidence Lab, points to the opportunities associated with "helping organisations to reduce their energy use by running software more efficiently—for example, through moving operations to the cloud".

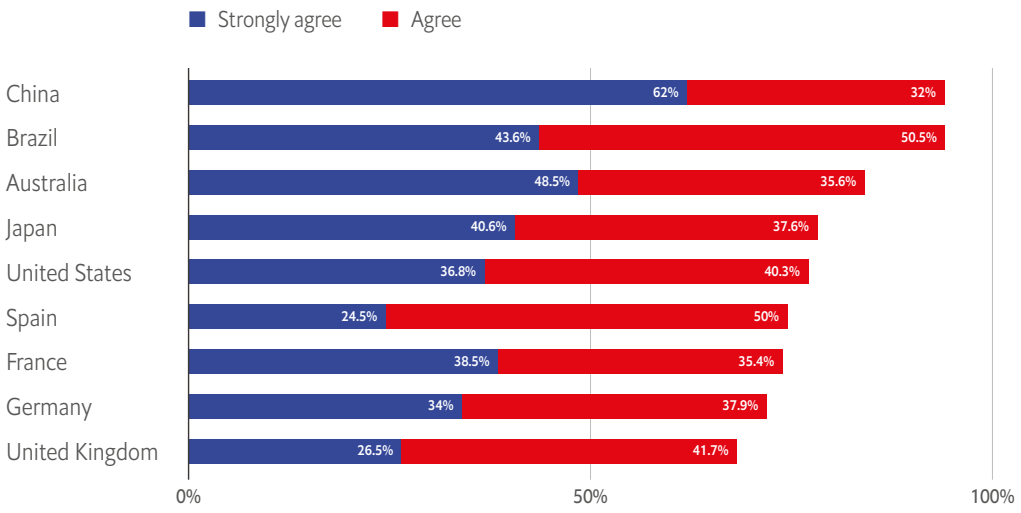
Business leaders' general attitudes could be indicative of underlying regional-level variations. European business leaders, albeit generally optimistic, present a more cautious stance. Smaller majorities of survey respondents in the UK (68%), Germany (72%), France (74%) and Spain (75%) were confident that opportunities will surpass challenges compared with a near unanimity (94%) in Brazil and China. This may reflect the more advanced stage of Europe's implementation, with the challenges of the transition already being felt more keenly than elsewhere.

"Public appreciation of the climate emergency is much higher in Europe than elsewhere," says Flore Suquet-Raymond, senior manager, sustainability at Amazon. "People are much more aligned that solutions are needed for the green transition and so may be more realistic about the transition's impacts than in other countries."

Most regions have made progress in recent years, but the green transition—particularly the decarbonisation of the energy sector and the shift to less resource-intensive economic sectors—is more advanced in Europe than elsewhere.[13] For example, whereas the carbon intensity of the economy (in kg per PPP US$ of GDP) is just 0.1 in the UK and 0.082 in France, it is higher in Brazil (0.13), Australia (0.28), and especially China (0.45).[14] Many European countries derive only a small, and declining,

Figure 1: Green opportunities

% of respondents who strongly agree or agree that the green transition presents more opportunities than challenges



Source: Economist Impact survey

[13] https://www3.weforum.org/docs/WEF_Fostering_Effective_Energy_Transition_2021.pdf
[14] https://databank.worldbank.org/reports.aspx?source=2&series=NY.GDP.MKTP.CD&country#

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share of their GDP from carbon- and resource-intensive activities, such as heavy manufacturing, extraction of fossil fuels or agriculture. Moreover, the region has improved its energy system performance and sustainability outcomes with lower fossil fuel subsidies, higher investments in diverse and cleaner energy portfolios, and a stronger regulatory environment.[15]

However, the transition is a global reality. China, for instance, has managed to halve the carbon intensity of its economy in the past three decades (although it is still above the global average), despite deriving nearly 40% of its GDP from industry.[16] The US has cut down its carbon intensity to below the world average and implemented some of the largest green transition policy initiatives in the world.[17]

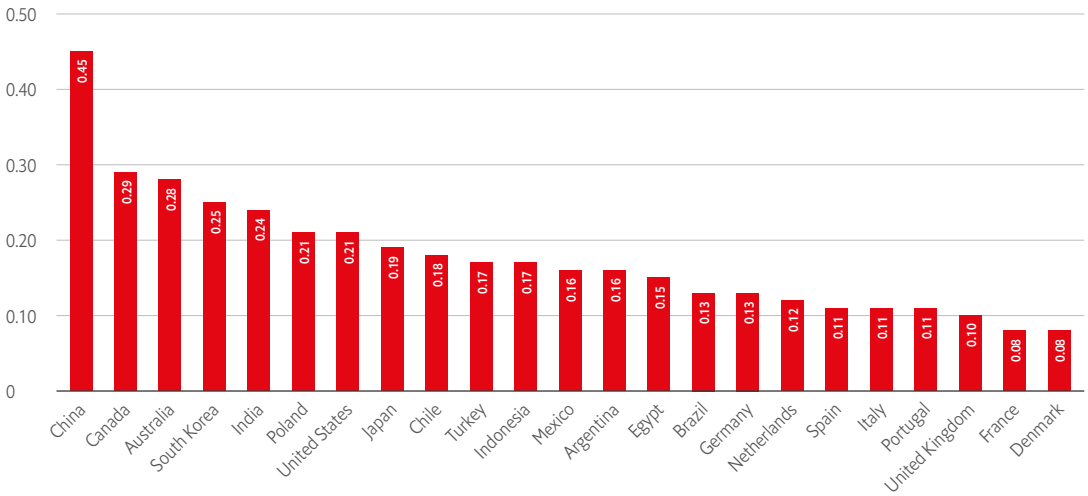
This progress and transition will create significant new opportunities for communities (chapter 2), but there is also likely to be significant reallocation and disruption. "Parts of Europe are already experiencing significant challenges as a result of the transition, with communities and workers losing out," claims Simon Schmid, director of the Just Skills Hub and a partner at SkillLab. Moreover, Steve Coulter, head of economy at the Green Alliance, points to how politicians have exploited this emerging disruption, causing resentment of the green transition to swell. "In a lot of European countries, we are seeing how centre-right politicians are rolling net-zero policies into a wider culture war—they have realised this is an electoral issue that they can take advantage of." Restoring faith in the green transition will require significant efforts on the part of governments to mitigate any negative externalities by supporting investment and infrastructure development, training, education and social programmes in disrupted communities. Embedding "just transition" principles into climate policies and legislation, such as those proposed by Scotland among others, will be key.[18]

The impacts of the green transition on the labour market: job creation in the aggregate

As greener industries gain prominence, jobs will inevitably be both created and lost. In the

Figure 2: It's the (carbon) economy

Carbon intensity of the economy (kg of CO_2 emissions per PPP $ of GDP)



Source: Economist Impact calculations based on Climate Watch and Economist Intelligence Unit (EIU) data

[15] https://www3.weforum.org/docs/WEF_Fostering_Effective_Energy_Transition_2021.pdf
[16] https://data.worldbank.org/indicator/NV.IND.TOTL.ZS
[17] https://www.iea.org/data-and-statistics/charts/co2-emissions-intensity-of-gdp-1990-2021
[18] https://unfccc.int/sites/default/files/resource/UNFCC%20KCI%20-%20JTC%20submission.pdf

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aggregate, this is expected to have a net-positive or net-neutral impact on the availability of employment. The UK's Climate Change Committee estimates that between 135,000 and 725,000 net new jobs could be created as a result of the net-zero transition—with opportunities particularly apparent in growth sectors such as buildings retrofitting and EV manufacture.[19] At the global level, the ILO estimates that the transition could lead to 25m net new jobs by 2030.[20] These findings reflect previous research that has found that the expansion of renewable energy creates three jobs for each job lost in the fossil fuel sector.[21] This is driven by the high labour intensity of renewable energy production in comparison with the highly automated fossil fuel sector—for instance, research suggests that investment in solar photovoltaic energy will create an estimated 1.5 times as many jobs per US$1m invested than those in fossil fuels.[22,23] This is echoed by the results of our survey: almost three-quarters of respondents (73%) believe that the green transition will create more jobs than it eliminates, with 74% agreeing that it will allow their own organisation's workforce to increase in size.

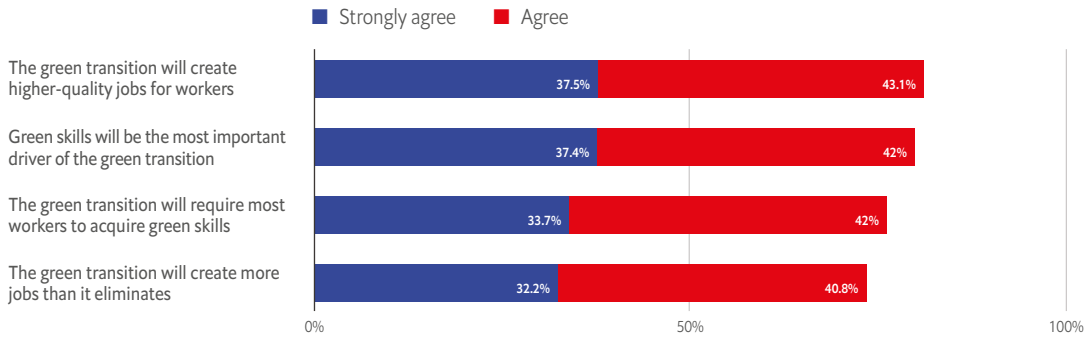
Growth in green jobs is not currently distributed evenly across the globe. While European nations are making significant strides in green job creation, their counterparts in Asia—such as China and India—are lagging behind. For example, while Europe has experienced a 41% growth in hiring for green jobs since 2016, growth in Asia-Pacific has been recorded at 30%, and in China the level is just 4%.[24] This may again reflect the more advanced stage of Europe's green transition, with a larger portion of businesses now requiring workers operating in green occupations. While employment in the renewable energy sector is soaring in countries like Denmark (1,206 jobs per 100,000 of the working population), Germany (664.4) and Portugal (542.7), it remains significantly lower in India (111.3), Mexico (95.7) and South Korea (80.9).[25]

The impacts of the green transition on the labour market: the potential for disruption

Despite the optimistic outlook for job creation in the aggregate, job losses in legacy industries are inevitable. Research by the ILO has found that while a transition to energy sustainability by 2030 would result in the net creation of

Figure 3: Labour market in transition

% of respondents who strongly agree or agree with the following statements about the green transition



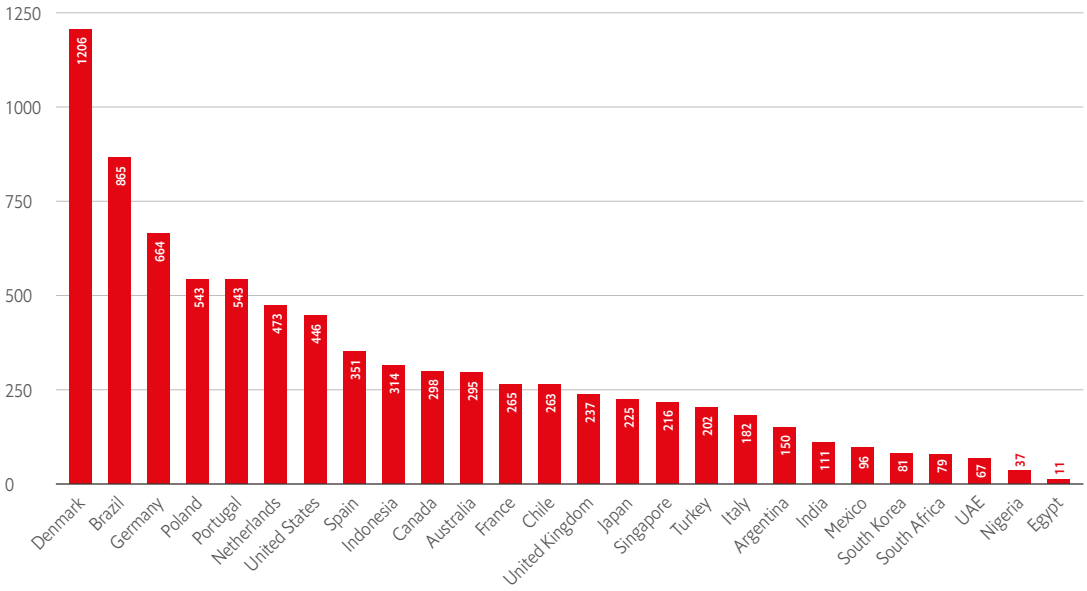
Source: Economist Impact survey

[19] https://www.theccc.org.uk/publication/a-net-zero-workforce/
[20] https://www.ilo.org/global/topics/youth-employment/publications/WCMS_856666/lang--en/index.htm#:~:text=The%20promotion%20of%20green%20jobs%20is%20at%20the,a%20net%20job%20creation%20of%2025%20million%20jobs
[21] Heidi Garrett-Peltier. 2017. "Green versus brown: Comparing the employment impacts of energy efficiency, renewable energy, and fossil fuels using an input-output model", Economic Modelling, 61, pp. 439–447.
[22] https://www.jstor.org/stable/pdf/resrep29195.3.pdf
[23] https://files.wri.org/d8/s3fs-public/2021-10/the-green-jobs-advantage-how-climate-friendly-investments-are-better-job-creators.pdf?VersionId=_4g3pkXM5qB8_DEy1MhhbF8AloDhqGUY
[24] https://economicgraph.linkedin.com/blog/investing-in-green-jobs-and-skills-in-the-asia-pacific-region-will-pave-the-way-towards-a-sustainable-future
[25] https://www.irena.org/Data/View-data-by-topic/Benefits/Renewable-Energy-Employment-by-Country

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Figure 4: Green energy is driving the labour market transition

Renewable energy jobs per 100,000 working population



Source: The International Renewable Energy Agency (IRENA)

jobs, it would also encompass 6–7m job losses in carbon-intensive segments of the energy sector—occupations such as coal mining and petroleum extraction.[26] A number of participants in our workshops echoed the need to better understand how such job losses will be distributed across workers belonging to various sectors, geographies and skill levels. "While more jobs may be created on average, that does not minimise the pain of those who are losing their jobs," according to Devashree Saha, director of US Clean Energy Economy Program at the World Resources Institute. "We need robust transition policies to support those workers and communities that will be impacted."

A prime example of those legacy industries where job losses will be concentrated is coal mining, where employment has already shrunk dramatically across numerous countries. In China, almost 2m employees in the coal sector lost their jobs between 2016 and 2020 as the country cut its annual coal production by more than 800m tons.[27] Similarly, in the US, employment in the sector fell by half between 2012 and 2020 as a result of the shutdown of coal-fired power plants.[28] A corollary of this trend is that job losses are unevenly distributed across geographies, with particular disruption in those regions where legacy industries are predominant—such as the historical coal heartlands of South Wales in the UK, Silesia in Poland and West Virginia in the US. As these are not necessarily the regions where new jobs will be created, without government intervention the risk of extended economic malaise in such communities is pronounced.

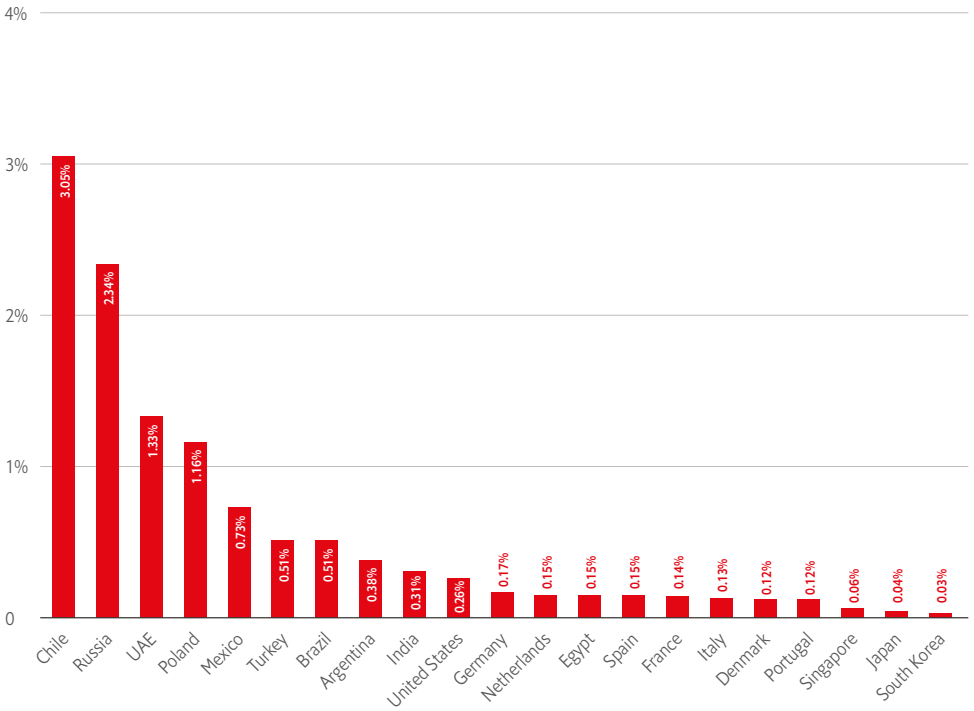
Certain demographics within the labour force, such as elderly and lower-skilled workers, will be disproportionately affected. New jobs are less likely to be accessible to these groups, causing greater disruption in the short-to-medium term. "The bulk of job creation as a result of the green transition will be at the medium-skill level, with quite a few jobs created at a high-skill level," says Olga Strietska-Ilina, work area lead on skills strategies for future labour markets at the ILO.

[26] https://www.ilo.org/global/about-the-ilo/newsroom/news/WCMS_823759/lang--en/index.htm#:~:text=Indeed%2C%20IRENA%20and%20ILO%E2%80%99s%20work%20finds%20that%20more,losses%20of%20between%20six%20and%20seven%20million%20jobs.
[27] https://asia.nikkei.com/Spotlight/Caixin/Chinese-miners-to-be-hardest-hit-by-global-coal-job-cuts-study-finds#:~:text=Over%20the%20following%20four%20years,2020%2C%20reported%20China%20Coal%20magazine
[28] https://energynews.us/2020/06/25/thousands-of-coal-workers-lost-jobs-where-will-they-go/

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Figure 5: Changes in the use of natural resources will impact many workers

Employment in mining and quarrying as a share of total employment (latest year available)



Source: Economist Impact calculations based on ILO, Cedefop, and Economist Intelligence Unit (EIU) data

"As a result, the first priority must be to retrain low-skilled workers." This is corroborated by previous research, which has found that highly educated workers are likely to fare better as a result of the green transition than their lower-skilled counterparts.[29] "Middle-aged workers, who still have a good amount of working life left, are most at risk," according to Cyrus Suntook, sustainable and people strategy lead at Accenture. "They have a massive reskilling journey ahead compared to early-stage workers who may find the transition easier."

As a result of its concentration in specific industries, geographies and demographics, labour market disruption is likely to hit hardest in those communities that are already economically vulnerable. Moreover, workers who lose their jobs may find it difficult to transition to a green alternative.[30] These apparent limits on labour mobility may stem from multiple causes, including workers' ties to geographies and sectors where green jobs are less common. Importantly, these limits are likely exacerbated by a mismatch in the skills profiles of legacy occupations and those of green alternatives, particularly for lower-skilled workers.[31,32]

Considering the impacts on women in the labour market will also be essential. Women account for only around 22% of the workforce in the oil and gas sector and 32% in renewables.[33] Overall, less than 30% of green-task jobs are held by women.[34] This has contributed to gender pay gaps as green jobs tend to offer significantly higher wages than their non-green equivalents. Improving women's participation in the green transition would yield a

[29] https://www.oecd-ilibrary.org/sites/302d43f1-en/index.html?itemId=/content/component/302d43f1-en
[30] https://www.nber.org/system/files/chapters/c14880/c14880.pdf
[31] https://www.nber.org/system/files/chapters/c14880/c14880.pdf
[32] David H. Autor, Frank Levy and Richard J. Murnane. 2003. "The Skill Content of Recent Technological Change: An Empirical Exploration", The Quarterly Journal of Economics, 118 (4), pp.1279–1333.
[33] https://www.irena.org/news/articles/2019/Jan/Gender-equality-for-an-inclusive-energy-transition; https://www.iea.org/commentaries/gender-diversity-in-energy-what-we-know-and-what-we-dont-know
[34] https://www.oecd-ilibrary.org/sites/21db61c1-en/index.html?itemId=/content/publication/21db61c1-en

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double dividend: reducing gender inequality and addressing labour market shortages. Targeted training, upskilling and reskilling programmes can help, but a broader cultural shift will be needed in businesses and educational systems.

As discussed in chapter 3, the role of governments in reducing barriers to labour mobility—for example, through reskilling programmes—will therefore be essential to ensuring that the green transition will be "just".

Case study: Coal communities in Poland

The winding-down of the Polish coal industry—a major component of the nation's green transition—has wrought significant disruption in certain segments of the labour market. Following the closure of two-thirds of the country's mines over the past three decades, mining unions have reported a drastic decrease in employment in the sector, from 300,000 to 80,000 jobs.[35] Although coal-related jobs account for less than 2% of total national employment in Poland, these jobs are highly concentrated in just a few regions, such as Silesia, resulting in acute disruption in certain communities.[36] For instance, in two Polish municipalities—Jastrzębie-Zdrój and Bieruńsko-Ledziński—coal-related jobs account for as much as half of all employment.[37] A significant fraction (16%) of this employment is represented by workers providing goods and services to mining conglomerates (ie, by non-mine workers), as well as those who are directly employed in mines.[38]

As mines continue to close, workers made redundant from coal-related jobs face significant hurdles in accessing alternative employment. New renewable energy facilities in Poland—such as offshore wind farms in the Baltic Sea—are often far from historical coal centres in the country, such as Silesia.[39] They also require workers of different skillsets and specialisations. Perhaps unsurprisingly, surveyed coal workers express a strong preference against transferring to different locations, positions and sectors for work, reducing the likelihood of them moving into such jobs.[40] Labour mobility is further hindered by slow local labour markets, which, having been dominated by local mining conglomerates for many decades, now struggle to accommodate swelling numbers of unemployed workers.

In order to mitigate disruption, Poland's Hard Coal Mining Phase-out Agreement provides employment guarantees for miners up to their retirement age and introduces social protection measures for those made redundant.[41] However, the Agreement is far from perfect—for example, it ignores one of the demographics most threatened by the closure of the mines: non-mine workers. In spite of the fact that non-mine workers are often lower-skilled and concentrated in the most vulnerable communities—meaning that they will encounter the greatest challenges in finding new employment—they are not covered by the Agreement's social protection measures.[42] Furthermore, greater emphasis is needed on reskilling miners—through vocational education and training programmes—which will equip redundant workers with the skills necessary to access green jobs, such as problem-solving in technology-rich environments.[43]

[35] https://www.equaltimes.org/as-coal-mines-close-silesia-s
[36] https://documents1.worldbank.org/curated/en/099855010032219698/pdf/P1776730bee10d096087ca0b19e448af8e1.pdf
[37] Ibid.
[38] Ibid.
[39] https://www.politico.eu/sponsored-content/the-green-turn-of-the-polish-energy-sector/
[40] Ibid.
[41] https://www.cire.pl/artykuly/serwis-informacyjny-cire-24/175624-podpisano-porozumienie-w-sprawie-zasad-i-tempa-transformacji-gornictwa
[42] https://documents1.worldbank.org/curated/en/099855010032219698/pdf/P1776730bee10d096087ca0b19e448af8e1.pdf
[43] Ibid.

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Chapter 2: Growth in demand for green skills

As new occupations emerge and others evolve to satisfy the demands of the green transition, new skills will be expected of the workers who occupy them. These green skills include the knowledge, competencies, values and attributes needed to develop and support a sustainable, low-carbon and resource-efficient society. As defined in the Executive Summary, we distinguish between three broad categories of green skill: soft skills, cross-sectoral skills and sector-specific skills.

The growing demand for green skills across the economy

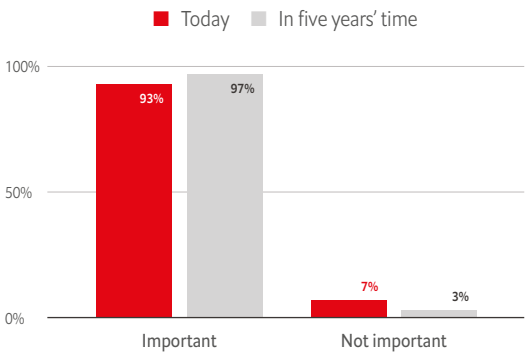
The need to equip the global workforce with green skills has grown steadily more urgent as industries pivot towards more sustainable business models. "All individuals [in the workforce] will need to acquire green skills—if a person doesn't have basic green literacy skills, they won't be able to effectively carry out their role," says Kevin Nilsen, president of ECO Canada. In fact, 80% of respondents to our survey agreed that green skills will be the most important driver of the green transition, with almost three-quarters (73%) of respondents agreeing that the transition will require most workers to acquire green skills.

Importantly, green skills are no longer perceived to be a challenge for tomorrow: 93% of respondents to our survey agreed that green skills are currently important to supporting their business's operations and objectives, and 97% agreed that they will be important in five years' time. In fact, one recent study found that the hiring rate for workers possessing at least one green skill is 29% higher than for the average workforce, demonstrating ongoing growth in demand for green skills across sectors, job profiles and geographies.[44]

As the green transition accelerates, firms will face significant pressures to equip their workers with the technical, sector-specific green skills necessary to carry out green functions. This will be particularly the case where business models will change most dramatically, such as in the

Figure 6: Green skills are good for business

% of respondents who consider green skills to be important to their business's operations and objectives



Source: Economist Impact survey

[44] https://economicgraph.linkedin.com/research/global-green-skills-report

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shift from carbon-intensive to clean energy. For example, solar heating system installation and repair was identified by energy sector survey respondents as one of the most important green skills to their organisation's transition. "The green transition [of the energy sector] is primarily going to be led by blue collar workers," says Jason Walsh, executive director of the BlueGreen Alliance. "We're going to need a lot of really skilled machinists and electricians to manufacture and install these new technologies." Additionally, early adopters in net-zero transformation will gain a competitive edge by attracting employees with key skills, appealing to young, progressive jobseekers, and building expertise. Late adopters, in contrast, will face a limited talent pool.[45]

In-demand green skills will not only those that help organisations to decarbonise. Although emissions reduction receives much publicity, the sustainable use of materials across the product life cycle is also a critical consideration—particularly in sectors with relatively low direct emissions.[46] In order to achieve a green transition, economies will need to move beyond net zero and address the circularity of economic activities, which will require green skills. This was borne out in our survey, with waste management and reprocessing identified as one of the most important green skills among 60% of IT and technology sector respondents (compared with just 27% of energy sector respondents). As well as mitigating firms' environmental impact, improvements in waste management can benefit their bottom line—for example, by minimising material costs through the repurposing of waste products.

Meanwhile, a variety of broader, cross-sectoral green skills will be crucial to ensuring that firms align their operations with environmental goals. In our survey, business leaders identified sustainability disclosure and reporting (39%), environmental impact assessment (35%), and sustainability compliance (32%) as the three most important cross-sectoral green skills for their organisation's green transition. The salience of these three skills in particular appears to reflect the central role played by government regulation in driving organisations' green transition. Sustainability disclosure and

[45] https://www.pwc.co.uk/issues/transformation/case-studies-and-insights/net-zero-early-mover-advantage.html
[46] https://www.sciencedirect.com/science/article/pii/S2666789420300064

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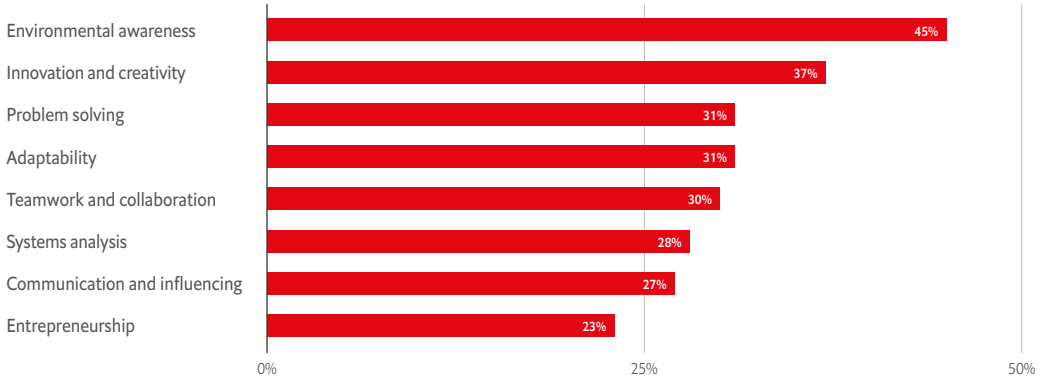
reporting is mandated by regulators across numerous markets—in the EU, for example, under the Corporate Sustainability Reporting Directive.[47,48] Similarly, environmental impact assessment is now a near-universal requirement of organisations seeking to undertake new projects or developments.[49,50]

The need to equip workers with green skills is also evident in those sectors where core technical skillsets will remain similar throughout the green transition, such as IT and technology. In these sectors, soft skills—such as creativity and environmental awareness—will ensure that firms can pivot their business models towards enabling the broader green transition of the economy. As James Robey, global head of environmental sustainability at Capgemini, notes, "workers [in the IT sector] will need to have awareness and understanding of sustainability in order to apply their existing technical skills to green ends—such as making their factory or code more sustainable." The particular significance of soft skills will apply across a number of "enabling" sectors—such as financial services and the legal profession—that will play a more ancillary role in facilitating the greening of the broader economy, rather than directly contributing to environmental goals themselves.

Soft skills will also be important in supporting business leaders' efforts to transition their businesses towards greener ways of working. For example, creativity will be instrumental to crafting novel solutions that allow leaders to transform business models while preserving their organisations' financial profitability.[51] "Individuals will need to combine innovative thinking and a broad understanding of sustainable development in order to direct their organisations along the green transition. Green mindset is a foundation to achieve change," says Margarita Pavlova, director, UNEVOC Centre (Hong Kong), The Education University of Hong Kong. To this end, environmental awareness (45%), innovation and creativity (37%), and problem solving (31%) were highlighted by business leaders in our survey as critical to enabling the green transition of their organisations.

Figure 7: Green skills: going soft

% of respondents who selected each of the following soft skills and competencies as being among the most important to enabling their organisation's green transition



Source: Economist Impact survey

[47] https://www2.deloitte.com/content/dam/Deloitte/my/Documents/risk/my-risk-sustainability-reporting-strategy.pdf
[48] https://finance.ec.europa.eu/capital-markets-union-and-financial-markets/company-reporting-and-auditing/company-reporting/corporate-sustainability-reporting_en
[49] https://www.iisd.org/learning/eia/eia-essentials/what-why-when/
[50] https://www.unep.org/resources/assessment/assessing-environmental-impacts-global-review-legislation
[51] https://www.sciencedirect.com/science/article/abs/pii/S0959652619310248

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Intersecting transitions

The digital revolution has potential to play a major role in accelerating the green transition. "There is a huge interaction between the digital and green transitions," says Olga Strietska-Ilina, work area lead on skills strategies for future labour markets, senior skills and employability specialist at the ILO. "The success of the green transition depends upon innovation in the technology and digital sectors." Digital innovations have created opportunities to radically improve efficiencies and reduce waste in manufacturing. For example, the distributed ledger technology developed to create cryptocurrencies has potential applications in material tracing, thereby allowing for more effective recycling of materials in a circular economy.[52] A third of respondents to one survey of British manufacturers claimed that digital adoption boosted their energy efficiency and process improvements helped to reduce emissions.[53]

Nevertheless, the digital industry's insatiable appetite for resources—from rare earth materials to energy—poses severe environmental challenges, underscoring its status as part of both the solution and the threat to the green transition. Public intervention will be necessary to maximise the benefits of the digital revolution for greening, while limiting its more damaging impacts.[54]

With respect to skills, there are a number of digital competencies that can be applied to green ends. Most notably, big data analytics is increasingly important in driving businesses' sustainability improvements, allowing organisations to optimise their energy use and enhance the efficiency of their supply chains. In fact, nearly half (49%) of IT and technology sector survey respondents identified big data analytics as one of the most important green skills in their organisation's green transition.

Yawning skills gaps threaten the progress of the green transition

As the green transition gains pace, global growth in demand for green skills is overtaking supply. According to our survey, just 55% of business leaders are currently implementing or planning to implement green skills programmes among their existing workforce. This leaves a sizeable proportion of the workforce without crucial training in green skills, thereby threatening the green transition's progress. The yawning green skills gap is evident in LinkedIn's data on US green job postings, which jumped by 20% in 2022 but were matched by only an 8.4% increase in the availability of green talent.[55] Such a shortfall is having real effects: 62% of respondents to our survey agreed that shortages in green skills will create bottlenecks that slow down the green transition.

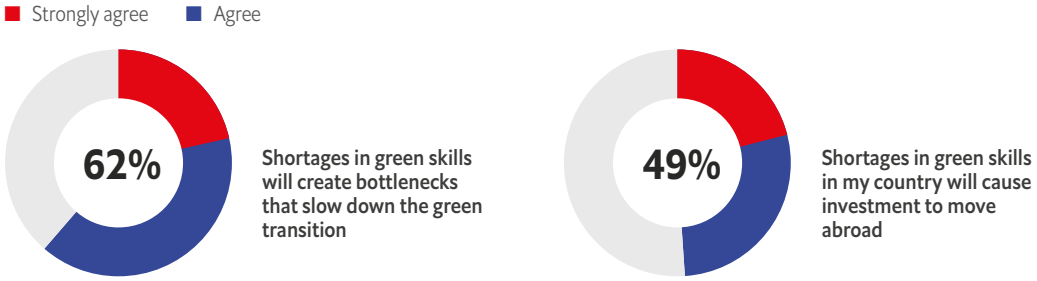
Constraints in the supply of technical, sector-specific green skills are a source of particular concern. "In the construction sector, there is a huge skills gap in specialised technical skills, such as construction retrofitting and efficient design, which is impeding the sector's transition towards net zero," claims Mr Nilsen. Within the energy sector, renewable energy firms are predicted to require an additional 1.1m blue-collar workers globally to develop and construct new renewable energy plants, with another 1.7m needed to operate them.[56] These workers will require an assortment of new technical skills, from solar panel installation to renewable energy system integration.

[52] https://joint-research-centre.ec.europa.eu/jrc-news-and-updates/twin-green-digital-transition-how-sustainable-digital-technologies-could-enable-carbon-neutral-eu-2022-06-29_en
[53] https://www.makeuk.org/insights/reports/decarbonising-manufacturing-challenges-and-opportunities
[54] https://joint-research-centre.ec.europa.eu/jrc-news-and-updates/twin-green-digital-transition-how-sustainable-digital-technologies-could-enable-carbon-neutral-eu-2022-06-29_en
[55] https://kanebridgenews.com/americas-green-skills-gap-raises-concerns-about-energy-transition/#:~:text=In%202022%2C%20the%20number%20of%20U.S.%20LinkedIn%20profiles,from%20LinkedIn%20provided%20to%20The%20Wall%20Street%20Journal
[56] https://www.mckinsey.com/~/media/mckinsey/industries/electric%20power%20and%20natural%20gas/our%20insights/energy%20and%20renewable%20insights/energy-and-renewable-insights.pdf

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Figure 8: Challenging times

% of respondents who strongly agree or agree with the following statements about the green transition



Source: Economist Impact survey

Nevertheless, the green skills gap is far from limited to technical skills. According to Sarah Strachan, senior lecturer practitioner (sustainability) at Anglia Ruskin University, "soft skills…face the most substantial skills gap, as they are often challenging to acquire and receive less emphasis in educational and training curriculum." For example, one recent study focusing on the IT sector in emerging economies found acute shortages across nearly all soft skills included in the research, including leadership, interpersonal and organisational skills.[57] In our survey, creativity, entrepreneurship and adaptability were recognised by respondents as being among the most challenging soft skills to source in the labour market, indicating a growing need for these skills to be integrated into educational curricula and on-the-job learning.



[57] Richa Singh Dubey, Justin Paul and Vijayshri Tewari. 2021. "The soft skills gap: A bottleneck in the talent supply in emerging economies". The International Journal of Human Resource Management, 33, pp. 1–32.

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Chapter 3: Closing the gap

Bridging emerging gaps in green skills will be imperative to driving the green transition forward. This will require innovative strategies on the part of governments, educational institutions and the private sector. The private sector will need to adjust its approach to talent development—for example, by engaging untapped pools of labour and integrating green skills in on-the-job learning. Meanwhile, governments will need to do more to create an enabling environment that facilitates businesses' transition to greener business models. Above all, however, meeting demand for green skills will necessitate increased collaboration between actors from across the ecosystem—through the establishment of partnerships between businesses and educational institutions, for example, which can ensure that graduates are equipped with the green skills demanded by the labour market.



Businesses should increase their investment in fostering the supply of green skills

Workers cannot be expected to shoulder the burden of acquiring green skills on their own, especially given the extensive costs associated with reskilling. A recent study of the UK workforce found that 61% of workers were unable to upskill themselves due to the high costs associated with green skills courses.[58] Unfortunately, businesses appear to be doing little to pick up the slack. Our survey of business leaders worldwide found that only 55% are currently implementing, or planning to implement, green skills programmes among their workforce. Meanwhile, just 43% are collaborating, or planning to collaborate, with educational institutions to build a talent pipeline of green skills.

[58] https://media.nesta.org.uk/documents/How_to_increase_the_appeal_of_green_skills_and_training_report.pdf

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Figure 9: More action needed

% of respondents whose organisation is employing, or planning to employ, the following strategies in order to meet projected demand for green skills



Source: Economist Impact survey

Businesses will need to increase their investment in reskilling in order to meet the requirements of greener business models. This is particularly the case for the automotive sector which is under pressure to accelerate workforce skills development amid soaring demand for EVs.[59] The design and manufacture of EVs require a suite of new skills that differ from those involved in the production of internal-combustion-engine vehicles, including battery technology, electrical engineering, software engineering and lithium supply chain management.[60,61] This is not limited to the manufacture of EVs—new skills will also be needed for EV battery servicing, as well the installation and operation of charging infrastructure.[62] In order to satisfy emerging demand, BMW has launched the "e-mobility" initiative to train existing employees in relevant green skills, such as the safe handling of high-voltage systems.[63] Around 46,000 employees have now received this training—over a third of the organisation's workforce.[64]

Given the rapidly evolving nature of the technologies and solutions driving the green transition, green skills are unlikely to remain static—much like the skills that underpin the digital revolution, they will be subject to change. As such, businesses' approach to fostering green skills development must be dynamic, with a focus on continuous, life-long learning among employees. Demonstrating this principle in practice is the Green Skills Passport, a free, online learning platform developed by Microsoft and EY that is focused on the development of workplace skills for sustainability.[65] By making green skills training available to all workers—regardless of age or level of seniority—such platforms have the potential to foster the continuous learning that will be necessary to meet the evolving demands of the green transition.

A myopic focus on upskilling existing employees will not be enough to build a resilient talent pipeline. In particular, working with students

[59] https://www.motor.com/2022/02/is-america-ready-for-the-juggernaut-of-skills-needed-to-hit-ev-targets/
[60] https://impact.economist.com/sustainability/net-zero-and-energy/sizing-the-energy-transition
[61] https://www.etrma.org/wp-content/uploads/2019/09/skill-council-automotive-report-2016-stampa4.pdf
[62] https://greenfleet.net/features/14092023/skills-needed-ev-space
[63] Ibid.
[64] https://www.bmwblog.com/2020/06/16/bmw-trained-over-46000-employees/
[65] https://www.esgtoday.com/ey-microsoft-launch-green-economy-job-training-program/

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and young people will be critical to ensuring that future generations of the workforce are equipped with the skills necessary to succeed in firms with greener business models. To this end, for instance, Invenergy, a US energy firm, has invested over US$1.75m in educating high-school students about innovation and clean energy.[66] This has included enrolling students in bespoke courses on environmental policy, green engineering and entrepreneurship. In funding such programmes, Invenergy has played a part in ensuring that the workforce of the future is equipped with the skills to support the green transition of energy sector firms—as well as that of Invenergy itself.

Government intervention is needed to facilitate the green transition of the labour market in the short and longer term

The role of government policy in fostering the green transition of the labour market is twofold.



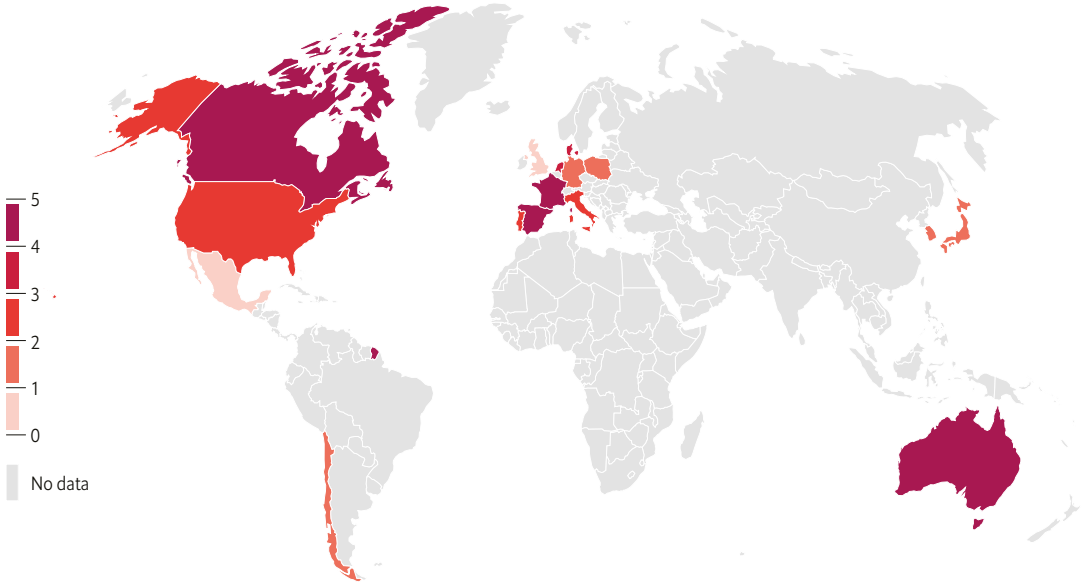
First, governments should introduce active labour market policies that address labour market disruptions stemming from the green transition and nurture the supply of green skills. Second, in the longer term, governments will need to create an enabling environment that incentivises the greening of the economy more broadly—for example, through stricter standards, putting a price on emissions, and removing subsidies for polluting industries such as fossil fuels. In 2022, direct and indirect fossil fuel subsidies reached US$7trn globally, accounting for 7% of GDP, largely driven by government support in response to soaring energy prices.[67] Such interventions should in turn encourage firms to take more proactive measures in bridging green skills gaps through initiatives such as workforce upskilling programmes.

Although the green transition is likely to create more jobs than it eliminates, the new jobs created may not be immediately accessible to displaced workers because they are in different locations, require different skills, or are otherwise undesirable.[68] As such, it is the responsibility of governments to ensure that new jobs are desirable, disrupted communities are supported, and displaced workers are given opportunities to reskill. In 2018 the Spanish government committed to investing US$280m in the country's coal-mining communities to mitigate the negative impacts of the transition away from coal.[69] This money has been spent on creating new green jobs locally in occupations such as environmental restoration, as well as on providing training in green skills. Importantly, money has been allocated to fund the early retirement of older workers who may face particular difficulties in acquiring new employment, thereby ensuring that the green transition does not wipe out the incomes of local communities. Unfortunately, government spending on such proactive labour market policies remains low in many countries—

[66] https://invenergy.com/news/power-lines/invenergy-and-the-polsky-foundation-invest-1-75-million-in-the-next-generation-of-innovators-
[67] https://www.imf.org/en/Topics/climate-change/energy-subsidies
[68] https://files.wri.org/d8/s3fs-public/2021-10/the-green-jobs-advantage-how-climate-friendly-investments-are-better-job-creators.pdf?VersionId=_4g3pkXM5qB8_DEy-1MhhbF8AloDhqGUY
[69] Ibid.

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Figure 10: Labour market protection: not so safe everywhere
Total public spending on labour markets as a share of GDP



Source: OECD

while public expenditure on such policies is 4.8% of GDP in Canada and 4% of GDP in France, it languishes at just 1.2% of GDP in Chile and 1.4% of GDP in South Korea, and at a mere 0.5% of GDP in the UK.[70] Public spending on labour market policies is almost non-existent in Mexico.[71]

Targeted government intervention can also support the green transition by proactively bridging skills gaps in green sectors. In Japan, the government has pledged to spend US$2.12bn on improving the country's international performance in science and mathematics, with a particular focus on green technologies.[72] By reversing Japan's declining graduation rates in the sciences, this investment is intended to boost the number of graduates entering the workforce with skills in decarbonisation and other growth fields.[73] Similarly, the Australian government has funded the establishment of 10,000 apprenticeships in emerging energy-related professions in order to facilitate the entry of workers into the renewable energy sector.[74]

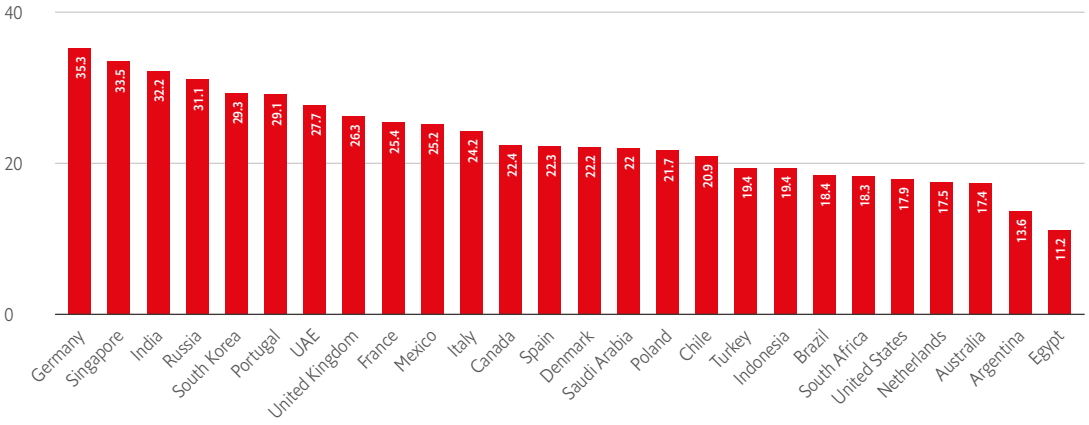
Accelerating the green transition of the labour market will require governments to improve the enabling environment around the greening of the economy. "Government really has a huge role to play," says Ermal Kapedani, head of innovation and sustainability at Ghelamco Group. "[Governments] have to set the minimum standards and reporting methods which apply to all players in a market, so that businesses are operating on a level playing field and are able to set comparable targets against clear benchmarks." This level playing field is principally mediated through regulation, which should ensure that businesses transitioning to greener business models are not penalised relative to their competitors. For example, the EU's carbon-border adjustment mechanism is set to impose a carbon price on all imports into the EU, with the goal of incentivising international suppliers to go green.[75] Similarly, the German Federal Act on the Increase of Energy Efficiency has imposed stringent regulatory requirements on companies with annual energy consumption over 7.5 GWh,

[70] https://data.oecd.org/socialexp/public-spending-on-labour-markets.htm
[71] Ibid.
[72] https://www.universityworldnews.com/post.php?story=20230725160329135
[73] https://tokyofamilies.net/2023/07/japan-spends-300-billion-yen-in-financial-aid-to-boost-science-education/
[74] https://www.adeccogroup.com/future-of-work/latest-insights/how-to-make-the-green-transition-work-for-every-worker/
[75] https://www.economist.com/finance-and-economics/2023/10/01/how-carbon-prices-are-taking-over-the-world

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Figure 11: STEM brains

Percentage of graduates from science, technology, engineering and mathematics (STEM) programmes in tertiary education (latest year available)



Source: The World Bank

with the aim of pressuring these companies to invest in improving their energy efficiency.[76] Unfortunately, regulation too often lags far behind what is needed. According to Stergios Mitoulis, associate professor at the University of Birmingham, "Environmental regulations [in the construction and infrastructure sector] are introduced slowly and fail to keep up with new technology requirements…The slow uptake of green policies is a major hurdle in the design and construction of green infrastructure."

Ultimately, collaboration between stakeholders will be the most important enabler of success

While action on the part of governments, educational institutions and the private sector will be important, it is coordination between these groups that will be most essential to bridging gaps in green skills. Governments and educators require up-to-date data from businesses on changes in demand for different skills in order to understand where gaps are emerging. The private sector, in turn, can benefit from dialogue with policymakers to discern how legislative and regulatory trends will influence the environmental requirements placed on businesses—and, as such, which green skills will be needed to satisfy them. As Simon Schmid, director of the Just Skills Hub and partner at SkillLab, explains, what is important is "having an ecosystem that enables communication and alignment between educational institutions, employers and governments".

The establishment of a forum for discussion with an explicit focus on green skills can help to foster stakeholder collaboration. To this end, Singapore's Ministry of Trade and Industry—in partnership with SkillsFuture Singapore, a government agency—has set up the Green Skills Committee which brings together industry players and training providers with the goal of developing green skills among the local workforce that are relevant to industry needs.[77] In doing so, the Committee focuses on both immediate market needs, such as equipping workers with skills in sustainability reporting, and the skills needs of emerging growth sectors, such as renewable energy and energy storage systems.

[76] https://www.allenovery.com/en-gb/global/news-and-insights/publications/update-germany-tightens-energy-efficiency-requirements-new-challenges-for-companies-and-data-centers#:~:text=Companies%20with%20an%20energy%20consumption,the%20latter%20in%20accordance%20with
[77] https://www.mti.gov.sg/Newsroom/Speeches/2023/02/Speech-by-Minister-for-Trade-and-Industry-Gan-Kim-Yong-at-Ministry-of-Trade-and-Industry

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Similarly, the Indian government has set up a Skills Council for Green Jobs to promote development of the workforce in line with the skills needs of green businesses.[78] With a governing board composed of representatives from government, business and academia, the Council is designed to facilitate close collaboration between the public and private sectors on skills development. By bringing industry and educators together under the auspices of the government, the Council is making progress on its goal of educating over 1m learners in green skills by 2025.[79]

This will play a critical role in ensuring that India's burgeoning stock of human capital—by some metrics the largest in the world—is fit to meet the needs of a greener future.[80]

Finally, the Reskilling 4 Employment (R4E) programme organised by the European Round Table for Industry brings together partners aiming to enhance upskilling and reskilling ecosystems in the EU, particularly as it navigates the green and digital transition.[81] Partnerships between businesses, governments and educational institutions will be critical in ensuring that the transition is inclusive and "just".



[78] https://thedocs.worldbank.org/en/doc/521521599688040437-0310022020/original/Indiaskillscouncil.pdf
[79] https://kpmg.com/xx/en/home/insights/2022/08/upskilling-for-the-green-economy.html
[80] https://www.ilo.org/wcmsp5/groups/public/---asia/---ro-bangkok/---sro-new_delhi/documents/genericdocument/wcms_142540.pdf
[81] https://reskilling4employment.eu/en/

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Conclusion



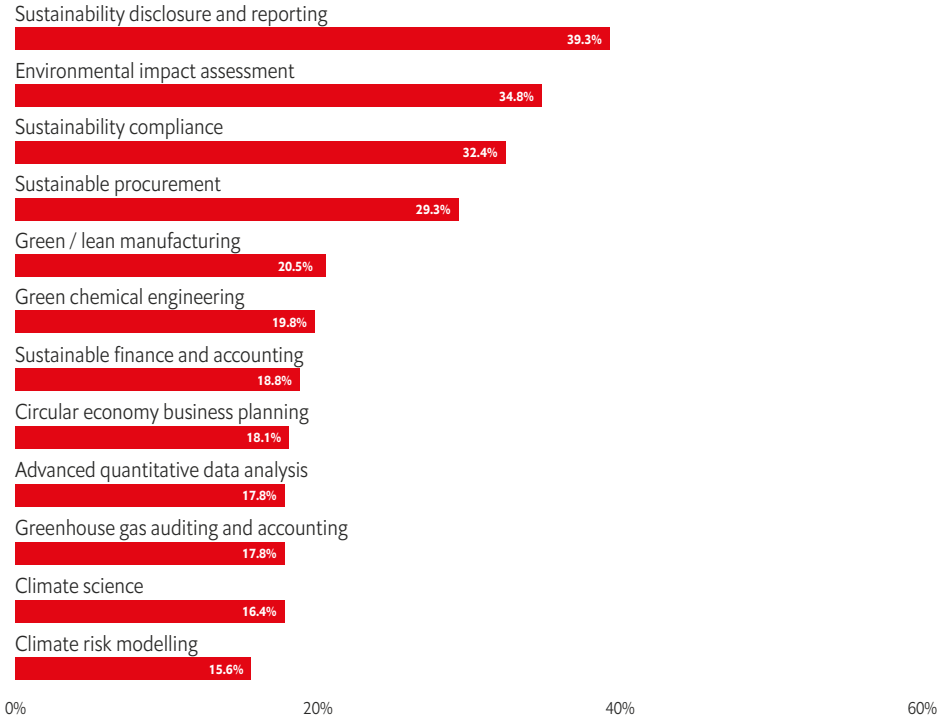
The green transition will necessitate a systemic transformation of the global economy and labour market. Compounded by several other major transitions impacting the workforce—not least, automation and the digital revolution—this is likely to have significant distributional impacts. While many workers, communities and regions will benefit, others will inevitably face significant challenges. From support for skills programmes to investment in job creation in affected communities, public sector intervention will be critical to attenuating the profound disruption that these transitions will bring. Businesses, meanwhile, will need to do more to pre-empt and respond to emerging skills gaps in order to ensure that the workforce is equipped with the skills demanded by greener business models. As the global green transition gathers pace, there is little time to lose.

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Appendix

Cross-sectoral skills

% of 1,056 respondents from all sectors who selected each of the following cross-sectoral skills and competencies as being among the most important to enabling their organisation's green transition

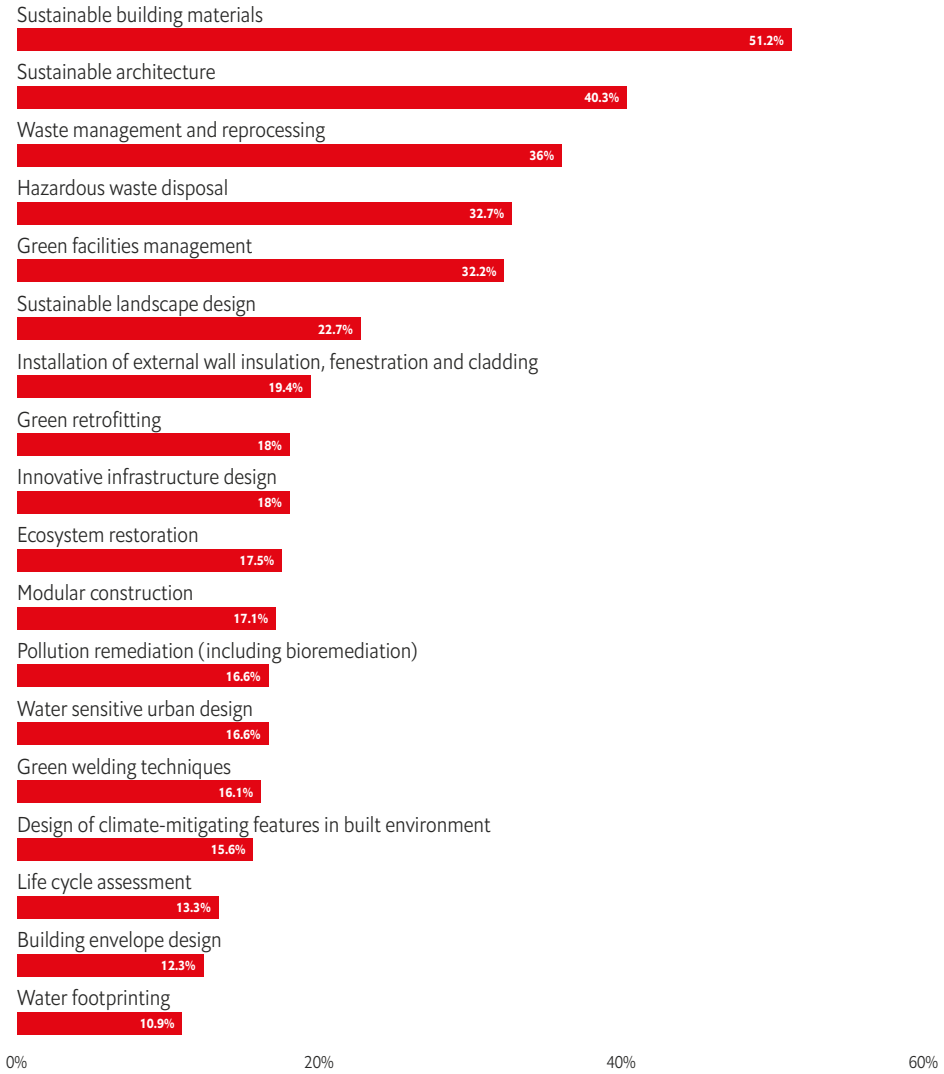


Source: Economist Impact survey

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Construction and infrastructure sector-specific skills

% of 211 respondents from the construction and infrastructure sector who selected each of the following sector-specific skills and competencies as being among the most important to enabling their organisation's green transition

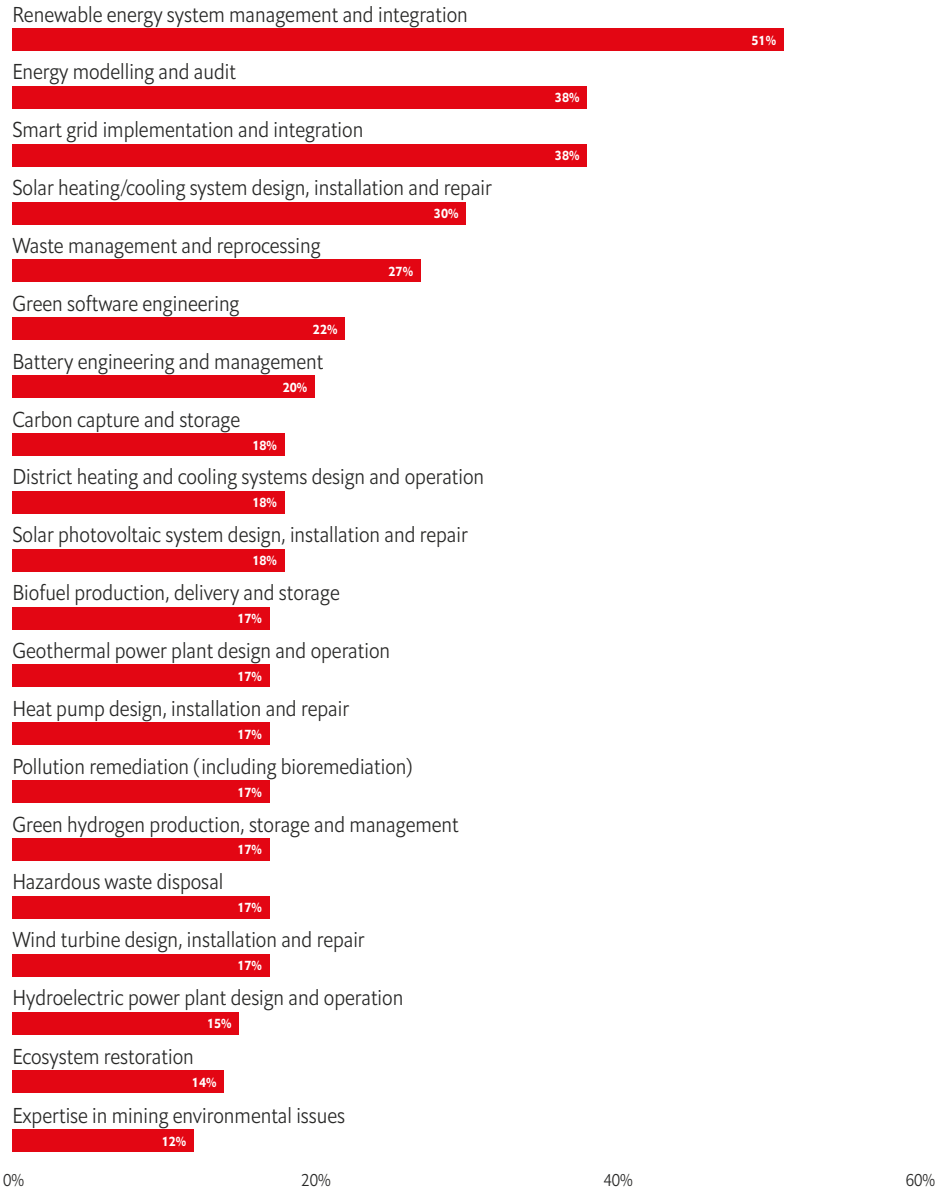


Source: Economist Impact survey

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Energy and utilities sector-specific skills

% of 192 respondents from the energy and utilities sector who selected each of the following sector-specific skills and competencies as being among the most important to enabling their organisation's green transition

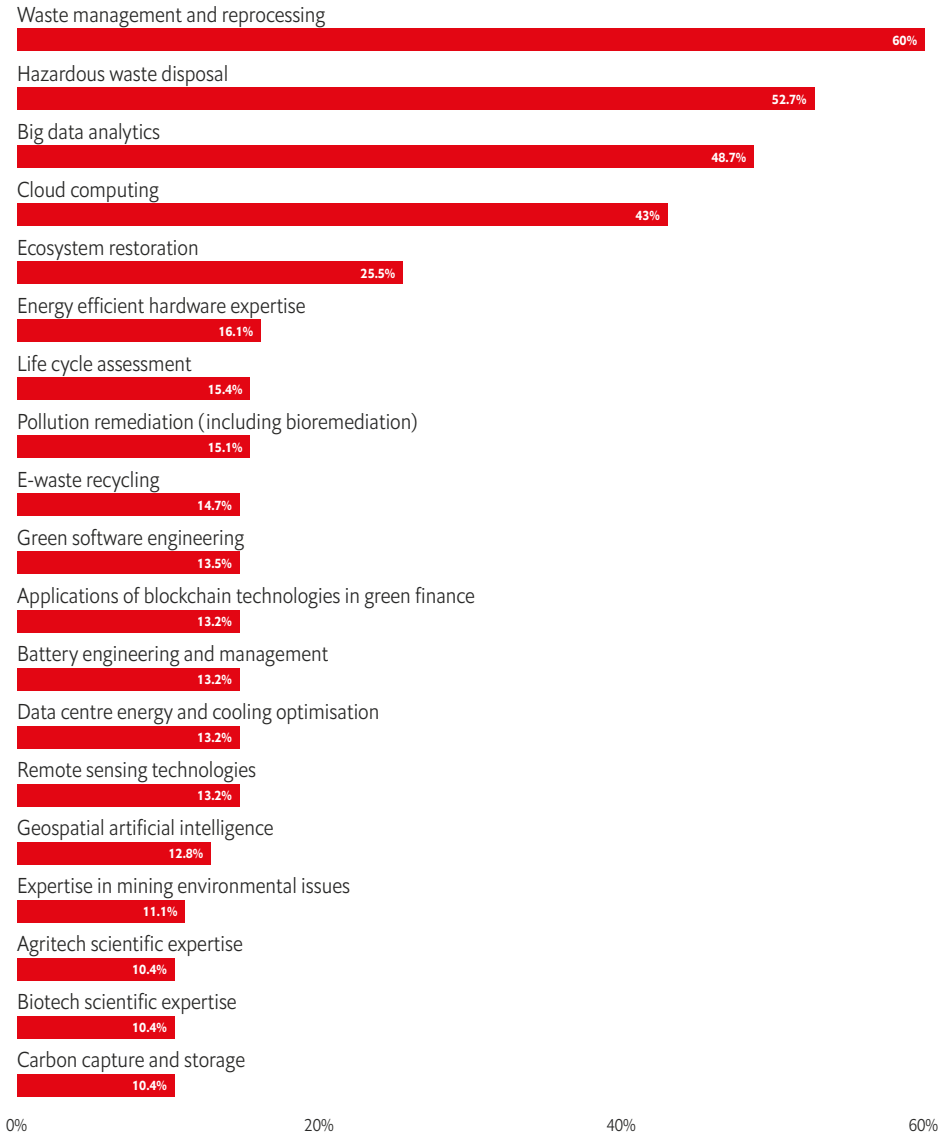


Source: Economist Impact survey

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IT and technology sector-specific skills

% of 423 respondents from the energy and utilities sector who selected each of the following sector-specific skills and competencies as being among the most important to enabling their organisation's green transition

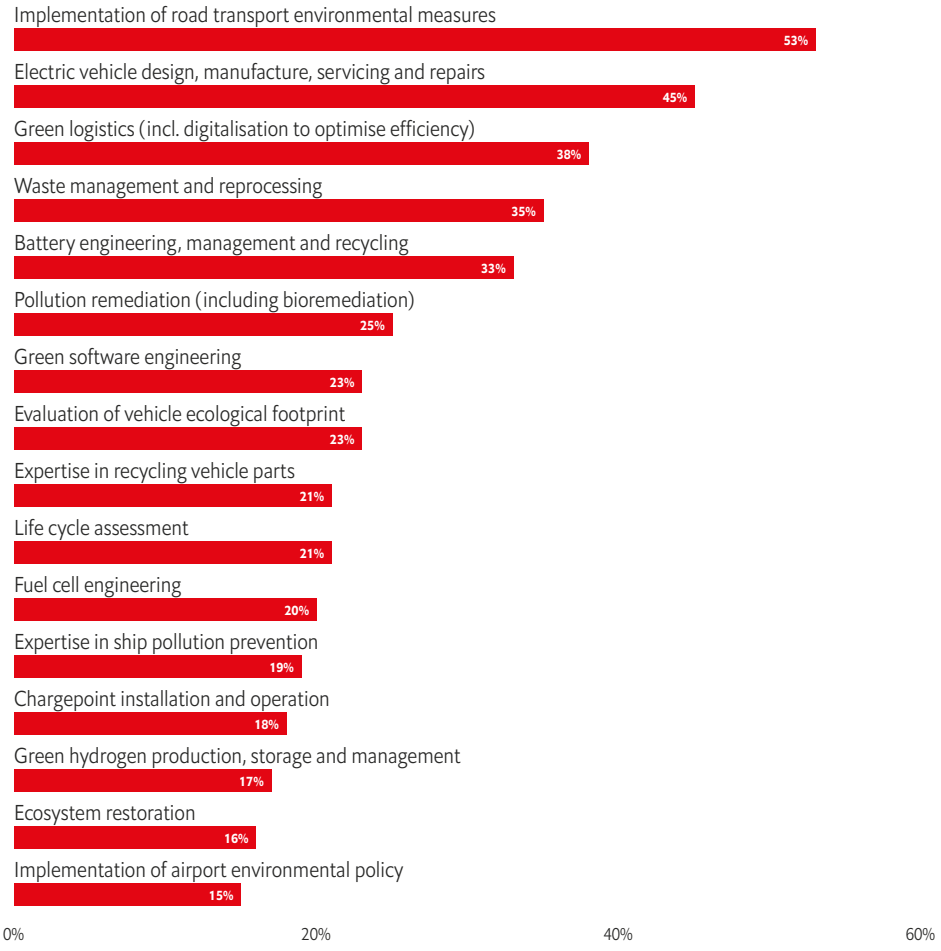


Source: Economist Impact survey

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Transport and logistics sector-specific skills

% of 230 respondents from the energy and utilities sector who selected each of the following sector-specific skills and competencies as being among the most important to enabling their organisation's green transition



Source: Economist Impact survey

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