

Global Green Skills Report 2022



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There is a massive shift underway in the global economy.

There is a massive shift underway in the global economy. In the wake of the pandemic, the world is witnessing a historic transformation in how people work, why they work and where they work. At LinkedIn, we call it the Great Reshuffle, an unprecedented moment in history where we are reimagining the future of work. People are actively acquiring new skills and pursuing new ventures. Employers are reinventing business models and creating new markets. And all of this economic upheaval, which would normally play out over the course of decades, is being compressed into a couple of years.

Amid this Great Reshuffle, we're faced with an urgent need to transition our society to a green economy to address the threat of climate change. How do we apply what we've learned from this unprecedented moment to power the enormous

transition that needs to happen to meet the climate crisis?

Achieving our collective global climate targets is a monumental task and it is going to take a whole-of-economy effort to make it happen. That means we need a transformation in the skills and jobs people have if we're going to get there. The good news is that we are already seeing a shift to green skills and jobs underway on our platform, which has nearly 800 million members around the world. Green talent in the workforce worldwide is rising. The share of green talent increased from 9.6% in 2015, to 13.3% so far in 2021 (a growth rate of 38.5%).

Jobs are a critical part of the conversation about achieving this green transition. And rightly so. We expect to see millions of new jobs created globally in the next decade driven by new climate policies and commitments. For example, in the last five years, the number of Renewables & Environment jobs in the U.S. has increased by 237%, in stark contrast to the 19% increase for Oil & Gas jobs. At this pace, the Renewables & Environment sector will outnumber Oil & Gas in total jobs on our platform by 2023.

It's more than jobs — we need to zoom in on the skills that power these jobs. Green skills. We believe real change will come through a skills-based approach to opportunity. We have seen

double-digit growth across dozens of green skills over the last five years. The fastest-growing green skills are in Ecosystem Management, Environmental Policy and Pollution Prevention. But the vast majority of green skills are being used in jobs that aren't traditionally thought of as green — such as fleet managers, data scientists or health workers.

Governments, companies, and individuals all need to come together to help transition the hiring market from focusing solely on titles and companies, degrees and schools, to also focusing on skills and abilities. We want to be a catalyst for job and skill transformations, and we have the tools to help.

This green skills report is one way we're doing our part. We leverage our unique data and labour market expertise to highlight actionable insights that are crucial to delivering a successful green transition and avoiding potential pitfalls.

I'm excited about this work and the ability to educate, inform and enable policy and investment decisions that will accelerate our transition to the green economy. LinkedIn is committed to tackling the climate change challenge. There is no more urgent one.



Ryan Roslansky
CEO, LinkedIn

If we're to deliver real change, we have to think about green roles and green skills.



At the heart of it is people. Greening the economy is a human capital issue.

We've looked at our unique global data, analysed it as only LinkedIn can, and have identified that if we're to deliver real change, we have to think about green roles and green skills.

Green skills are a critical factor in realising the success and speed of the green transition. Our data shows hiring for green skill talent is rising globally but nowhere near what's needed. In addition to diagnosing where we need to make more progress, we provide recommendations on how to close the green skills gap, upskill workers and enable the shift to more green jobs.

This report provides new data on green skills and jobs from all across the world, to empower policymakers, governments and business leaders with actionable insights to help them transition the global workforce to a green economy future.

We also analyse differences in the green transition for each country and sector, including how corporate services, manufacturing, energy and mining, public administration and construction are the sectors with the highest intensity of green skills globally. Every featured country shows green skills in at least one sector, but as economies green-up, some regions are creating green jobs across multiple sectors more than others.

We need to ensure that this transition is a just and inclusive one, as well as a sustainable one. We examine the gaps that exist across income, gender and education levels, and provide recommendations for actions that governments, organisations and individuals can take.

We can meet this challenge by working together and learning from each other. Let's get to work.

Chapter One

Green Skills & Jobs



Green skills and jobs are urgently needed to power the green transition.

We're in a time of great upheaval around the world. We are experiencing an unprecedented moment in history where we are reimagining the future of work. Governments are assessing policies, programmes and how to support constituents amid the pandemic. Business leaders are reimagining their entire working models, cultures and company values. Employees are rethinking what they do, where they do it and what it means. At LinkedIn, we call this the Great Reshuffle.

The Great Reshuffle presents us with an opportunity. We can harness this moment of change to redirect human talent to rise to the most urgent challenge facing humanity: the green transition. We cannot wait any longer to address climate change. We have to green the economy and activate the jobs, companies and policies that will power it. By capitalising on this unprecedented

moment of change to redirect human talent to accelerate the green transition, we'll have a fighting chance of meeting the climate challenge. But achieving this requires moving toward an economy that transitions workers into jobs beyond those currently considered green. New workers need to enter green and greening potential jobs, bolstered by green skills and more opportunities from employers.

The hard truth is that right now we are nowhere close to having sufficient green talent, green skills or green jobs to deliver the green transition. Based on the current trajectory of green skills growth in the labour market, we are not going to have sufficient human capital to meet our climate targets. While more workers are transitioning into green and greening jobs than are leaving, the total number of workers transitioning into those jobs is still really low. Not all jobs

Definitions

Green skills: are those that enable the environmental sustainability of economic activities

Green jobs: are those that cannot be performed without extensive knowledge of green skills

Greening jobs: can be performed without green skills, but typically require some green skills

Greening potential jobs: can be performed without green skills, but occasionally require some level of green skills

Non-green jobs: are those that do not require green skills to be performed

Green talent: a LinkedIn member who has explicitly added green skills to their profile and/or are working in a green or greening job

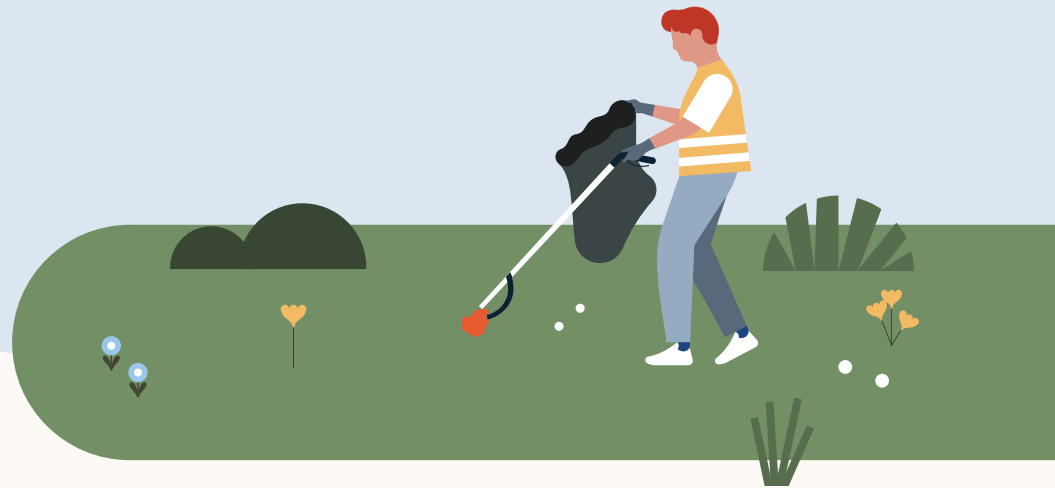
will need to be exclusively green — it's not just those building solar panels — it's the sustainable fashion manufacturer, the fleet manager, the sales manager. There is a marked lack of green skills and jobs, and this is slowing the rate at which we can green the economy.

Green skills intensity needs to increase in every sector and country to build the supply needed and meet the demand required to achieve climate goals. Some progress has been made. In 2019, the balance tipped towards green talent as the green hiring rate accelerated ahead of the overall hiring rate in most economies around the world. This means that, globally, green workers were hired at a higher rate than non-green workers. At the same time, the share of green talent in the global workforce increased from 9.6% in 2015 to 13.3% so far in 2021 (an annual growth rate of 6% and a cumulative growth rate of 38%).

Why Green Skills

Green skills are the building blocks of the green transition and the key to unlocking the human capital that will power it. We need more opportunities for those with green skills. We have to upskill workers who currently lack those skills. And we need to ensure green skills are hardwired into the skillset of future generations.

Green-skilling is needed to fuel greener jobs. To measure the current status and the recent evolution of green skills, we use LinkedIn's new green skill taxonomy to quantify the extent to which different countries, sectors and jobs use these skills. We call this **green skill intensity**.



Chapter One: Green Skills & Jobs

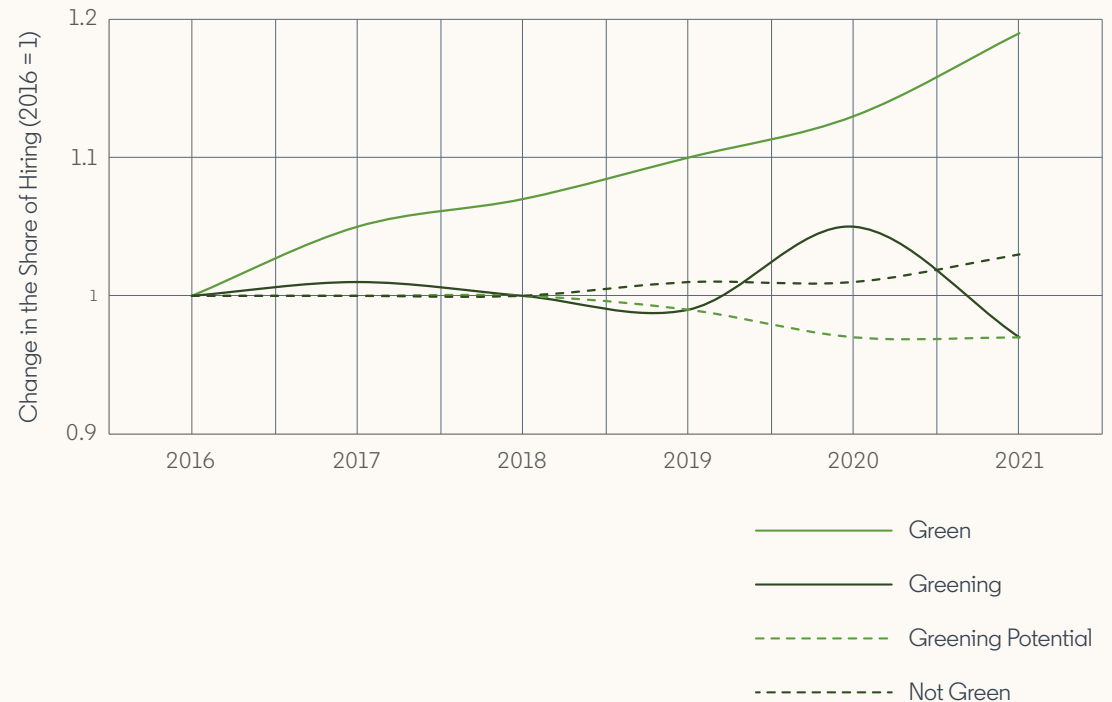
We have not made enough progress, especially when it comes to equipping workers with the green skills they need to meet this growing demand. Growth in the demand for workers with green skills has outpaced the growth in the supply of green talent. While job postings requiring green skills grew at 8% annually over the past five years, the share of green talent has grown at roughly 6% annually in the same period. This is a significant missed opportunity for the planet and for workers — one that we can begin to address immediately.

Along with **green skills intensity**, green or greening jobs are the catalyst for real-world change. Green jobs are occupations that cannot be performed without extensive knowledge of green skills. Importantly, greening or greening potential jobs are those that could be performed without green skills, but typically require some level of green skills. Chart 1 shows the growth in the hiring of green jobs, and that the hiring of green jobs in the global workforce is rising. Yet, together green and greening jobs still only account for 10% of hiring in 2021, while non-green jobs dominate at 50% of hiring (Chart 3). The share of hiring for greening and greening potential jobs is stagnating or declining, while the share of non-green jobs is still growing.

While job postings requiring green skills grew at 8% annually over the past five years, the share of green talent has grown at roughly 6% annually in the same period.

Chart 1: Change in the share of global hiring by job type

Data indexed to 2016 hiring levels

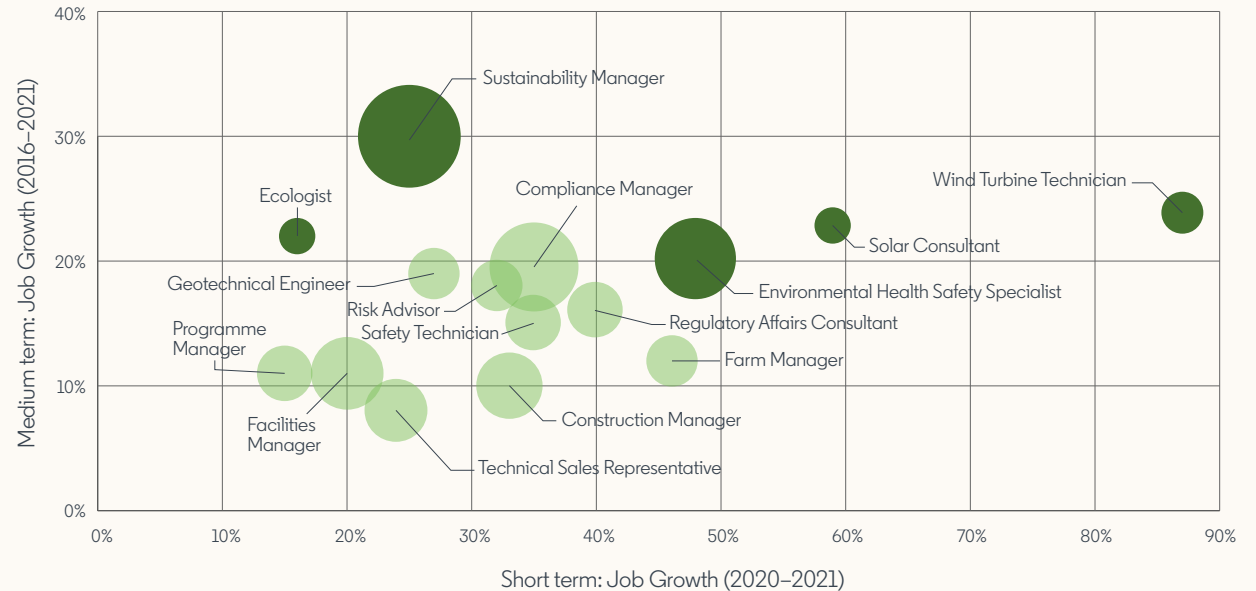


Most jobs requiring green skills are not traditional green jobs.

Chart 2 shows that the top five fastest-growing green jobs between 2016 and 2021, in terms of annual growth, are Sustainability Manager (30%), Wind Turbine Technician (24%), Solar Consultant (23%), Ecologist (22%), and Environmental Health and Safety Specialist (20%). The fastest-growing greening jobs, moreover, are less specialised and are found in a variety of sectors — including roles that range from Compliance Manager (19%) to Facilities Manager (11%) and Technical Sales Representative (8%).

We have a historical opportunity to rethink how we approach the global workforce’s transition into a greener economy, based on skills. By adding insights from new data to this challenge, we can make a plan to increase green skills intensity around the world. The workforce is ready and the planet can’t wait: the time is now.

Chart 2: Fastest-growing green and greening jobs globally



Bubble size indicates share of countries in the sample where the job was among the fastest-growing in 2016–2021. Smallest: 5%; Largest: 50%. Bubble shade indicates type of job. Dark: Green job; Light: Greening job.

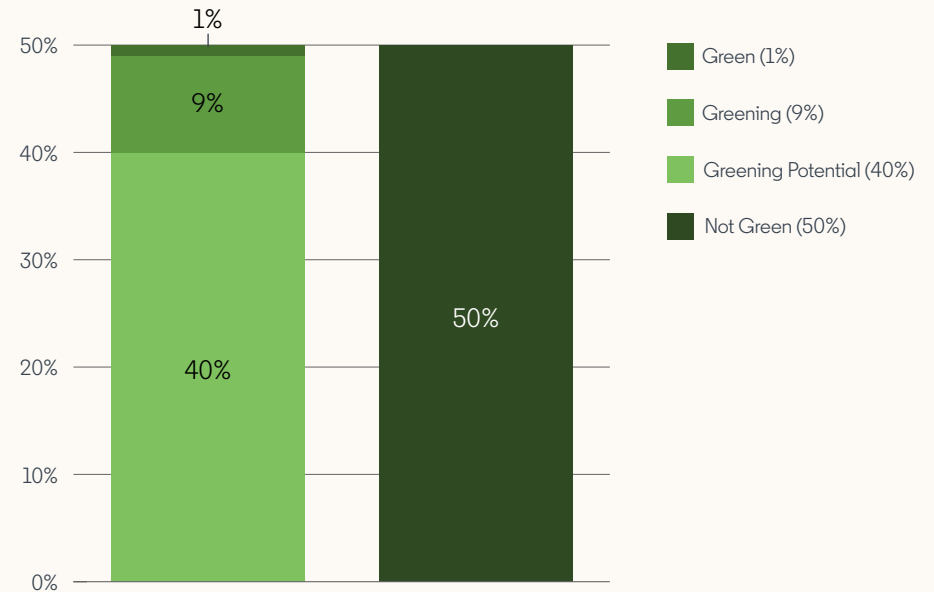
Five trends shaping the green economy

Trend 1

Demand for green talent will soon outpace supply.

In the past year, ~10% of job postings requiring skills have explicitly required at least one green skill — which is generally aligned with ~10% of the hires in the same period going to green or greening jobs (Chart 3). However, while job postings requiring green skills grew at 8% annually over the past five years, the share of green talent has grown at roughly 6% annually in the same period.

Chart 3: Share of 2021 Hiring, by job type (2021)



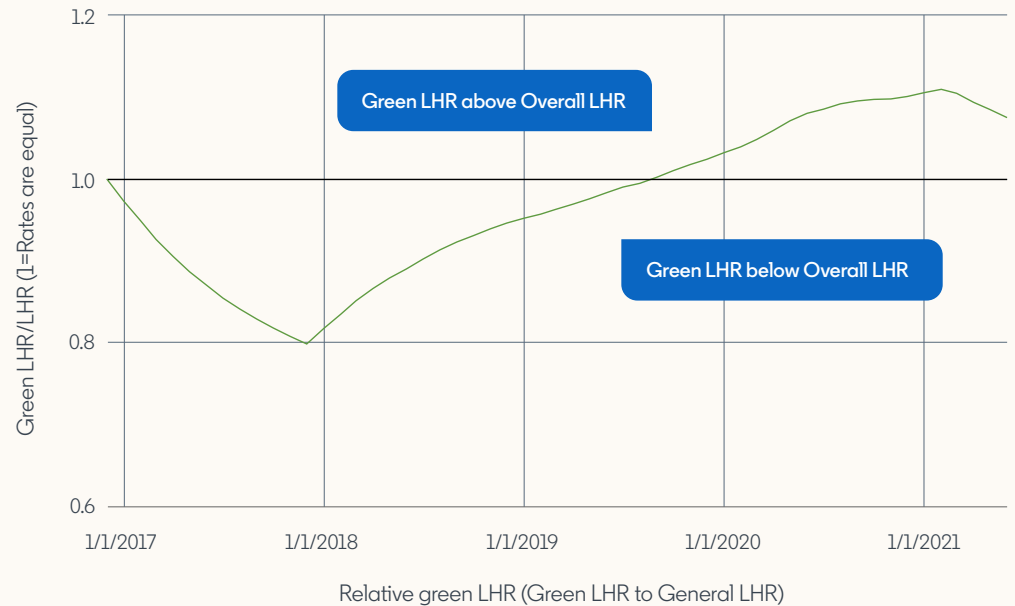
Five trends shaping the green economy

Trend 2

Hiring of green talent is accelerating faster than overall hiring.

In 2019, the hiring balance tipped towards green talent, as the green hiring rate accelerated ahead of the overall hiring rate in most economies around the world (Chart 4). This means that, globally, green workers were hired at a higher rate than non-green workers. The pandemic has accelerated this trend, which suggests that green talent has been relatively more resilient to an economic downturn than non-green talent.

Chart 4: Relative Green Hiring Rate, global



Five trends shaping the green economy

Trend 3

There's currently a good balance in the green skills that are needed.

Currently, there is a relatively good balance in the supply and demand of green skills. Half of the top 10 in-demand green skills match the most popular skills among the green workforce

Table 1: Top in-demand green skills required by employers (2021)

Skill name	Green skill category	Share of job postings requiring the skill (out of job postings requiring any green skill)
Sustainability	Sustainable Development	27.6%
Remediation	Environmental Remediation	8.8%
Occupational Safety and Health Advisor (OSHA)	Environmental Policy	8.6%
Climate	Ecosystem Management	5.6%
Renewable Energy	Renewable Energy Generation	5.4%
Environmental Awareness	Ecosystem Management	4.9%
Environment, Health and Safety (EHS)	Environmental Auditing	3.7%
Solar Energy	Renewable Energy Generation	2.6%
Corporate Social Responsibility	Environmental Policy	2.5%
Recycling	Environmental Remediation	2.1%

(Tables 1 and 2), including Sustainability, Renewable Energy, Environmental Awareness, Environment, Health and Safety (EHS), and Corporate Social Responsibility.

Table 2: Top green skills added by members (2021)

Skill name	Green skill category	Share of members who added the skill (out of members adding any skill)
Sustainability	Sustainable Development	12.6%
Environmental Awareness	Ecosystem Management	10.0%
Renewable Energy	Renewable Energy Generation	9.2%
Environment, Health and Safety (EHS)	Environmental Auditing	5.9%
Sustainable Development	Sustainable Development	5.3%
Sustainable Design	Pollution Prevention	5.1%
Environmental Science	Sustainability Research	4.7%
ISO 14001	Environmental Policy	4.2%
Environmental Management Systems	Environmental Auditing	4.1%
Corporate Social Responsibility	Environmental Policy	4.1%

Five trends shaping the green economy

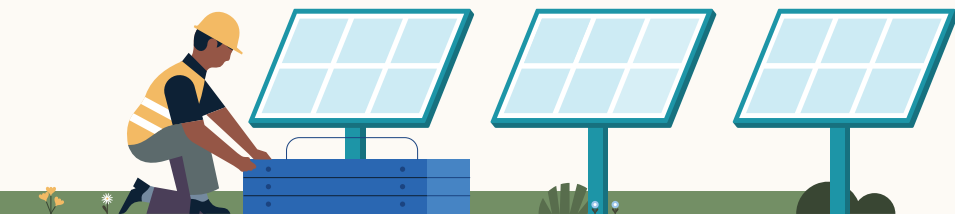
Trend 4

The fastest growing green skills are both mainstream and emerging.

Some skills in high employer demand that show relatively lower prevalence in the workforce, are Remediation, Recycling, OSHA, Climate and Solar Energy — but the last three listed are among the fastest growing skills in 2016–2020. And several of the fastest growing green skills across all sectors during the same time period were not necessarily in-demand skills, but suggest the emergence of new trends, including Sustainable Fashion, Oil Spill Response and Sustainable Business Strategies, among others (Table 3).

Table 3: Fastest-growing green skills (2016–2021)

Skill name	Green skill category	Skill growth
Sustainable fashion	Pollution Prevention	90.6%
Environmental services	Ecosystem Management	82.5%
Oil spill response	Environmental Remediation	80.4%
Climate	Ecosystem Management	68.7%
Sustainable Growth	Environmental Auditing	67.2%
Surface water	Ecosystem Management	64.5%
Occupational Safety and Health Advisor (OSHA)	Environmental Policy	57.9%
Sustainable business strategies	Pollution Prevention	56.6%
Solar systems	Renewable Energy Generation	55.5%
Sustainable landscapes	Ecosystem Management	52.9%



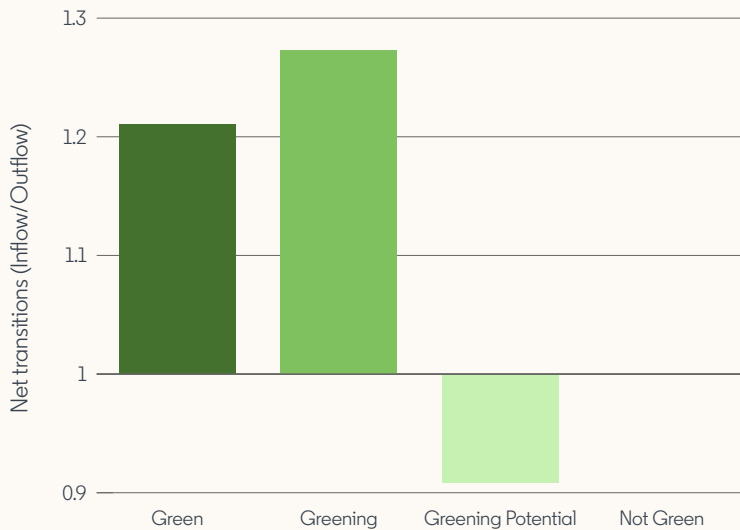
Five trends shaping the green economy

Trend 5

The volume of workers moving into green and greening jobs is too low.

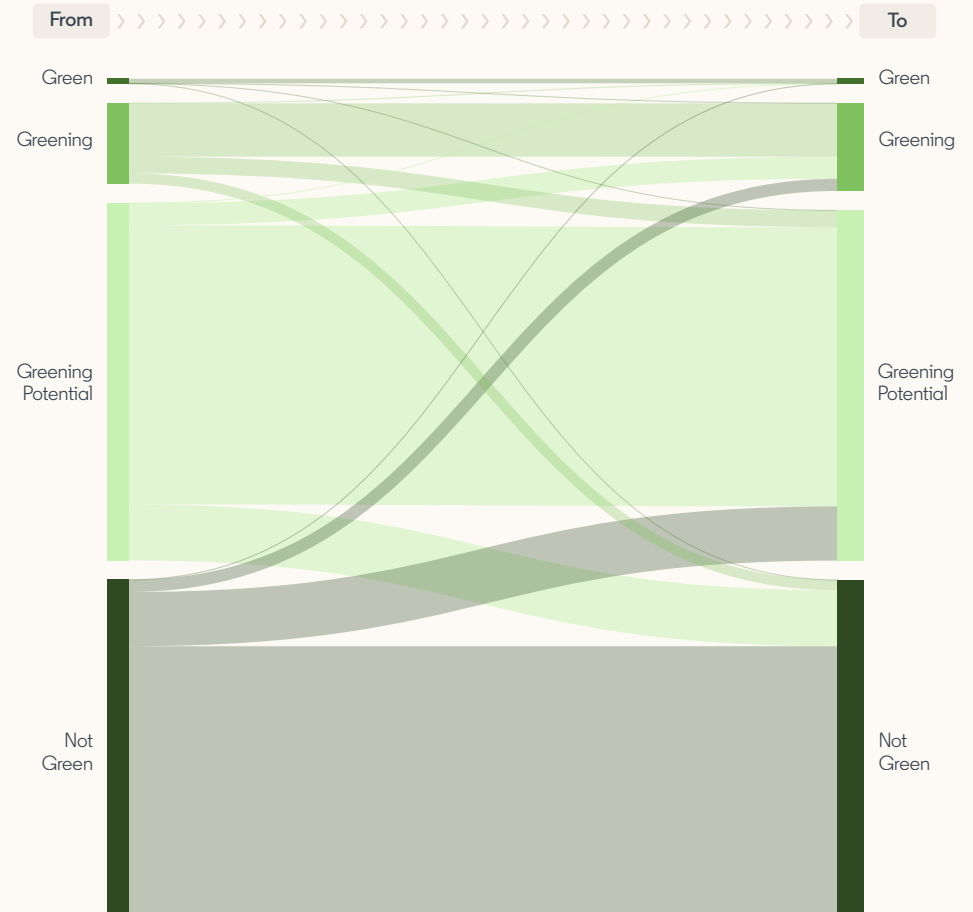
Workers are increasingly acquiring green skills and transitioning into green and greening jobs, resulting in positive net transitions into these jobs (Chart 5). However, on aggregate, the volume of transitions into green and greening roles is still too low to have a transformative impact by itself (Chart 6).

Chart 5: Global Net Job Transitions: Ratio of workers transitioning into a job type vs. those transitioning out (2016–2021)



At 1 the number of workers transitioning into a job type equal the number of workers transitioning out of that job type.

Chart 6: Global job transitions among different types of jobs (2016–2021)



Chapter Two

Country & Sector Trends



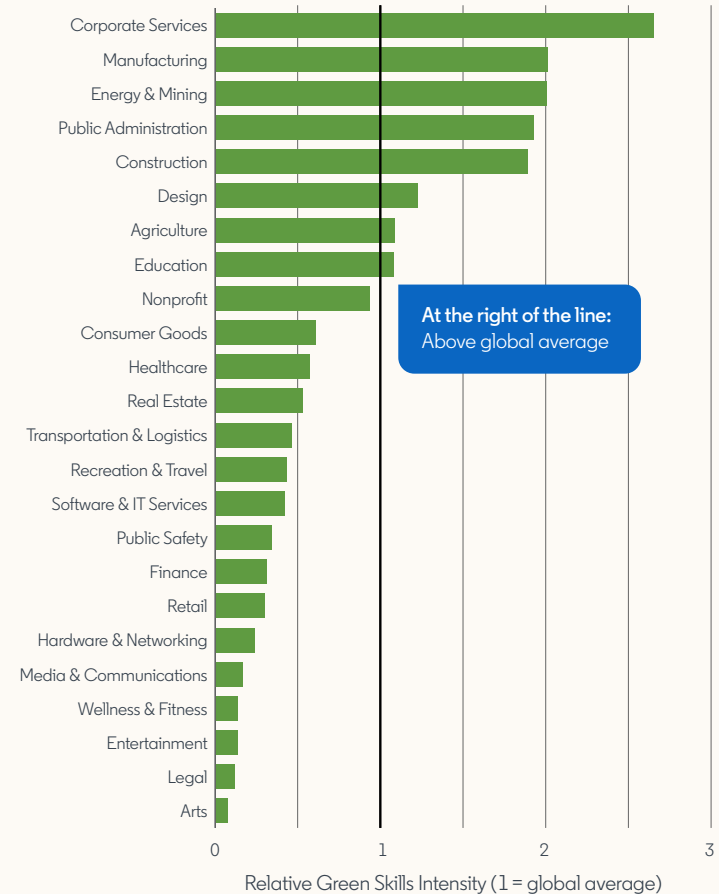
Current green talent will not meet the demand for green jobs.

Looking at the spread of talent around the world and within sectors through the lens of green skills, we can see clearly that the demand for green talent and green skills is outpacing supply. The impact of the green transition has reverberated throughout all sectors and countries across the globe — with not one left unchanged. Our insights not only highlight the scale of the challenge, but shine a light on the path forward. We can empower policymakers and business leaders with specific insights across sectors and countries, outlining the needs of the workforce and what skills are required. We're seeing early trends in how green-skilling is playing out, especially within

industries and geographies that have traditionally focused on high-emission jobs. Indications are that workers are upskilling to green their jobs. The data also shows that sectors in different countries are attracting green skills at varying paces. **Green skills intensity** needs to increase in every sector and country to build the supply needed and meet the demand required to achieve climate goals.

Chart 7 on **green skills intensity** across sectors shows that corporate services, manufacturing, energy and mining, public administration, and construction are the sectors that use the highest number of green skills across the globe.

Chart 7: Relative green skill intensity by sector



Chapter Two: Country & Sector Trends

This said, there is variation across countries — of the top 25 countries with the highest number of sectors with green skills, different countries concentrate on different sectors (Chart 8).

Chart 8: Top 25 countries with the higher number of sectors with green skills (2021)

Green skill intensity: ■ Above global average ■ Below global average

Sector	Argentina	Australia	Brazil	Canada	Chile	Colombia	France	Germany	Greece	India	Indonesia	Italy	Mexico	Netherlands	Peru	Portugal	Saudi Arabia	South Africa	Spain	Sweden	Switzerland	Turkey	United Arab Emirates	United Kingdom	United States
Agriculture	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■
Arts	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■
Construction	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■
Consumer Goods	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■
Corporate Services	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■
Design	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■
Education	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■
Energy & Mining	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■
Entertainment	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■
Finance	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■
Hardware/Networking	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■
Healthcare	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■
Legal	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■
Manufacturing	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■
Media & Comms	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■
Nonprofit	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■
Public Admin	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■
Public Safety	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■
Real Estate	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■
Recreation & Travel	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■
Retail	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■
Software & IT Services	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■
Transp. & Logistics	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■
Wellness & Fitness	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■

Chapter Two: Country & Sector Trends

Not only does the intensity of green skills vary by country and sector, but Table 4 shows how workers' job transitions are trending differently across sectors. In line with the global trend, most sectors are trending positive for the moment. However, there are five sectors showing unclear or negative trends.

Table 4: Sector trends in job transitions

Green transition trend	Sectors	Trends
Leading	<ul style="list-style-type: none"> • Agriculture • Corporate Services • Design • Energy & Mining • Manufacturing • Public Administration 	With an above-average green skill intensity, workers in these sectors are increasingly showing transitions into green/greening jobs. For every 100 workers transitioning into non-green jobs, up to 256 workers transition into green/greening jobs.
Trending positive	<ul style="list-style-type: none"> • Arts • Consumer Goods • Entertainment • Finance • Healthcare • Legal • Media & Communications • Real Estate • Recreation & Travel • Retail • Software & IT Services • Transportation & Logistics • Wellness & Fitness 	These sectors have a below-average green skill intensity, but workers are transitioning into green/greening jobs faster than workers in non-green jobs are transitioning into green/greening. For every 100 workers going into non-green jobs, up to 477 workers transition into green/greening jobs.
Unclear	<ul style="list-style-type: none"> • Hardware & Networking • Non-profit Organisations • Public Safety 	Performing below the average green skill intensity, these sectors are not showing major shifts in job transitions.
Trending negative	<ul style="list-style-type: none"> • Construction • Education 	These sectors show an above-average green skill intensity, but workers are transitioning out of green/greening jobs at a faster rate than workers in non-green jobs are transitioning into green/greening. In fact, for every 100 workers transitioning into non-green jobs, as little as 47 workers transition into green/greening jobs.

As countries go green, job opportunities emerge.

Green skills intensity is a helpful metric to understand how workers in different countries are applying green skills in their jobs. As Chart 9 on **green skills intensity** across countries shows, the average job in the United States, United Kingdom and Australia uses roughly two to three times more green skills than the average job globally.

This is the moment to turn to urgent climate action — good for the planet and good for workers. More jobs, more opportunities, even in times of global crisis. The pandemic has shown that green talent can be more resilient than non-green talent. Each region and sector must turn attention to more green skills and jobs in every corner of the world, to power the urgent transition.

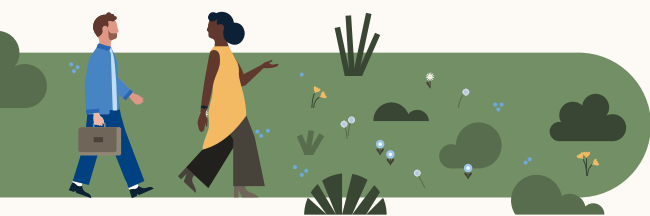


Chart 9: Relative green skill intensity by country (Top 25)



Case Study Spotlight



Exploring unique trends in the green transition

LinkedIn data makes it clear that we need to act quickly and boldly, and it shows which areas require the most urgent attention. These insights are designed to help policymakers and business leaders make evidence-based, focused decisions about the green transition. Below are five case studies that complement these insights. They have been selected to illustrate the opportunities and successes of sectors and regions around the world in rising to the climate challenge.

We applied a global lens to both a traditional and new industry and zoomed in on three success stories in three different regions to showcase how the growth in **green skills intensity** is powering positive change:

- Sustainable Fashion, while still a niche skill, was one of the fastest growing green skills globally in 2016–2020, with an average annual growth rate of 90.6%. This new trend demonstrates how an industry that has been around for thousands of years can make the shift to green.
- Green Entrepreneurship is blossoming across multiple industries. We need green innovators and entrepreneurs to bring their best new thinking to market; new ideas, new business models and new technologies. Green Entrepreneurship is on the rise and growing even faster than overall Entrepreneurship in the U.S. and worldwide.
- In the last five years, the number of Renewables & Environment jobs in the U.S. has increased by 237% in stark contrast to the 19% increase for Oil & Gas jobs. At this pace, we are predicting that the Renewables & Environment sector will outnumber Oil & Gas in total jobs on our platform by 2023.
- The need for innovative solutions to emissions reduction has influenced rapid technological change in the European automotive industry. LinkedIn data shows that the share of green talent has been increasing by 11.3% annually for the past five years — exhibiting one of the highest growth rates in green talent amongst all manufacturing sectors.
- In the Asia-Pacific, 47% of the total land area is agricultural and the region has a high concentration of countries with high **green skills intensity** in agriculture. Current trends in four countries — Australia, New Zealand, India, Singapore — show positive signs across the sector. This trend points to the potential of reducing emissions in a sector that is critical to achieving our climate targets.



The eco-awakening in fashion is showing in the workforce.

The global pandemic has heightened awareness of environmental and sustainability issues, and this trend is also showing up in the talent data.

LinkedIn data shows that Sustainable Fashion was the fastest-growing green skill globally (+90.6% on average between 2016–2020). And traditional fashion jobs, such as fashion designers, stylists and merchandisers, are increasingly applying Sustainable Fashion skills.

A broader set of jobs, beyond those typical of the Apparel and Fashion industry, are applying green skills. Beyond the traditional jobs, workers skilled in Sustainable Fashion are also active across many other industries, such as media and communications, design, arts, manufacturing, corporate services, non-profit organisations, and software and IT services.

Talent in the Apparel and Fashion industry is becoming greener, not only in fashion design hubs but also across manufacturing hubs. The share of green talent in the Apparel and Fashion industry has increased consistently at the global level since 2015. Table 5 shows that in traditional design hubs — predominantly located in Europe and North America — the share of green talent grew at 5.8% and 4.4% annually in 2015–2021, respectively. In manufacturing hubs — predominantly in Asia — the share of green talent grew by 5.9% in the same period.



Table 5: Growth of green talent in Apparel and Fashion

Continent	Compounded Annual Growth (2015–2021)
Asia	5.9%
Europe	5.8%
North America	4.4%

Key Takeaway:

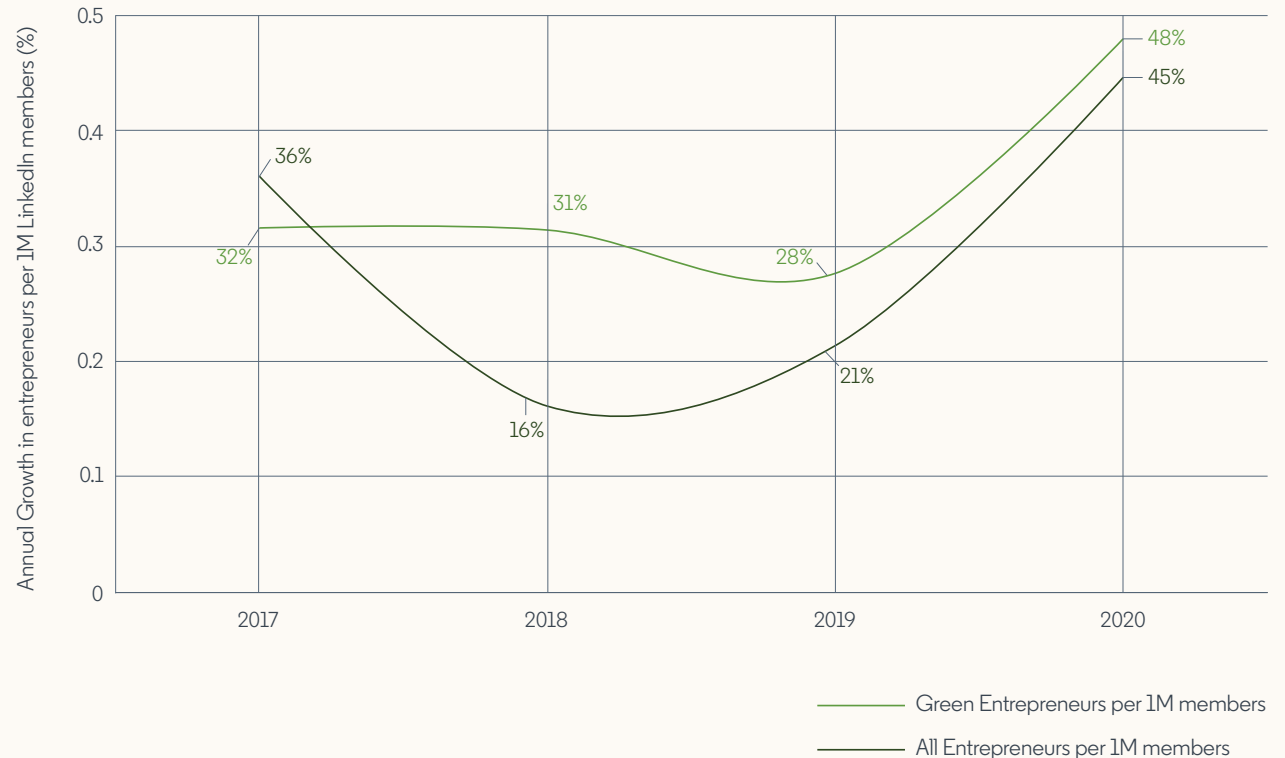
Applying green skills across all sectors, especially those that produce high emissions, has the potential to accelerate the green transition while creating new jobs globally.



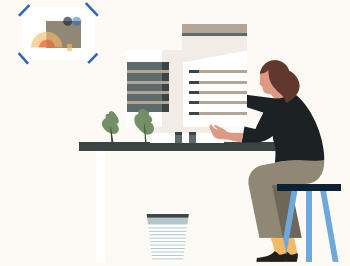
Green entrepreneurs are innovating globally and across sectors.

Green Entrepreneurship is nascent, but growing at a faster rate than overall entrepreneurship. As has been demonstrated throughout this report, we need green skills to permeate all industries and all sectors of the economy if we are to meet the climate challenge. But that's not all we need. We also need new ideas, new business models and new technologies. That means we need green innovators and entrepreneurs to bring their best new thinking to market, to power even more change. Green Entrepreneurship is on the rise, and growing even faster than overall Entrepreneurship in the U.S. and worldwide (Chart 10). While still niche, the share of entrepreneurs adding green skills to their profiles increased from 2% in 2016 to 3% in 2021, globally. Top skills being added by founders in this field are Sustainability, Renewable Energy and Sustainable Design.

Chart 10: Global growth in entrepreneurs



Green entrepreneurs are innovating globally and across sectors.



The vast majority of green entrepreneurial activity is now happening outside of traditionally green sectors. The sectors seeing the highest entrepreneurial activity amongst green founders — beyond Environmental Services and Environment & Renewables — are Software, Architecture, Design and Finance.

Europe and North America are leading the way, but emerging economies are catching up:

- **2.5% of Brazil’s startups work with Environmental Solutions and Renewables¹** — and 20% of Brazil’s startups have workers with green skills — above the global average of 18%. Besides Environmental Solutions and Environment and Renewables — where over 90% of workers have green skills — the industries with the highest share of

startups with workers with green skills are Farming (82%), Oil & Gas (74%) and Biotechnology (59%).

- **In India, for every 100 entrepreneurs, two are highly skilled in green.** With the help of top business schools preparing MBAs in sustainability careers², green Indian founders are increasingly combining tech and business skills — which represent 42% and 14% of the most representative skills amongst this talent, respectively — with green skills driving innovation across a wide range of industries. These include Farming, Oil & Gas and Automotive, where the share of startups with green talent range from 45% to 60%.
- **Mexico is driving green innovation across multiple sectors** — ranked 48 out of 141 economies in global competitiveness³ and one of the largest

economies in Latin America, LinkedIn data shows that 11% of Mexico’s startups have workers with green skills and the sectors with the highest share of startups with workers with green skills are Oil and Energy (57%), Higher Education (39%) and Automotive (26%).

Key Takeaway:

Mobilising green entrepreneurs and powering the startup engine of innovation will be essential to bring new technologies to multiple sectors and make progress on global climate goals. Fostering the growth and opportunities of green entrepreneurs, by getting these founders networked, connected and resourced, will drive the development of green talent and green economies all over the world.

1 ACE Cortex (2021) Inovação ESG

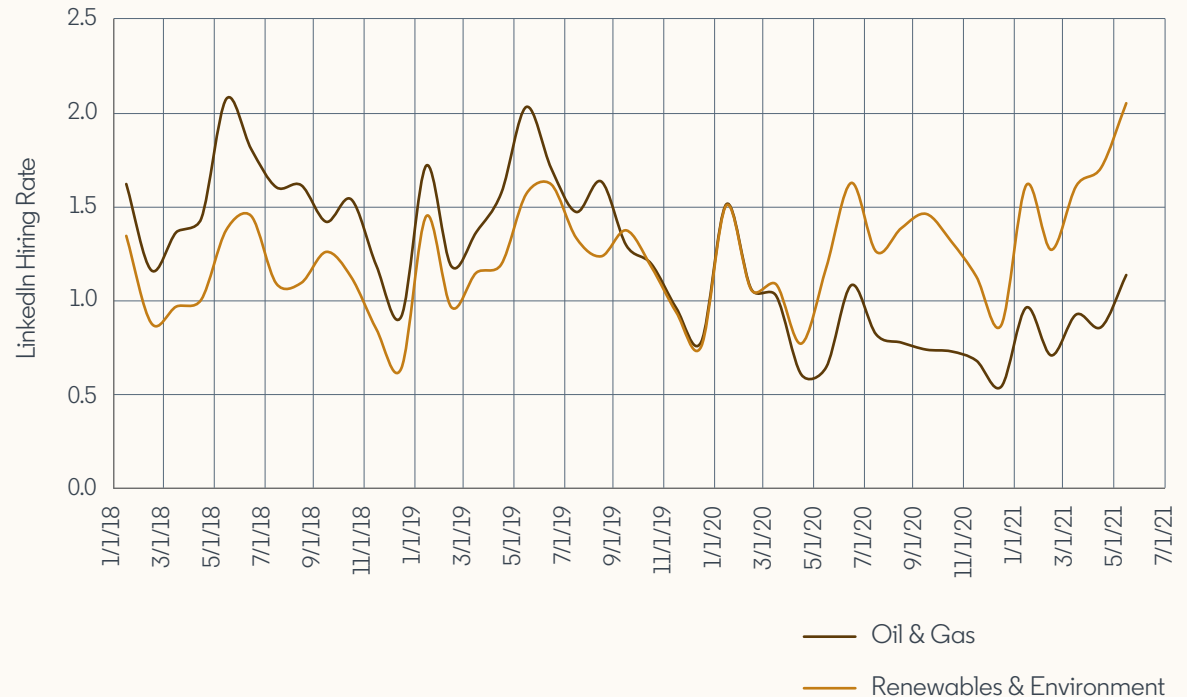
2 The Financial Times (2021), “MBA graduates take on a green hue as fewer choose fossil fuel careers”

3 World Economic Forum, [The Global Competitiveness Report 2019](#)

United States' talent shifting away from Oil & Gas and into Renewables & Environment

The United States is the country with the highest green skill intensity, and is showing that a historic shift towards green talent is underway. LinkedIn data shows that though it's the second largest emitter, the United States is the world leader in green skills application in many sectors. In particular, in the last five years, the number of Renewables & Environment jobs has increased by 237% — overtaking that of Oil & Gas in September 2019, which only grew by 19% in the same period. Chart 11 shows that, since 2019, workers have been moving away from Oil & Gas into the Renewables & Environment sector. At this pace, we are predicting that the Renewables & Environment sector will outnumber Oil & Gas in total jobs on our platform by 2023.

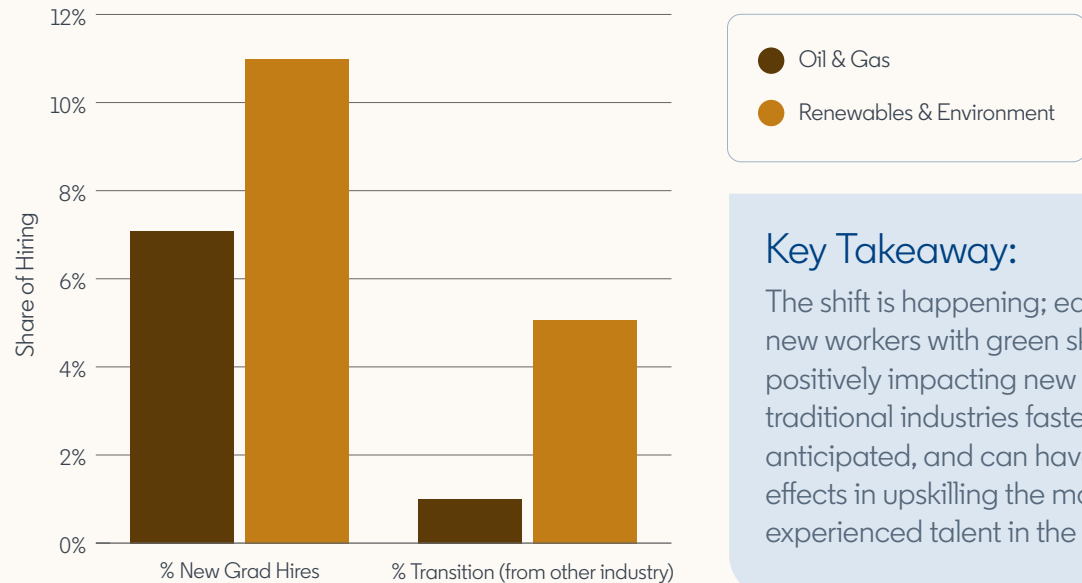
Chart 11: US monthly industry hiring rate by sector



United States' talent shifting away from Oil & Gas and into Renewables & Environment

Younger generations are making fast progress. Our data shows an opportunity for green talent growth in the US, where Generation Z is growing faster (129%) than Millennials (115%), Generation X (70%) and Baby Boomers (30%) — if the newest entrants to the workforce focus on green jobs from the start, imagine the lasting impact for the planet. Transitions into the Renewables & Environment sector are primarily dominated by the younger generations. Chart 12 shows that in 2020, hiring of new graduates was 1.6 times higher in the Renewables & Environment sector than in Oil & Gas.

Chart 12: Share of hiring of new graduates and of workers transitioning from other industries (2020)



Key Takeaway:

The shift is happening; equipping new workers with green skills is positively impacting new and traditional industries faster than anticipated, and can have ripple effects in upskilling the most-experienced talent in the industry.

Green skills are driving sustainable change in the European automotive industry.

The move to electric is reshaping the talent profile of the automotive industry.

The need for innovation to cut emissions has influenced a sustained technological change in the European automotive industry. LinkedIn data shows that the share of green talent has been increasing by 11.3% annually for the past five years — exhibiting one of the highest growth rates in green talent amongst all manufacturing sectors. Some of the fastest-growing sustainable transportation skills in the region are related to electric vehicles and energy management (Table 7).

The shift to green is happening across the entire EU. The countries benefiting from the highest share of green talent (with figures taken from June 2021) are Austria (21.4%) and Germany (20.4%). And this trend is reflected across the EU, with Romania, Slovakia and the Czech Republic seeing some of the fastest-growing annual rates

of green talent concentration in the sector between 2015 and 2021.

Creating a smooth road to green skills will drive the industry. The sector makes up 8.5% of European manufacturing jobs⁴; green skills are influencing nearly every level of the workforce. From emerging jobs at mid-skill levels, such as those related to the use and maintenance of existing vehicles, to high-skill levels, such as R&D related to designing green transport systems, green-skilling expands the current workforce and creates new opportunities.

Table 7: Fastest-growing sustainable transportation skills in the EU-27

Skill Name	Green Skills Growth, Compound Annual Growth (2015–2020)
Electric Vehicles	51.2%
Energy Storage	39.5%
Battery Management Systems	35.7%
Lithium-ion Batteries	29.6%
Electric Cars	27.6%

Key Takeaway:

The automotive industry plays a substantial role in the environment and in the improvement of air quality. Upskilling and reskilling this workforce, across all levels, will accelerate the transition and create new opportunities. Coordinated regional policies and investments will continue to be important in greening this sector and upskilling the talent in it.



⁴ [European Commission \(2021\) Automotive industry](#)

How green skills are helping the Asia-Pacific address the climate impact of agriculture



In the East Asia-Pacific, 47% of the total land area is agricultural and the region has a high concentration of countries with green skills intensity in that sector.⁵ Current trends in four countries — Australia, New Zealand, India, Singapore — show huge potential to bring lasting change to the sector and slow down the effects of one of the most polluting industries in Table 8.⁶

The share of green talent in agriculture has been increasing consistently since 2015 across these four countries. As Table 8 shows, Singapore leads with a 9.7% compounded annual growth in the share of green talent, driven by advances in Farming (including Urban Farming). Australia and Singapore (9%) meanwhile, made the largest advances in the dairy industry, while New Zealand (7.8%) led in Ranching.

Green skills related to sustainable agriculture grew consistently in 2016–2020. This is the case globally, with sustainable agriculture skills growing by 3% annually on average. But in Australia, New Zealand, India and Singapore alone, growth of these skills reached 12% annually. Related skills, such as Urban Agriculture and Precision Agriculture, also grew by 17% and 13% respectively on average, globally.

Table 8: Growth in the share of green talent by country and industry, Agriculture Sector

Country	Share of Green Talent, Compounded Annual Growth Rate (2015–2021)		
	Dairy	Farming	Ranching
Australia	9.0%	3.8%	3.1%
India	6.0%	5.5%	1.5%
New Zealand	7.1%	2.2%	7.8%
Singapore	9.0%	9.7%	1.6%

Key Takeaway:

The data points to rapid changes in agriculture. Changes that, alongside the infrastructure and urban areas being built out in many parts of the Asia-Pacific, will be critical in ensuring that developments are more resilient and better able to withstand heightened risks of climate change.

⁵ The World Bank Agricultural land (% of land area)

⁶ The United Nation Environment Programme (2019) [The huge potential of agriculture to slow climate change](#)

Chapter Three

A Just Transition

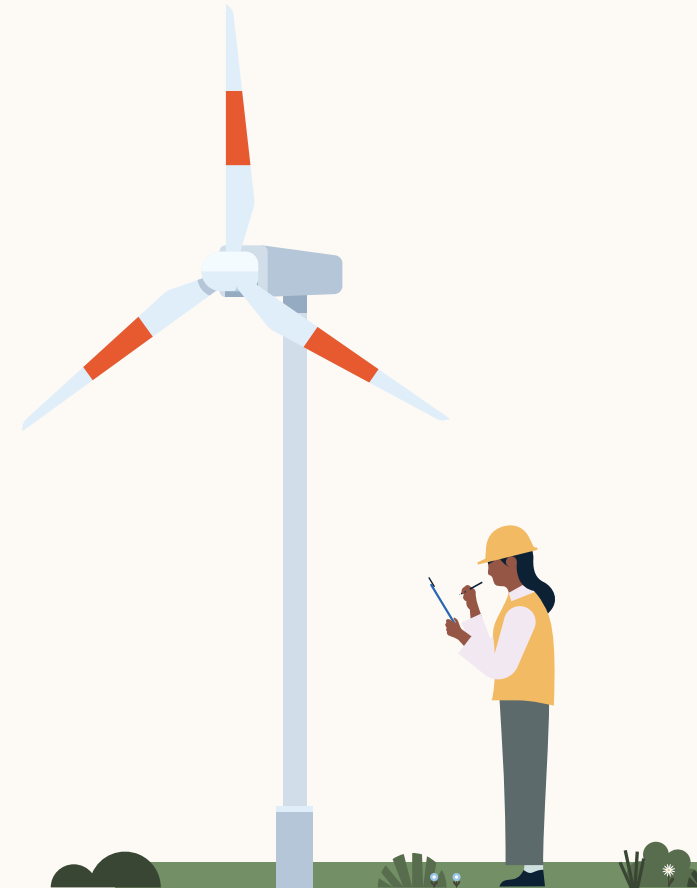


Trends blocking an equitable transition for workers and a sustainable transition for the planet

The Great Reshuffle and the green transition offer us an opportunity to ensure not only a sustainable future for the planet but an equitable and resilient one for workers too. Governments and companies must seize this opportunity to ensure a more diverse and inclusive future for all workers. However, the current trends are not going in the right direction. Our data shows that we have inequities persisting not only between countries but also along gender, demographic and educational lines.

1. **Green skilling trends vary across country-income levels.**

Countries of all income levels are exhibiting high upskilling and reskilling in broad green skills, such as Environmental Services, Organic Farming, and Environment, Health and Safety (EHS). However, while high, upper-middle and lower-middle income countries are showing growth in more niche skills — such as Sustainable Fashion, Photovoltaics and Lithium-ion Batteries — low-income countries are behind in Environmental Issues and Environmental Awareness.

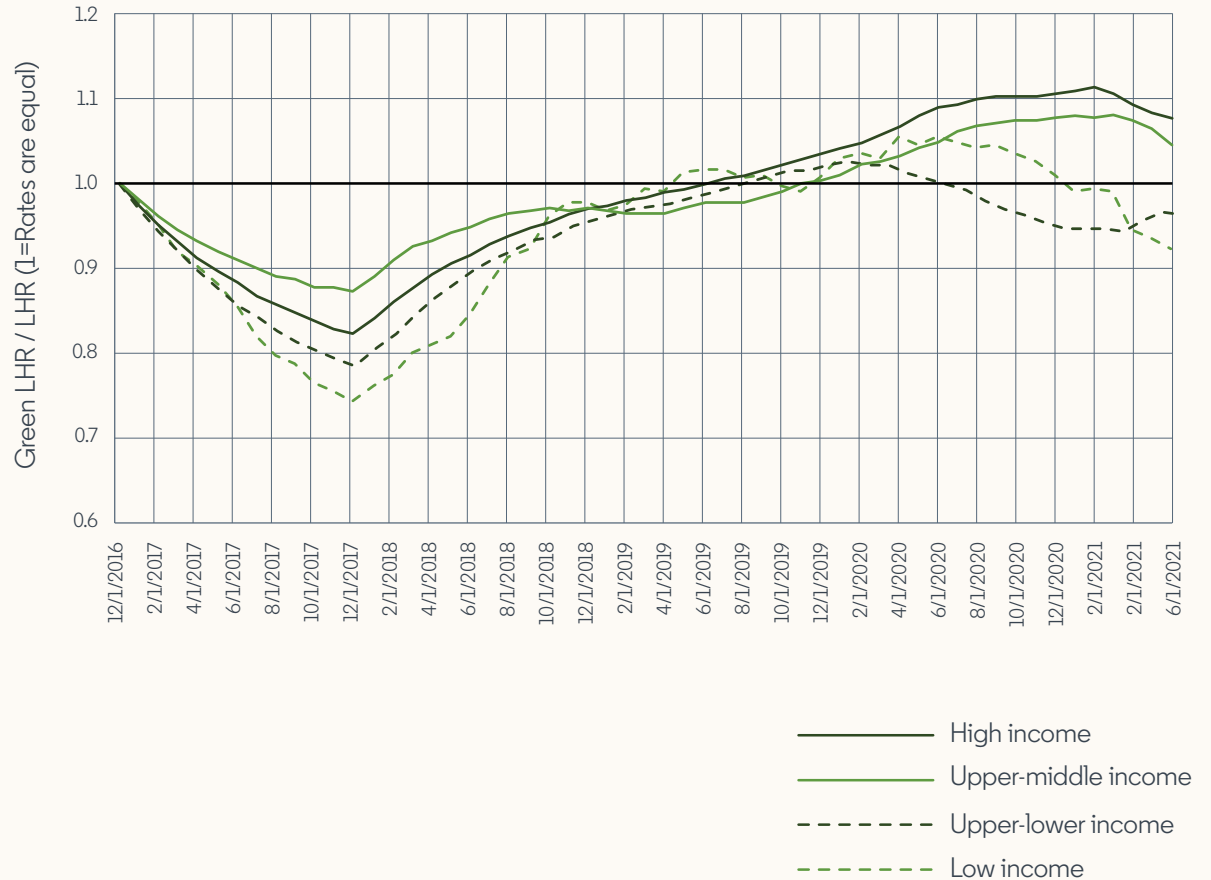


2. Country-income levels⁷ are correlated with the rate of greening.

The share of green talent grew cumulatively by 39% between 2015 and 2021 in high-income countries, 37% in upper-middle income countries; 31% in lower-middle income countries; and 18% in low income countries.

When looking at the relative green talent hiring rate — which is LinkedIn’s green hiring rate normalised by LinkedIn’s total hiring rate — we can see that high-income and upper-middle-income countries have maintained a steady green hiring rate in 2020, while lower-income countries have started to decelerate (Chart 13).

Chart 13: Relative Green Hiring Rate, by country income-level



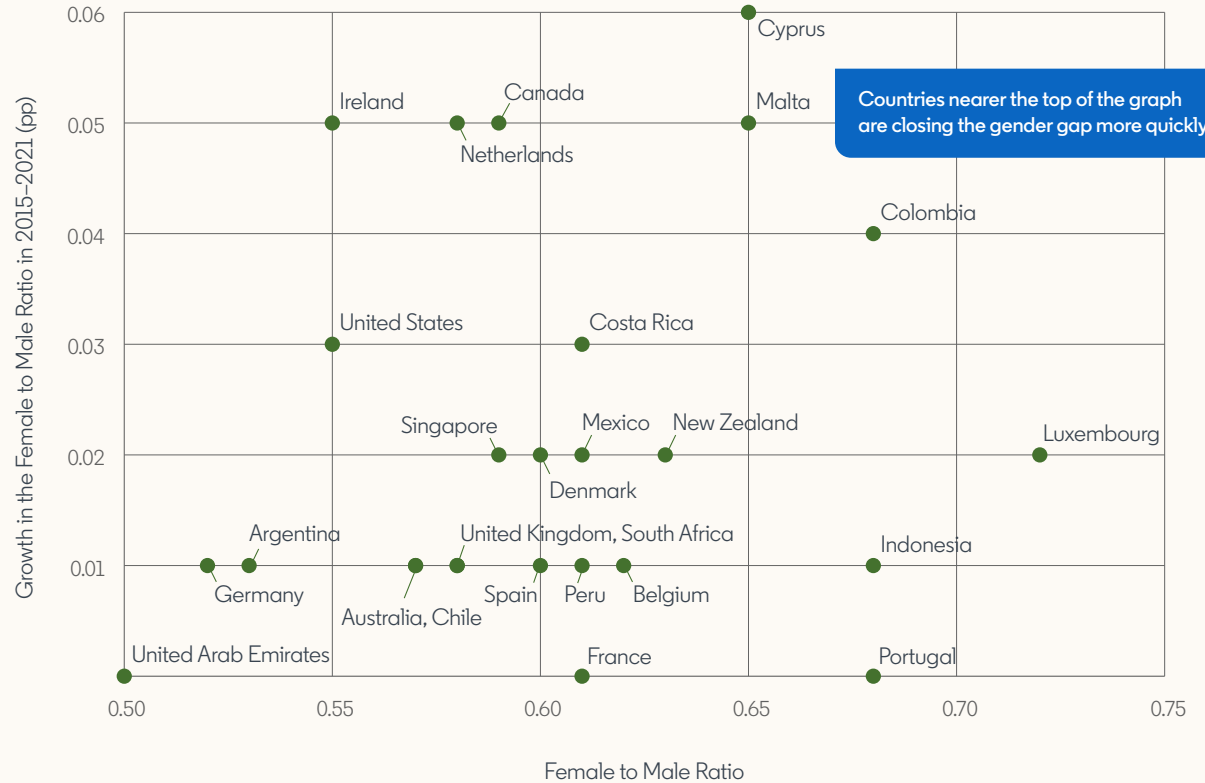
⁷ World Bank (2021) “World Bank Country Income Classification”

3. There is a green gender gap, and it hasn't improved since 2015.

Globally, in 2021 there are only 62 women for every 100 men considered green talent — a number that has been stagnant since 2015. All countries we looked at have grown their share of female green talent since 2015 — from 6.4% in 2016 to 8.9% in 2021, on average. But their share of male green talent grew at a similar pace — from 10.3% to 14.2%. Moreover, men are transitioning into greener jobs faster than women: in 2015–2021, 66% of transitions into green jobs, and 63% of transitions into greening jobs were made by men.

Despite global trends, half of the countries examined have shown some reduction in their gender gaps, as female talent is rising faster than male green talent. Chart 14 shows the top 25 countries closing the gender gap — with most of the fastest being concentrated in Europe, including Cyprus, Malta, Ireland, The Netherlands and Denmark.

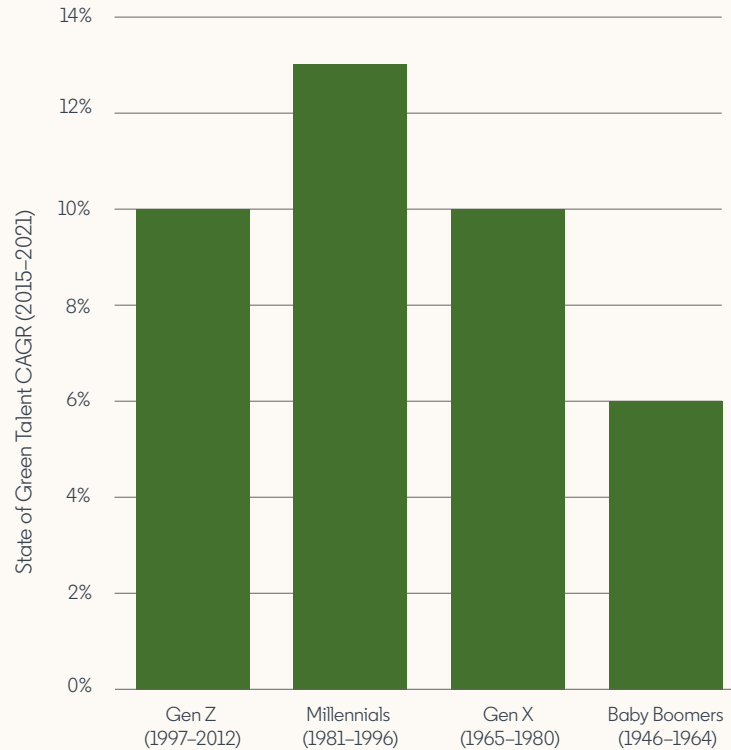
Chart 14: Top 25 countries with the fastest narrowing of the gender gap



4. Younger green talent are in pole position.

Our data shows that there is growth in green talent across all age groups in almost every country, but younger generations are showing the largest growth across the world. Globally, Millennials are leading with 13% compounded annual growth in green talent between 2015 and 2021 (Chart 15). While this represents an opportunity for newer generations to have a positive impact on greening the economy immediately and throughout their careers, it also poses a question on what targeted mechanisms should be in place to facilitate and accelerate this knowledge transfer to prevent more experienced professionals being excluded from the green transition.

Chart 15: Annual growth in the share of green talent, country average (2015–2021)



5. The share of green talent has grown among workers at all levels of education, but is growing faster among workers holding a bachelor's degree or higher.

Globally, the share of green talent among workers with a bachelor's degree or higher has grown at an average rate of 11% annually in 2015–2021, compared to 9% among workers without. However, some countries showed the opposite trend — these include some European countries such as Iceland, Slovakia, Estonia, Norway and Croatia, along with China and Peru (Chart 16).

Chart 16: Annual growth in the share of green talent by education level (2015–2021)



Chapter Four

Action Plan



The time for action is now.

Governments, companies and individuals have to come together to address the urgent climate crisis. Policymakers, business leaders and the global workforce have a shared opportunity and responsibility.

Achieving our climate targets is a monumental task and it is going to take a whole-of-economy effort to make it happen. That means we need a transformation in the skills and jobs people have if we're going to get there.

Green skills are the core of the green transition and harnessing the shift of talent. Through a targeted approach, we can progressively shift towards these greener jobs, using skills to identify jobs with the highest ability to turn sectors and countries green. We need more opportunities for those with green skills, we have to upskill workers who currently lack those skills, and we need to ensure green skills are hardwired into the skillset of future generations.

Informed by our insights and data, here are recommendations for immediate and impactful action.

Policymakers: Champion green skills and prepare the workforce for the green transition

- Take a skills-based approach to opportunity to pave the way for real change. Connect green skills, jobs and broader green economy policies, ensuring development is balanced with demand and the pace of transformation in the marketplace. Provide clarity and direction on which skills need to be developed and the types of training that will be available to prepare for the future.
- Adopt a targeted approach to progressively focus green upskilling and reskilling efforts in a given location. Integration of these insights into awareness-raising and education settings should be made a priority. Partner with experts to build training materials and promote online learning resources to equip not only entrepreneurs but also the wider community with the necessary green skills to boost employability throughout the green transition. Provide investment into training, including empowering and fostering entrepreneurship. Channel efforts into growing these bridging skillsets to accelerate the transition.
- Ensure new policies create opportunities for the equal development of green skills across all groups, supported by significant investment to ensure green-skilling opportunities are accessible to diverse groups. Consider the influence of external factors in creating potential skill discrepancies to protect vulnerable groups, then remove potential barriers, convene discussion, enable knowledge sharing and pool resources.



Business leaders: Invest in upskilling current and future green talent

- Support green upskilling and reskilling efforts through targeted investment into workforce training, through learning courses and local programmes.
- Hire diverse talent, with green skills.
- Recognise the importance of green hiring and upskilling on your talent brand — current employees and prospective candidates expect their employers to take action on climate change.
- Reimagine some open and future roles — the vast majority of green skills are being used in jobs that aren't traditionally thought of as green.
- Find or fund entrepreneurial opportunities that will help individuals identify green business opportunities, expand economies and increase **green skills intensity** in your sector or others.



Global workforce: Gain green skills to power change and compete for the best jobs

- Consider a career that allows for regular upskilling, activates your role in the green transition and enhances your future employability. Globally, members considered green talent have been relatively more resilient to economic turndowns — such as the global pandemic — than the rest of the workforce.
- Expand your networks. Green talent tends to have a more intertwined network, with 2x to 3x more LinkedIn connections on average, and follow selected topics and companies of interest — which grants them access to job opportunities and specialised content.
- Explore training programmes in your sector and online e-learning courses, as well as asking your employer what training will be made available in the short and long term.
- Stay on top of the changes in your sector to understand how your job will likely transition to become greener, and the skills and training that you will need to compete in the future.



Glossary of key terms and data descriptions

Sustainability — a situation in which economic, social and environmental goals are all achieved in balance through sustainable development.

Green economy — an economy that operates safely within planetary environmental boundaries, notably with regards to a stable climate and healthy ecosystem biodiversity.

Planetary Environmental Boundaries — concept first proposed in 2009 by scientists from the [Stockholm Resilience Centre](#) and the [Australian National University](#), its definition of a “safe operating space for humanity” is the most widely referenced precondition for sustainable development and is based on scientific evidence that human actions since the [Industrial Revolution](#) have become the main driver of global environmental change.

Sustainable growth — increase in the productive capacity of an economy consistent with development pathways necessary for a stable climate (i.e., a 1.5-degree pathway) and healthy ecosystem biodiversity, as well as

satisfying humanity’s basic needs and sharing additional wealth and benefits with reduced inequalities, in line with the UN Sustainable Development Goals (SDGs) for 2030.

Green growth — increase in the productive capacity of an economy consistent with development pathways necessary specifically for a stable climate (i.e. a 1.5-degree pathway) and healthy ecosystem biodiversity.

Transition to sustainability — a process whereby an economy becomes green (see above) as well as its society meeting basic human needs globally and providing equal opportunities according to UN principles and in line with SDGs for 2030.

Green transition — the process of evolution towards a green economy (see above) to support the goals of the Paris Agreement, to deliver net-zero emissions in order to limit climate change to 1.5 degrees. This includes structural transformation across all sector and country value chains.

Just transition — a transition which addresses the societal needs of those negatively impacted by the process or by existing inequalities.

Climate neutral and low carbon — types of economic or social activity that are either fully compatible with a green (i.e. climate-safe) economy or contributing to the process of transitioning to it becoming so (i.e. with lower GHG emissions than currently).

Adjacent and ambivalent skills — other skill categories such as digital, sector-specialised, business, or interpersonal skills that have the potential to contribute to greening the economy.

Country income levels — refers to the World Bank classification⁸ of the world’s economies into four income groups (high, upper-middle, lower-middle and low), based on GNI per capita in current USD.

Supported by a set of core data terminologies

Skills

- **Skills** — refers to the 38,000 skills that are listed on LinkedIn member profiles and have been standardised by expert taxonomists.
- **Green skills** — are those (out of the 38,000 listed on LinkedIn) that enable the environmental sustainability of economic activities. Examples include skills in pollution mitigation and waste prevention, environmental remediation, sustainable procurement, energy generation and management, etc.

Green jobs

- **Green jobs** — are occupations that cannot be performed without extensive knowledge of green skills. Skills are used as a signal for whether the greening of the economy is the primary focus of the occupation. In these jobs workers have the highest **green skills intensity** as green knowledge needs to be extensive. Examples include sustainability specialists and solar consultant.

- **Greening and greening potential jobs** — are those that *could* be performed without green skills, but typically require some level of green skills. The main distinction between greening and greening potential comes from the level of **green skills intensity** in the occupation, with greening job workers having a higher **green skills intensity** than greening potential ones. Examples include HVAC technicians, logistics managers and construction workers.
- **Non-green jobs** — are jobs that do not require green skills to be performed.

Green talent — A LinkedIn member is considered green talent if they have explicitly added green skills to their profile and/or they are working in a green or greening job (both of these job categories require a relatively high intensity of green skills).

Hiring rates

- **LinkedIn Hiring Rate or Overall Hiring Rate** — a measure of LinkedIn members who added a new employer in the same period

a job began, relative to the total number of LinkedIn members in the location.

- **LinkedIn Green Hiring Rate** — focuses on new hires who are green talent.

Fastest-growing jobs — jobs that have experienced very high hiring growth in 2016–2021, or during COVID (2020–2021).

Career transitions — LinkedIn member-reported transitions over a five-year period, from one type of job to another new job that the member has never previously held. First jobs, new graduates and intra-job type transitions are excluded.

Premium job postings — LinkedIn’s paid jobs, posted by companies.

Glossary of key terms and data descriptions

This body of work represents the world seen through LinkedIn data, drawn from the anonymised and aggregated profile information of LinkedIn's 774+ million members around the world. As such, it is influenced by how members choose to use the platform, which can vary based on professional, social and regional culture, as well as overall site availability and accessibility.

In publishing these insights from LinkedIn's Economic Graph, we want to provide accurate statistics while ensuring our members' privacy. As a result, all data show aggregated information for the corresponding period following strict data quality thresholds that prevent disclosing any information about specific individuals.

Skills

Skills are the main building blocks of the insights in this report. They are sourced from LinkedIn members (skills explicitly listed on member profiles, or inferred from other aspects of members' profiles, such as job titles, fields of study, etc.) or from job postings.

Skill names are standardised by expert taxonomists into approximately 38,000 skills, categorised into 249 skill groups, and subsequently annotated to identify the following categories: tech skills, disruptive tech skills (these first two can be combined into digital skills), sector-specialised skills, business skills, soft skills and green skills.

Skill genome

For any entity (occupation or job, country, sector, etc.), the skill genome is an ordered list (a vector) of the 50 'most characteristic skills' of that entity. These most characteristic skills are identified using a TF-IDF algorithm to identify the most representative skills of the target entity, while down-ranking ubiquitous skills that add little information about that specific entity (e.g., Microsoft Word).

TF-IDF

TF-IDF is a statistical measure that evaluates how representative a word (in this case a skill) is to a selected entity. This is done by multiplying two metrics:

1. The term frequency of a skill in an entity ('TF').
2. The logarithmic inverse entity frequency of the skill across a set of entities ('IDF'). This indicates how common or rare a word is in the entire entity set. The closer IDF is to 0, the more common a word is.

So, if the skill is very common across LinkedIn entities, and appears in many job or member descriptions, the IDF will approach 0. If, on the other hand, the skill is unique to specific entities, the IDF will approach 1.

Details available at [LinkedIn's Skills Genome](#) and [LinkedIn-World Bank Methodology](#) note.

Skill intensity

Based on the skill genome of an entity, skill penetration shows the 'intensity' of a set of skills that we call 'skill groups' or 'skill categories' (e.g., digital literacy, green) in that entity.

Skill intensity/penetration rates are calculated at an aggregated entity level (usually occupation

Glossary of key terms and data descriptions

or job, but also can be done at the country, company or sector level), for example, if ‘green skills’ are five of the 50 skills in the skill genome vector for an occupation, the **green skills intensity** for that entity is 10%.

Green skills

Green skills are those that enable the environmental sustainability of economic activities, such as skills in pollution mitigation and waste prevention, environmental remediation, sustainable procurement, energy generation and management, etc. ‘Core’ green skills (such as recycling) are most directly related to these sustainability-promoting activities; ‘ambivalent’ green skills (such as fleet management) may or may not be used for sustainability and ‘adjacent’ green skills (such as biology) can support acquisition of core and ambivalent green skills.

Jobs or occupations

LinkedIn member titles are standardised and grouped into approximately 15,000 occupations. These are not sector or country specific. These occupations are further

standardised into approximately 3,600 occupation representatives. Occupation representatives group occupations with a common role and specialty, regardless of seniority.

Green jobs or occupations

A **‘green’ job (technically, occupation representative)** is an occupation representative that cannot be performed without extensive knowledge of green skills. Skills are used as a signal for whether the greening of the economy is the main/primary focus of the occupation representative, in any sector where the occupation representative may exist. ‘Green’ jobs are those occupation representatives that have the highest **green skills intensity**, to capture the fact that green knowledge needs to be extensive.

– E.g., sustainability specialist, solar consultant.

A **‘greening’ job or a ‘greening potential’ job (technically, occupation representatives)** is an occupation representative that could be performed without green skills, but typically

requires some level of knowledge of green skills. Skills are used as a signal for whether the occupation representative’s main function is different from greening the economy in any sector. The main distinction between ‘greening’ and ‘greening potential’ comes from the level of **green skills intensity** typically encountered in the occupation representative, with greening occupation representatives typically having a higher **green skills intensity** than greening potential ones.

– E.g., HVAC technician, logistics manager, construction worker.

Non-green job (technically, occupation representative) is an occupation representative that does not require green skills to be performed.

Green talent

A LinkedIn member is considered **green talent** if they have explicitly added green skills to their profile and/or they are occupied in a green or greening occupation representative (both of these categories have a relatively high intensity of green skills).

Glossary of key terms and data descriptions

LinkedIn Hiring Rates

LinkedIn Hiring Rate or Overall Hiring Rate

is a measure of hires normalised by LinkedIn membership. It is computed as the percentage of LinkedIn members who added a new employer in the same period the job began, divided by the total number of LinkedIn members in the corresponding location.

LinkedIn Green Hiring Rate is computed following the overall hiring rate methodology, but only considering members classified as green talent.

Fast-growing jobs

A **fast-growing job** (technically, occupation representative) is an occupation representative that has exhibited very high growth in hiring over a period of time. Emerging jobs are identified over the last five years by ranking the Compound Annual Growth Rate (CAGR) of the hiring of a job in that time period.

For data quality and robustness reasons, the methodology requires minimum thresholds of hiring to ensure the growth rate is not originating from a very low base, and a minimum Herfindahl-Hirschman (HHI) for company hiring concentration to remove cases where the hiring of some jobs is overly concentrated in a small number of companies. Moreover, members who joined LinkedIn after the beginning of the time period are excluded, to account for platform growth and membership engagement.

Career transitions

Career transitions are computed by aggregating member-level job (technically, occupation representatives) transitions over a five-year period, from one occupation representative to a new occupation representative that the member has never previously held. To maximise signal capture, first occupations by new graduates and intra-occupation transitions are excluded.

Geographic coverage

In order to ensure the highest data quality of our analysis, we only included analysis of countries where LinkedIn has the strongest and most representative data. This report selected 50 countries: Argentina, Australia, Austria, Belgium, Brazil, Canada, Chile, China, Colombia, Costa Rica, Croatia, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, India, Indonesia, Ireland, Israel, Italy, Latvia, Lithuania, Luxembourg, Malta, Mexico, Netherlands, New Zealand, Norway, Peru, Poland, Portugal, Romania, Saudi Arabia, Singapore, Slovakia, Slovenia, South Africa, Spain, Sweden, Switzerland, Turkey, United Arab Emirates, United Kingdom, United States.

LinkedIn  Economic Graph