Sustainability and AI

Workforce Signals from the Twin Transition

Rosie Hood

Lead Data Scientist, EMEA
LinkedIn Economic Graph
Research Institute

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KEY FINDINGS

Sustainability and AI: Workforce Signals from the Twin Transition focuses on sustainability and AI as a twin transition, and how the two are interacting to evolve both workforces. In this article, we discuss the role of AI for sustainability that is supporting the further development of the green economy, exploring how AI is enabling green workers to advance in energy efficiency, climate solutions, and resource management. We also examine workforce trends in sustainable AI, that is, AI's contributions to climate change, emphasizing the importance of developing green skills among AI professionals and the workforce that supports AI's growth.

By prioritizing these competencies, we address the need for a workforce that is both technically proficient and skilled in sustainability. Throughout, our analysis centers on the workforce perspective, considering how targeted training and upskilling are essential to bridging these two transitions. In doing so, we aim to produce an overview of these workforces and contribute actionable insights on preparing workers to both develop and apply AI technologies for a sustainable future.

INTRODUCTION

As the world grapples with climate change and rapid technological advancement, two powerful forces are emerging to reshape global industries: the green transition and the rise of artificial intelligence (AI). This twin transition is not only transforming how we produce and use energy, but also redefining the skills and roles required across the workforce. At their intersection lies both a challenge and an opportunity: how to ensure that innovation in and with AI supports, rather than hinders, a more sustainable future.

By analyzing workforce trends and skills development across countries from LinkedIn's 1.3+ billion members, we examine the dynamic relationship between AI and sustainability, exploring how targeted training and new tools are enabling workers to help build a greener, more resilient economy.

AI ADOPTION IN THE GREEN ECONOMY WORKFORCE

In this section we focus on the ways in which AI can be used to support the green economy. We examine the growth and diffusion of AI skills among the green talent pool and an industry with important ramifications for climate: utilities and the green energy sector.

LinkedIn's skills taxonomy categorizes AI skills into two groups: AI engineering and AI literacy skills. AI engineering skills refer to the technical expertise and practical competencies required to design, develop, deploy, and maintain artificial intelligence systems, and AI literacy skills refer to the knowledge, abilities, and critical thinking competencies needed to understand, evaluate, and effectively interact with artificial intelligence technologies[1]. Examples of AI engineering skills that members add include skills like image processing, machine learning, classification, computer vision, and neural networks, and examples of AI literacy skills include ChatGPT, prompt engineering, Midjourney, GitHub Copilot, and Microsoft Copilot.

AI engineering and AI literacy skills are increasingly important in the green economy, enabling faster innovation and smarter infrastructure. For example, generative AI is accelerating the discovery of sustainable battery materials by identifying promising chemical compounds. while companies like LineVision use AI to optimize power line throughput, enhancing grid efficiency and resilience.

These applications highlight how AI is driving both environmental and operational sustainability across energy, materials, and infrastructure sectors. Recognizing these skill distinctions is essential, as the growing adoption of both AI engineering and literacy skills enables green workers across sectors to be more productive, efficient, and innovative.

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[1] Hood et al. (2025). AI Data Partnerships - LinkedIn Methodology. LinkedIn's Economic Graph.

Table 1: The top AI skills added by green talent globally and the fastest growing AI skills added by green talent globally

Rank	Top AI Engineering Skills	Top AI Literacy Skills	Fastest growing AI Skills (By Year-over-Year Growth)
1	Artificial Intelligence	ChatGPT	Responsible AI (+517%)
2	Machine Learning	Prompt Engineering	LangChain (+379%)
3	Deep Learning	Generative AI Tools	Large Language Models (LLM) (+219%)
4	Generative AI	Microsoft Copilot	Prompt Engineering (+197%)
5	Natural Language Processing (NLP)	AI Prompting	Chatbot Development (+171%)
6	Computer Vision	Google Gemini	ChatGPT (+171%)
7	TensorFlow	GPT-4	Machine Learning Algorithms (+165%)
8	Large Language Models (LLM)	Midjourney	Generative AI (+142%)
9	PyTorch	GitHub Copilot	Applied Machine Learning (+129%)
10	Image Processing	Stable Diffusion	Artificial Intelligence (AI) (+114%)

Table 1 shows the top AI engineering and AI literacy skills added by green talent globally[2], as well as the fastest growing AI skills (by year-over-year growth). Common skills added by green talent that are AI engineering skills include AI, machine learning, deep learning, and generative AI. In terms of AI literacy, green talent is upskilling in ChatGPT, prompt engineering, generative AI tools, and Microsoft Copilot. These skills are also commonly added by AI talent; thus, green talent is upskilling in the latest AI trends and technology.

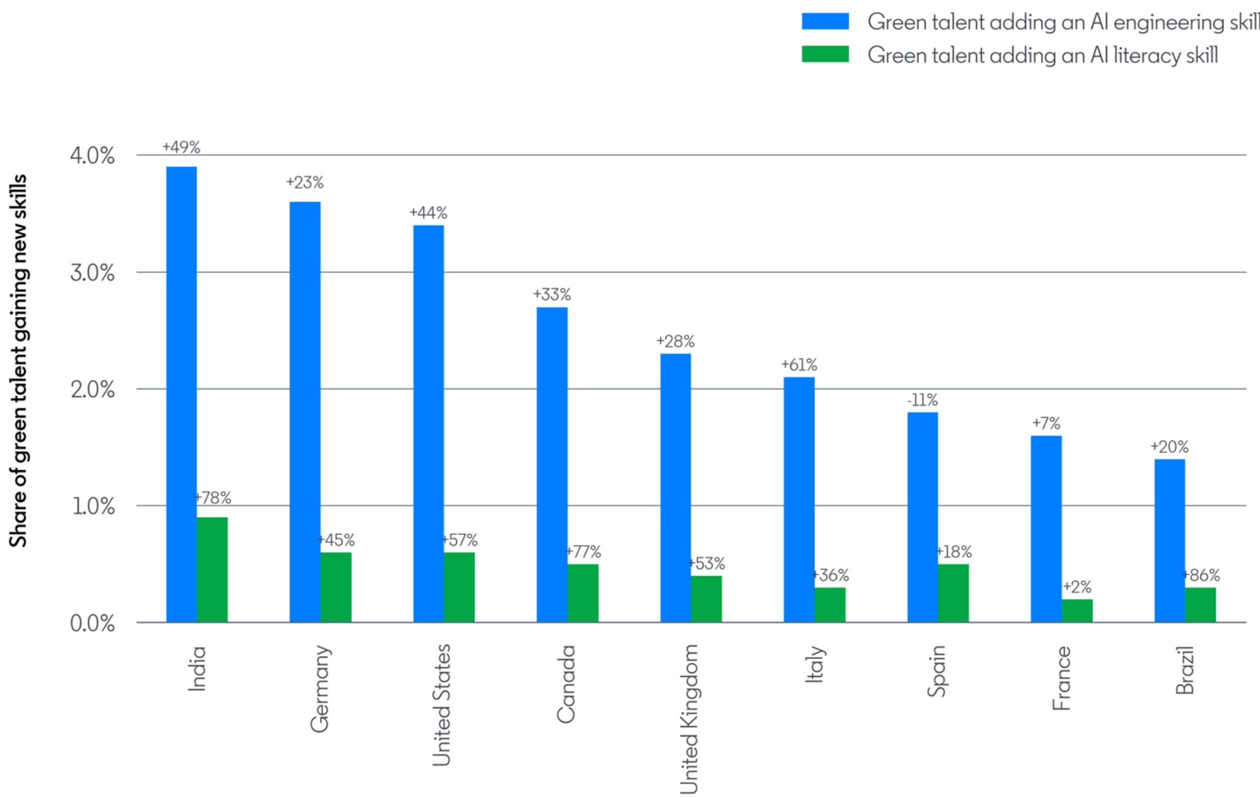
The fastest growing skills among green talent are responsible AI (up 517% YoY), LangChain (up 379% YoY), large language models (up 219% YoY), prompt engineering (up 197% YoY), chatbot development (up 171% YoY), and ChatGPT (up 171% YoY). Green talent is focused on upskilling in the latest advancements in AI, with a mixture of AI literacy skills and AI engineering skills required to develop and utilize these models. Responsible AI has the largest year-over-year growth amongst green talent, which can be suggestive of a more advanced understanding of AI and its impact in an industry, but may also highlight how green talent is likely more attuned to the broader impacts of technology, not just from an energy or carbon footprint perspective, but also its ethical, societal, and environmental implications.

When examining the fastest growing skills among AI talent across all sectors (and not just green), there is fast adoption of agents, AI strategy, and AI productivity – notably missing for green talent (see Table 1). This gap suggests several possibilities: green talent may benefit from more strategically targeted upskilling to leverage the latest advancements in AI; the maturity of AI engineering within green sectors may lag behind industries with higher rates of AI skill adoption; or green professionals may still be in the process of identifying meaningful applications of these technologies specific to their unique use cases.

We can also analyze which areas green talent are concentrating their upskilling efforts. Figure 1 shows green talent who gained a new skill in 2025, and of those, how many added an AI-related skill. From this, we observe that upskilling by green talent is increasingly focusing more on AI. This is most pronounced in India, where 3.9% of green talent that upskilled in 2025 did so in AI, up 49% year-over-year, closely followed by Germany (3.6%) and the United States (3.4%).

[2] To create global metrics we analyzed data from Argentina, Australia, Austria, Belgium, Brazil, Canada, Chile, Colombia, Costa Rica, Czechia, Denmark, Egypt, Finland, France, Germany, Greece, India, Indonesia, Ireland, Italy, Luxembourg, Malaysia, Mexico, Netherlands, New Zealand, Norway, Pakistan, Peru, Philippines, Poland, Portugal, Romania, Saudi Arabia, Singapore, South Africa, Spain, Sweden, Switzerland, Thailand, United Arab Emirates, United Kingdom, United States, and Vietnam

Figure 1: The share of green talent gaining new skills each year who also acquired an AI skill in 2025



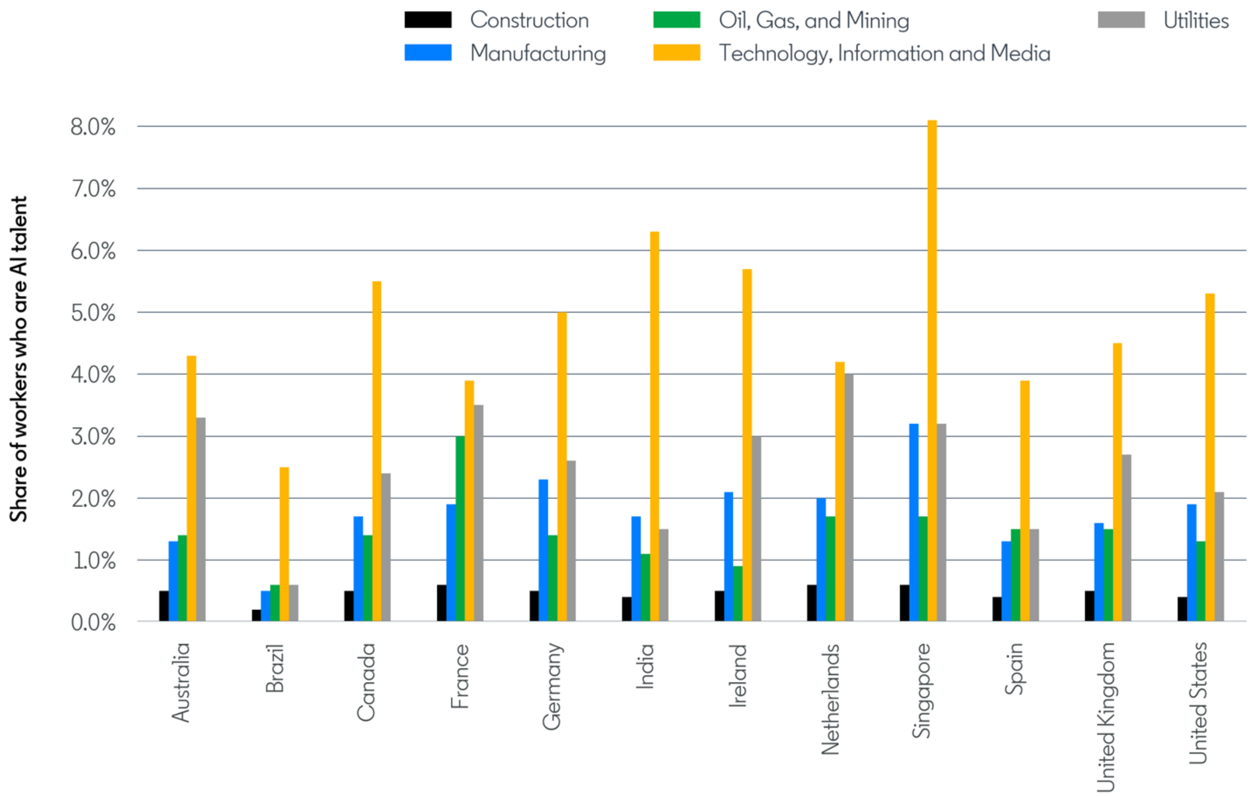
As certain industries have an outsized impact on the climate, we turn our attention to utilities and the green energy sector where the use of AI tools in this context could accelerate the sector's ability to deliver climate solutions. We analyzed LinkedIn job postings, in particular, skills inferred from a job posting, to understand the growing demand for AI skills in the utilities sector, which includes entities that provide electric power, natural gas, steam supply, water supply, and sewage removal. In 2024, 0.1% of job postings in the utilities industry in the United States required an AI skill, up 8% compared to 2023 and 83% since 2022. Though this demand for AI skills is on the rise in utilities, demand is growing faster in other industries we examined.

When we examine the supply of talent, we see stronger AI skills adoption. Globally, 2.2% of professionals in utilities have AI talent, and this is on the rise, up 14% year-over-year. For example, 2.1% of workers in the utilities industry are AI talent, up 17% since 2024, higher than manufacturing, where 1.9% of workers are AI talent, the oil, gas, and mining sector where 1.3% are AI talent, and construction where 0.4% are AI talent. For reference, this is less than half the share of AI talent in the technology, information and media sector in the United States, which make up 5.3% of the sector. Figure 2 shows the AI Talent concentration by country in several industries including the utilities sector and the technology, information and media sector.

AI talent concentration in utilities varies by country and is highest in the Netherlands and Luxembourg, making up 4.0% of each utilities sector respectively, followed closely by France where 3.5% of the sector are AI talent. The gap in AI talent concentration between utilities and the technology, information and media industry is also country dependent, and is less pronounced in the Netherlands where 4.2% of tech professionals are AI talent and in France (3.9%).

When we analyze the most characteristic skills, or skills genome, of utilities by country, that is, the most characteristic skills of the industry, artificial intelligence as a skill itself features in the top 50 skills in many countries, ranking highest in Austria (#20) and Singapore (#28). However, only Singapore featured one other AI skill, machine learning (#23). This suggests that though there is upskilling in the industry and the AI talent segment is growing, AI skills are not necessarily seen as integral to the industry. However, if we look at individual occupations in the sector, like energy

Figure 2: AI Talent concentration by country and industry



analyst, we see the importance of AI skills; for example, machine learning is ranked #16 for energy analysts in Germany.

There has been a remarkable surge in demand for energy talent with green skills, with demand for energy specialists, energy managers, and energy analysts, especially in advanced economies like the United Kingdom, Belgium, France, and Sweden. In Belgium, for example, energy specialist roles have nearly doubled year-over-year (up 92% year-over-year), while the demand for energy specialists in the United Kingdom grew by 65%. This trend underscores the industry's ongoing transition to renewables and the critical need for expertise in energy efficiency, system integration, decarbonization strategy, and sustainable energy management. It may be that demand for AI skills and its skills penetration in the industry is lagging behind the growing skills of the workforce itself as applications of AI are in the early stages of development and use cases are still being explored. The International Energy Agency's 2024 report on Energy and AI[3] also suggests that limited clarity on AI use cases and high implementation costs are hindering AI literacy in energy firms, focusing on the sector's dual need for operational and digital expertise.

SUSTAINABLE AI IN THE WORKFORCE

In this section, we discuss sustainable AI, which refers to minimizing the impact of AI operations on climate change, particularly related to emissions from processing AI queries, powering AI data centers, and building out required AI infrastructure.

AI is transforming industries by solving complex problems, automating tasks, and generating valuable insights across diverse fields. Yet, as the computational power behind AI continues to grow, so does its energy and resource demands. Meeting these needs sustainably is crucial to ensuring that the positive impacts of AI are not overshadowed by its environmental footprint. The importance of integrating green skills among the AI workforce and throughout the AI supply chain has become increasingly clear.

[3] International Energy Agency (2025). Energy and AI. IEA, 2025.

This emerging area is still in the early stages of development and centers on equipping AI talent with sustainability competencies, such as energy-efficient programming, responsible data management, and knowledge of sustainable computing infrastructure.

To understand this emerging workforce in sustainable AI, first we examine how AI talent is adopting green skills[4], where a LinkedIn member is considered AI talent if they have explicitly added at least two AI skills to their profile and/or they are or have been employed in an AI job[5]. We analyze the skills these members add to their LinkedIn profiles, where examples of sustainable AI skills in LinkedIn's skills taxonomy include sustainability, environmental, social, and governance (ESG), and process optimization. Table 2 shows the top green skills added by AI talent globally and the fastest growing green skills (ranked by year-over-year growth).

The most common green skills added by AI talent include Lean Six Sigma, sustainability, process optimization (manufacturing), product lifecycle management, and operational efficiency. Crucially, these skills are focused on sustainability and waste prevention and demonstrate how AI professionals are not just developing technical expertise but are also exploring methods and strategies that can help reduce environmental impact and improve resource efficiency.

Examining the fastest growing green skills added by AI talent globally in 2024 and ranked by year-over-year growth (as shown in Table 2), there is a similar trend towards waste prevention, and an increasing focus on repair. The fastest growing green skills among AI talent are operational efficiency (up 579% YoY), maintenance and repair (up 190% YoY), computer repair (up 159% YoY), and product lifecycle management (up 152% YoY). Indeed, increasing adoption of skills related to repair and maintenance highlights a model of resource use that aligns with a circular economy.

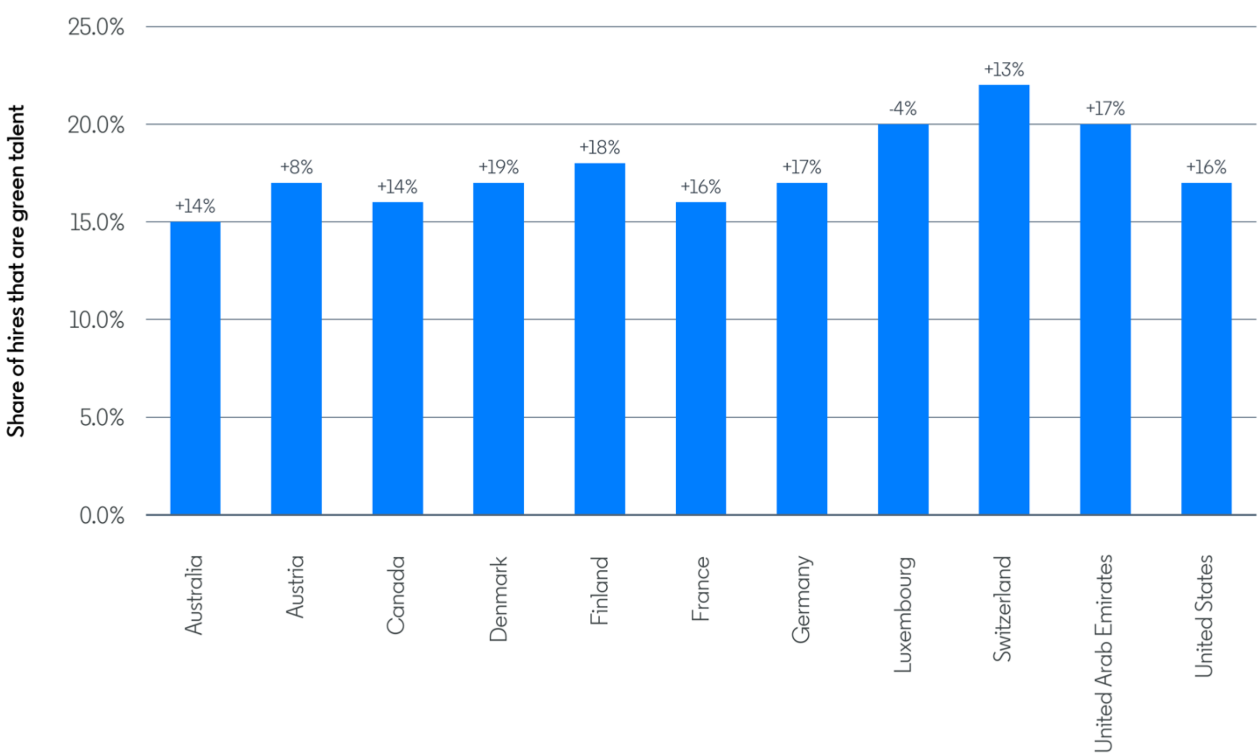
There is also a rise in skills related to environmental policy like ESG (up 151% YoY), environment, health, and safety (up 103% YoY), and corporate social responsibility (up 81% YoY). As companies and stakeholders that employ AI talent place greater emphasis on reducing environmental impact and adhering to social and regulatory standards, AI professionals with these skills are better positioned to drive responsible innovation and ensure compliance. Moreover, having green skills enables AI talent to contribute to solutions that not only advance technology, but also address

Table 2: The top green skills added by AI talent globally and the fastest growing green skills added by AI talent globally

Rank	Top Green Skills	Fastest growing Green Skills (By Year-over-Year Growth)
1	Lean Six Sigma	Operational Efficiency (+579%)
2	Sustainability	Maintenance and Repair (+190%)
3	Process Optimization (Manufacturing)	Computer Repair (+159%)
4	Product Lifecycle Management	Product Lifecycle Management (+152%)
5	Operational Efficiency	Environmental, Social, and Governance (+151%)
6	Renewable Energy	Process Optimization (Manufacturing) (+132%)
7	Environmental, Social, and Governance (ESG)	Environment, Health, and Safety (+103%)
8	Maintenance and Repair	Lean Six Sigma (+85%)
9	Sustainable Development	Computer Maintenance (+81%)
10	Computer Repair	Corporate Social Responsibility (+81%)

[4] LinkedIn's Green methodology is detailed in our Global Green Skills Report 2024.
[5] Hood et al. (2025). AI Data Partnerships - LinkedIn Methodology. LinkedIn's Economic Graph.

Figure 3: The share of hires that are green talent in technology, information and media in 2025 for the largest shares by country; annotated with year-over-year growth



broader sustainability goals, making them more valuable in today's rapidly evolving job market.

Focusing on the tech sector, which has the highest concentration of AI talent (4.4% globally), we observe how the industry is greening over time. LinkedIn's Global Green Skills Report[6] showed that between 2023 and 2024, the technology, information, and media industry experienced a surge in demand for green talent, where the proportion of jobs requiring green skills jumped by 60%, driven by the growing adoption of AI and the expansion of datacenter capacity.

We analyze the share of hires in the industry that are made up of hires of green talent – that is, LinkedIn members who have explicitly added at least one green skill to their profile and/or are working in a green job – and whether this is growing year-over-year in 2025, to understand if the industry is greening (see Figure 3). In the United States, the largest share of green talent hires occurs in the utilities industry (36% of hires in utilities over the last year were green roles), however, green talent hires in technology, information and media still account for 17% of hires, up 16% year-over-year. This share is largest in Switzerland, where 22% of hires in technology, information and media were made up of green roles, up 13% year-over-year.

Sustainable AI also concerns the building of AI infrastructure and powering data center operations. For example, data centers can be large users of energy and water, and companies and policymakers are moving to make data center operations use resources efficiently and source sustainably. We can see this trend reflected in the workforce by examining the most characteristic skills of a data center worker, that is, the occupation's skills genome, to understand how relevant green skills are to performing the role. Green skills feature in the top 50 skills in the skills genome of a data center engineer in Ireland, the Netherlands, the United Arab Emirates, and the United Kingdom; these skills include maintenance and repair, planned preventative maintenance, electrical maintenance, and decommissioning. These skills are

[6] LinkedIn (2024) Global Green Skills Report 2024. LinkedIn's Economic Graph.

also becoming increasingly important to the role; maintenance and repair, for example, increased by 31% in 2024.

Just as the rise of electric vehicles has pushed utilities to develop new skills and infrastructure to manage changing demands on the grid, the rapid growth of data centers will create similar pressures and require comparable adaptation. Additionally, growth in data centers may accelerate demand for renewable energy production, leading to greater employment in the sector. For example, energy markets, smart metering, energy management, energy storage, and energy efficiency all feature in the skills genome for the utilities industry, as well as localized skills like NERC in the United States, which sets the standards for the reliable operation of the power grid.

The most characteristic green skills show not only how the utilities industry is greening, but also the variation of grid management expertise by country. The United States exhibits the most varied and high-ranking grid management-related green skills, with skills such as energy markets, energy storage, and utility-scale solar photovoltaics. There is also a trend towards grid management upskilling, as utility-scale solar photovoltaics and utility-scale energy storage move up in relevance in 2025, along with renewable energy systems and energy storage, suggesting increasing prioritization of skills crucial for grid flexibility and resilience. We also see increasing importance of grid managements skills in Australia, the United Kingdom, India, and Canada.

Assuming a data center can meet all energy demand through renewables, the main source of emissions lies with embodied carbon in building materials. This puts additional pressure on sectoral decarbonization in hard-to-abate sectors, that is, not just in the energy sector, but also in industries such as construction and manufacturing, which have fewer immediate alternatives for emissions reduction. Addressing embodied carbon may require innovations in material science, greater adoption of low-carbon concrete and recycled steel and even shifts in building design to lower material use. Without progress in these adjacent sectors, the overall climate impact of rapidly expanding digital infrastructure will remain substantial despite advances in renewable energy sourcing.

Construction is positioned for an influx of climate-related investment and has the second-highest demand for green talent, where one in five job postings (20.6%) require green skills[7]. We analyze the skills genome in the construction industry over time, to see if skillsets are moving towards decarbonizing steel and cement (or concrete) manufacturing. There is a marked trend towards integrating green skills related to green building, sustainability, life cycle assessment, and environmental management, which have become increasingly prominent, especially in advanced economies. This is most pronounced in the Netherlands and Denmark, where green building and sustainability are among the most characteristic skills, as well as Germany, Austria, and the Nordic countries, which emphasize process optimization and energy efficiency in both construction and manufacturing.

RECOMMENDATIONS

Through analyzing workforce trends at the intersection of AI and sustainability, we observe a dual transition underway toward more sustainable technologies and a greener economy. To support this shift, we present these policy recommendations to prepare workers to both develop and apply AI for a sustainable future.

Train and set standards for sustainability competencies in AI development: As AI continues to evolve, integrating green skills, such as sustainability, process optimization, and operational efficiency, into the core competencies of AI professionals can help align technological progress with environmental responsibility. AI talent is upskilling fast in sustainable skills related to, for example, the circular economy, but this is still a small segment of the workforce. Policymakers and companies should prioritize training and standards for sustainability competencies in AI development.

Promote digital and AI literacy training in the utilities and green energy sectors: The utilities industry shows increasing AI skills adoption, but these skills do not have a high penetration within the sector. In a sense, increasing AI adoption within utilities and the green energy sectors is in fact crucial to foster innovation and identify and effectively implement high-impact use cases of AI in the sector. Providing digital and AI-literacy training within companies could accelerate AI adoption in the green energy sector. Incorporating similar training into energy-related curricula and professional certifications would further support this transition.

Build sustainability skills amongst data center workers: Data center workers are upskilling in green skills such as maintenance, repair, and energy management in countries such as Ireland, the Netherlands, the United Arab Emirates, and the United Kingdom. The expansion of data centers parallels the rise of electric vehicles in increasing demand for renewable energy and specialized workforce skills related to grid management, energy efficiency, and storage. Mapping and supporting the fastest-growing green skills in this sector will help ensure that operational sustainability keeps pace with technological and capacity growth in data centers.

Foster collaboration across the AI supply and value chain: To meaningfully reduce emissions from AI systems, upstream

[7] LinkedIn (2024) Global Green Skills Report 2024. LinkedIn's Economic Graph.

industries such as steel and cement manufacturing must adopt low-carbon tools and methods, while downstream sectors need to extend the lifespan of assets like chips and servers. This requires coordinated workforce development across the value chain, including retraining for sustainable materials engineering, circular design, and lifecycle management. Policymakers should incentivize cross-sector partnerships and invest in training programs that enable workers to adapt to new roles in a decarbonized AI ecosystem.

CONCLUSIONS

The twin transition of sustainability and AI is rapidly reshaping the global workforce, with hybrid workers emerging with both advanced digital and AI skills and sustainability-focused skills. To ensure AI's growth supports the sustainability transition, integrating green competencies into AI development and operations is essential. In turn, AI can increasingly accelerate the growth of the green economy, but a workforce empowered with sustainability and digital fluency will be critical. Targeted training, upskilling, and clear sustainability standards will help workers adapt to new opportunities in AI, utilities, and data centers, while also driving progress toward climate objectives. By bridging the skills gap across sectors, policymakers, companies, and educators can foster a resilient, future-ready workforce capable of maximizing AI's potential for a sustainable future.