

DATA BRIEF

Who Powers Europe's Twin Transition?

Mapping green skills, talent hubs, and strategic gaps in Europe's AI workforce

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Executive Summary

The European Union is pursuing an unprecedented twin transition, where digital and sustainable transitions are being driven in parallel for greater innovation and efficiency. Delivering on this ambition depends on a workforce capable of integrating digital and sustainability expertise across sectors. Additionally, labour market trends show that green skills are no longer limited to traditionally "green" jobs. Demand for green talent is growing rapidly, by 8 percent annually, according to a World Economic Forum estimate, and more than half of green hiring now occurs in roles without explicitly 'green' titles. This means that many professionals, including data scientists and AI specialists, may command an additional premium for holding green skills, such as environmental data analysis, geospatial modelling, or optimisation for sustainability.

This paper examines Europe's AI workforce using the 604 green skills, competencies and knowledge concepts, as defined by European Skills, Competences, Qualifications and Occupations (ESCO) taxonomy. While it must be noted that the taxonomy has a strong focus on primary industries like agriculture, it represents a pan-European collection of skills related to the green transition through which we can derive greater learnings on the twin transition workforce. ESCO also aligns with the International Standard Classification of Occupations (ISCO), an occupational classification system from ILO. While national taxonomies and approaches may differ, ESCO's multilingual and international alignment make it best suited for this analysis.

When we apply ESCO's green framework to our dataset of Europe's AI workforce, we find that only one-third of Europe's AI workforce possesses "significant" green expertise, that is, they have five or more ESCO green skills. This twin-transition talent concentrates in established hubs like London, Paris, and Berlin, and in countries with mature green economies such as the Nordic nations. Gender disparities in the green AI workforce present challenges with regards to equality, with the underrepresentation of women risking further exclusion at a time when green skills are increasingly in demand.

As skills are central to global competitiveness, the EU must strengthen workforce planning and training programmes to fully leverage green and digital capabilities. This need is becoming more urgent as meeting climate targets requires more focused policy action, particularly given that the rapid expansion of AI systems places growing strain on energy infrastructure, increases electricity costs, and risks environmental harm across Europe. Identifying skill concentrations and gaps is the first step in allowing member states and EU institutions to design effective training

pathways and career transitions that enable Europe's workforce to drive technological innovation and ecological transformation.

Our analysis draws from [Revelio Labs](#), a workforce intelligence company that aggregates publicly available professional profiles, job postings, and related sources. The dataset from September 2025 encompasses 616 million individuals in the global workforce.

Background

Commission President von der Leyen's State of the Union report placed competitiveness at the heart of Europe's future, particularly through investment in digital and clean technologies. However, despite technological capability and political will, the twin transition remains increasingly constrained by a critical shortage of the necessary skills. Future projections in countries like [Germany](#) anticipate that labour shortages will increasingly be concentrated in highly skilled occupations, exacerbating existing challenges in the labour market. This skills crisis is further compounded by the intersection of AI and green transition imperatives, where the demand for workers who can navigate both domains continues to exceed supply. Currently, the intense competition for workers means that *"63% of EU companies trying to recruit ICT specialists experience difficulties in filling these vacancies"*¹.

The global labour market also signals the importance of the twin transition. Global hiring for green skills is expected to grow nearly 8% annually, and more workers are being hired thanks to the green skills that they bring to non-green roles. According to the [LinkedIn 2025 Global Green Skills Report](#), these workers are hired at a rate that is 46.6% higher than the average hiring rate. These skills are in demand, driving economic growth, and are strategically important to all workforce dynamics.

As the European Union focuses on growing a competitive AI industry, it simultaneously explores how that very technology can be used to aid the green transition. In [a letter to the Commissioner for Startups, Research and Innovation](#), von der Leyen laid out support for "high-value technologies in support of green and digital transitions" and encourages the development of a strategy for European scientists to use more AI. The principle of AI First at the G20 Summit highlighted how AI strengthened global disaster resilience and responses. The European Green Deal describes AI solutions can help "evidence-based decisions and expand the capacity to understand and tackle environmental challenges." The [2026 Commission](#)

[Work Programme](#) sets the goal of ensuring that the future of clean tech must come from Europe, stressing the need to “*protect [European] citizens from the impacts of climate change and reduce our impact on ecosystems,*” and the [European Pillar of Social Rights](#) promotes digital skills to lead the digital and green transition. The EC’s [research](#) indicates that the EU’s regulations for the environment are inspiring other countries to enact environmental protection policies of their own. Clearly, the EU does not suffer from a lack of ambition to drive the green transition at a global scale.

Yet despite approximately [€65 billion in available EU skills investments](#), challenges in coordination, industry involvement, and data-driven policy design have yielded disappointing results for ensuring Europeans have the skills necessary to meet future demands. Adult training participation rates are far below the 60% target established by the [2020 European Skills Agenda](#) with some member states seeing fewer than 20% of adults participating in education or training in 2022.

This paper examines Europe’s twin transition workforce, the people with both AI and green expertise, at a time when their strategic importance is increasingly evident. Using [European Classification of Occupations, Skills and Competences \(ESCO\)](#), Europe’s central repository of skills, functioning “as a dictionary, describing, identifying and classifying professional occupations and skills relevant for the EU labour market and education and training,” we analyse comprehensive workforce data from by Revelio Labs to map the current state of green AI talent in Europe.

Understanding this workforce starts with understanding what constitutes green skills in the EU. The ESCO taxonomy defines 604 green skills, competences and knowledge concepts. Of these, 26% relate to information skills and 45% of green knowledge concepts relating to engineering, manufacturing and construction. Additionally, 18% of knowledge concepts relate to natural sciences, mathematics and statistics². These skills capture activities across primary industries like agriculture, traditional manufacturing, and infrastructure development, alongside emerging technological capabilities.

Within the taxonomy, technology-related competencies include 28 skills engaging technology directly. Five involve data analysis, four involve modelling, and three address automation. One skill, “green computing,” is defined as “the use of ICT systems in an environmentally responsible and sustainable manner, such as the implementation of energy-efficient servers and central processing units (CPUs), reduction of resources and correct disposal of e-waste.” Skills related to modelling include *performing energy simulations* and *use agronomic modelling* focus primarily

on the “running computer based, mathematical models” as well as "conduct airport environmental studies" and "study groundwater," where modelling forms part of broader research strategies.

The taxonomy also encompasses many technologies related to electrical or automotive engineering, like type of vehicle engines, install onshore wind energy systems, energy microgeneration technologies, alongside broader categories like sustainable technologies in design. These definitions provide the framework to identify professionals working at various intersections of technology and environmental objectives, from traditionally green sectors to its emerging digital applications.

In this paper, we apply ESCO's green taxonomy to Europe's AI workforce to examine what it reveals about the distribution of twin transition talent. Given the accelerating market demand for professionals who combine AI capabilities with green expertise and the EU's explicit commitment to leveraging AI for climate objectives, mapping the intersection of AI and green competencies is more essential than ever for strategic workforce planning. Our analysis draws from [Revelio Labs](#), a workforce intelligence company that aggregates publicly available professional profiles, job postings, and related sources. The dataset from September 2025 encompasses 616 million individuals in the global workforce. Applying ESCO's green skills framework to Europe's AI workforce creates greater insight into where capacity to drive twin transition currently exists, where it concentrates geographically, and where critical gaps may undermine Europe's ability to achieve its digital and green goals while maintaining global competitiveness.

Methodology

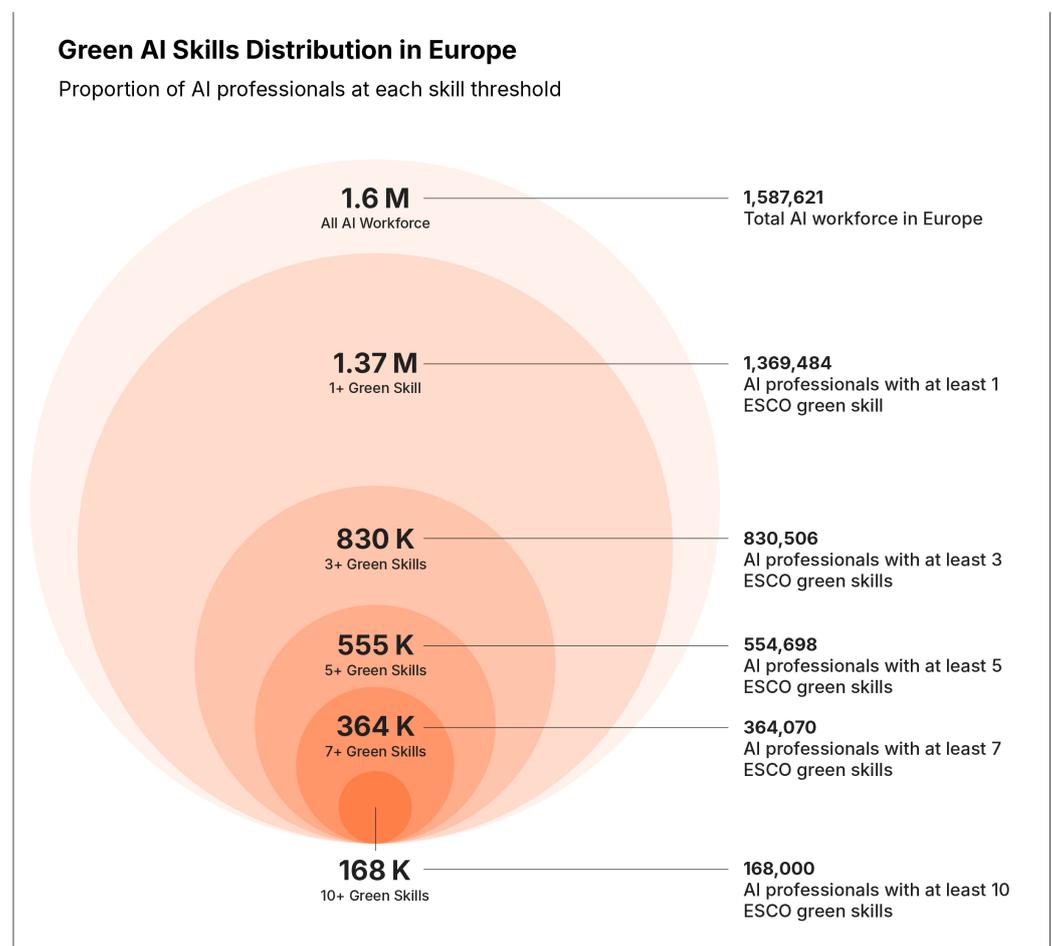
This study utilises comprehensive workforce data provided by [Revelio Labs](#), a workforce intelligence company that aggregates and structures publicly available professional profiles, job postings, and related sources. The dataset from 2025 encompasses over 616 million individuals in the global workforce.

Revelio Labs has a taxonomy of skills that were used to help classify the AI workforce. These skills were then mapped to the equivalent skill(s) within the European Skills, Competences, Qualifications and Occupations (ESCO) [new taxonomy of skills for the green transition](#). This was done by manually identifying 1-2 equivalent Revelio Labs skills for each ESCO skill, then filtering the dataset using this hybrid taxonomy. Additionally, we mapped if there were extra or related skills that reinforce or support the probability that an individual would fit the taxonomy element. The process of mapping Revelio Labs skills to ESCO taxonomy was thus as follows:

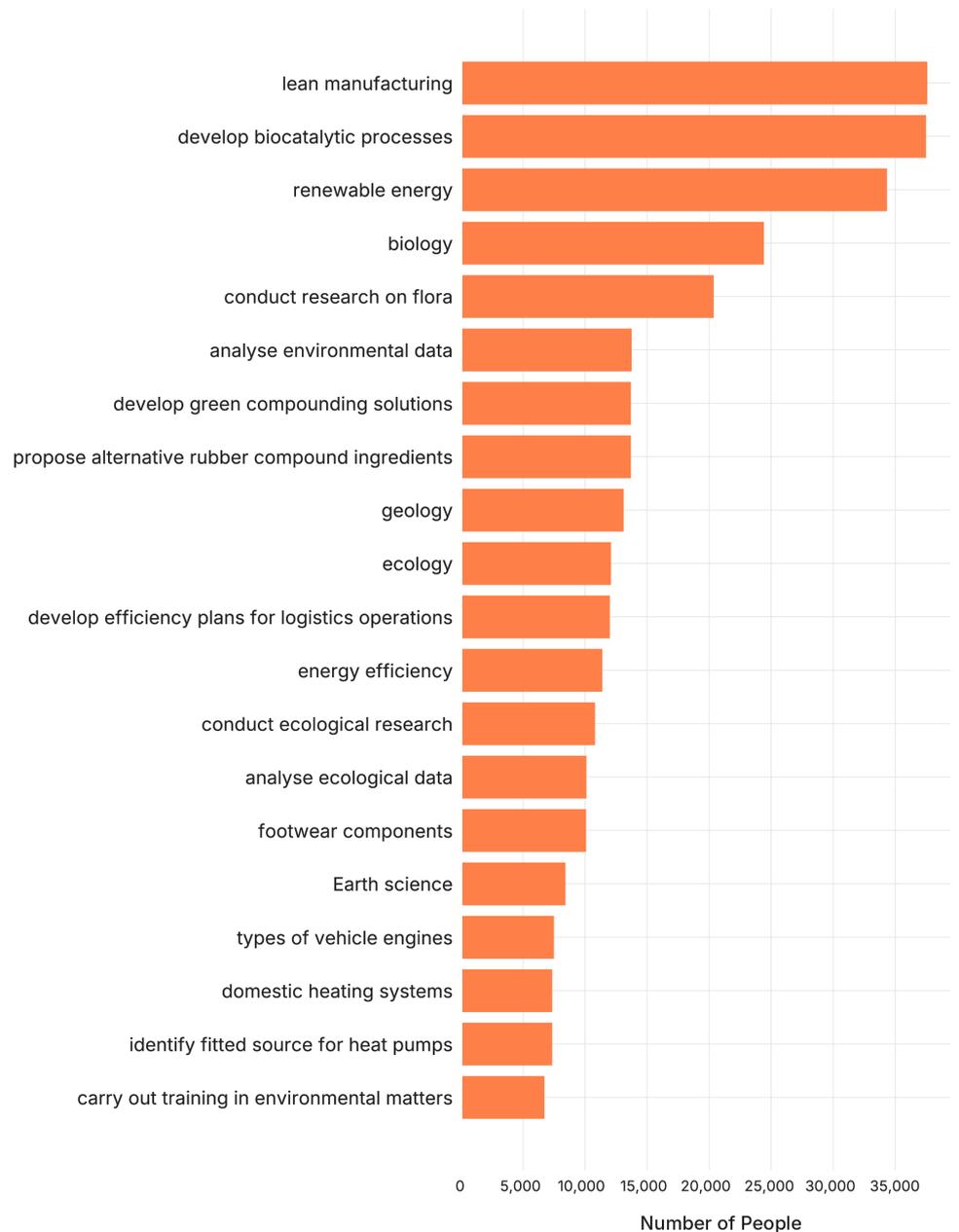
- Identifying if the individual had one or more of the core skills for the taxonomy element
- Identifying if the individual had at least one related skill

For each element, the individual was then classified as having the ESCO skill if they had every core skill, or the core skills with at least one extra skill.

Findings



Most Common Revelio Green Skills in AI Workforce



Data source: Revelio Labs | Analysis by interface

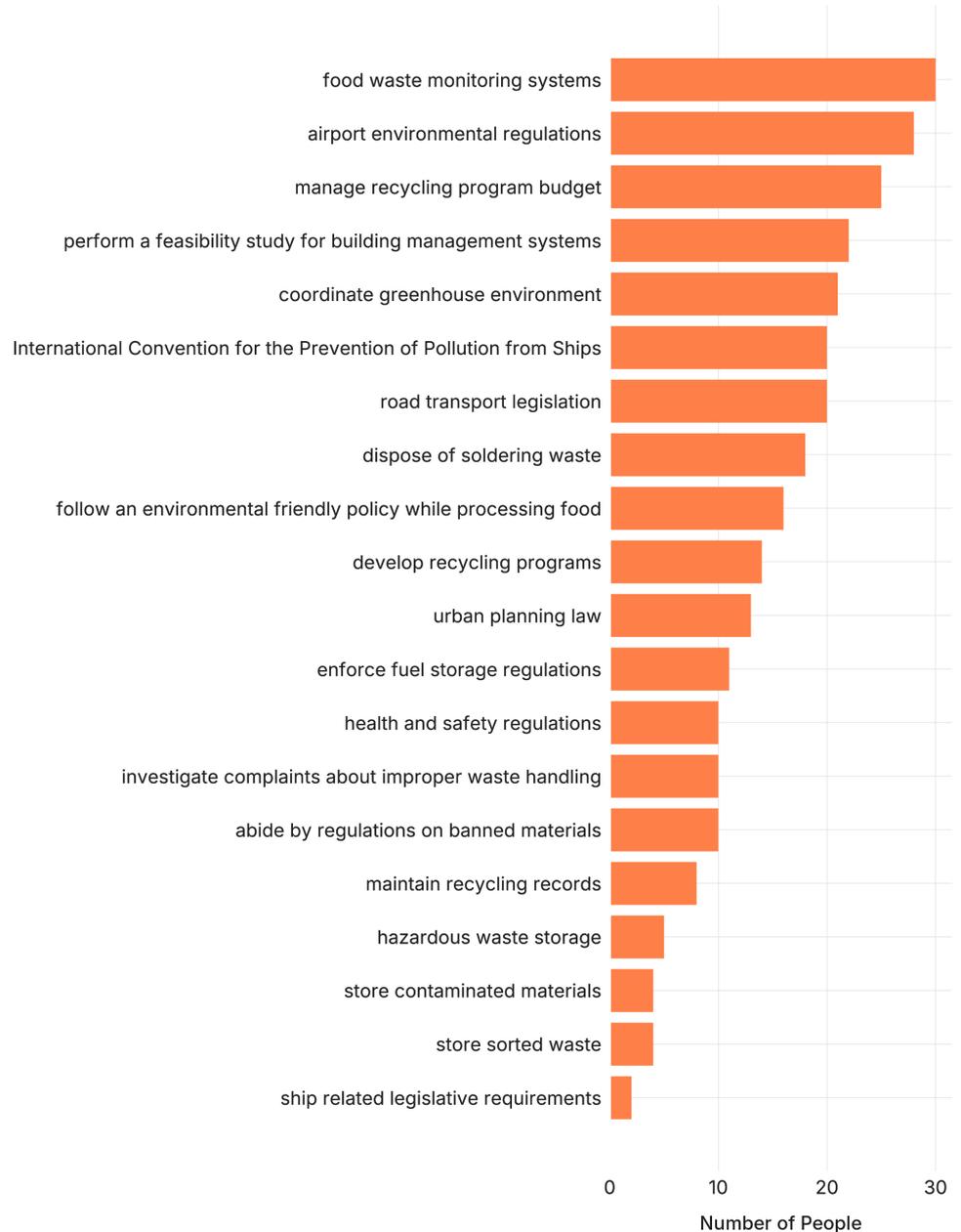
What You See: The first figure shows the total number of AI talent as defined by Revelio that have at least one or more strict ESCO green skills and knowledge concept that are “*needed to live in, develop and support a society which reduces the impact of human activity on the environment.*” The second figure shows the top 20 most common green skills within the AI workforce using the Revelio Labs skills labelling.

What It Means: The table above captures ESCO's current green skills framework applied to the AI Talent in Europe as per the Revelio Labs data set. Of Europe's nearly 1.6 million AI professionals, 1,369,484 have at least one skill from the ESCO green skills taxonomy. The number drops by nearly 40% to 830,506 individuals with at least three strict taxonomy skills. There are 554,698 individuals within the AI talent pool showing a high degree of specialisation in green skills (e.g., 5 or more ESCO taxonomy skills), indicating that only a third of Europe's AI workforce has green tech skills. This steep decline may indicate a limitation with the ESCO green taxonomy, where AI professionals like climate data scientists may have their green expertise excluded, or that Europe's AI workforce is primarily focused on topics beyond the twin transition.

This sharp decrease may undermine the EU's work towards increasingly incorporating AI into green initiatives and scientific research, like earth monitoring and climate science. The [Green Deal Data Space](#) (GDDS) aim to create an open space for data and services around areas like pollution and biodiversity, an initiative that requires advanced data science and AI engineering skills. The [Copernicus Programme](#) creates crucial data by observing the earth through satellite and in situ data, while the European Space Agency has launched models like [Digital Twin Earth](#) that use satellite data and AI to create digital twins of the earth to model and monitor the impacts of environmental changes. A recent Digital Europe Programme [call for proposals](#) offered up to €55 million for AI uptake, and some [Horizon projects](#) have used AI in everything from improved sensor data quality assurance to earth observation data processing workflows to detecting land degradation. A [CORDIS Results Pack](#) documented how AI can be used to support life sciences research. These initiatives are only a few of the numerous AI applications for climate data and solutions in Europe and represent substantial public investment.

The twin transition workforce does concentrate heavily in either primary industries or manufacturing, with the most common green skills in Europe being lean manufacturing and developing biocatalytic processes. These skills are often related to pharmaceuticals, agriculture, and consumer products, industries in which Europe has historic strengths. Renewable energy ranks third, with about 34,000 professionals, reflecting historic investments in the field. Additionally, many of the skills present for the twin transition represent fields of study and research areas, such as ecological research or analysing environmental data. These skills form the backbone of many European green programmes and represent the research acuity found across member states.

Least Common Revelio Green Skills in AI Workforce

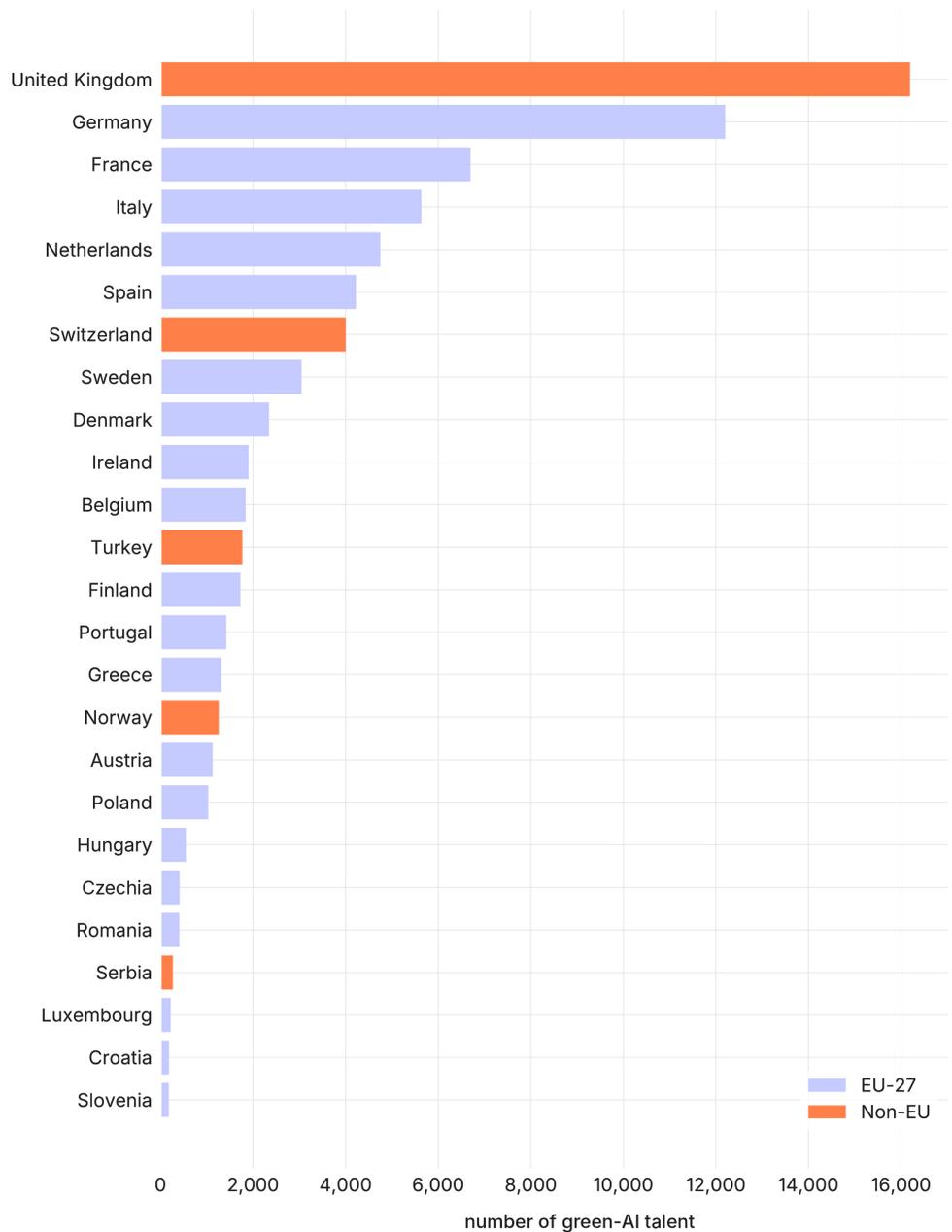


Data source: Revelio Labs | Analysis by interface

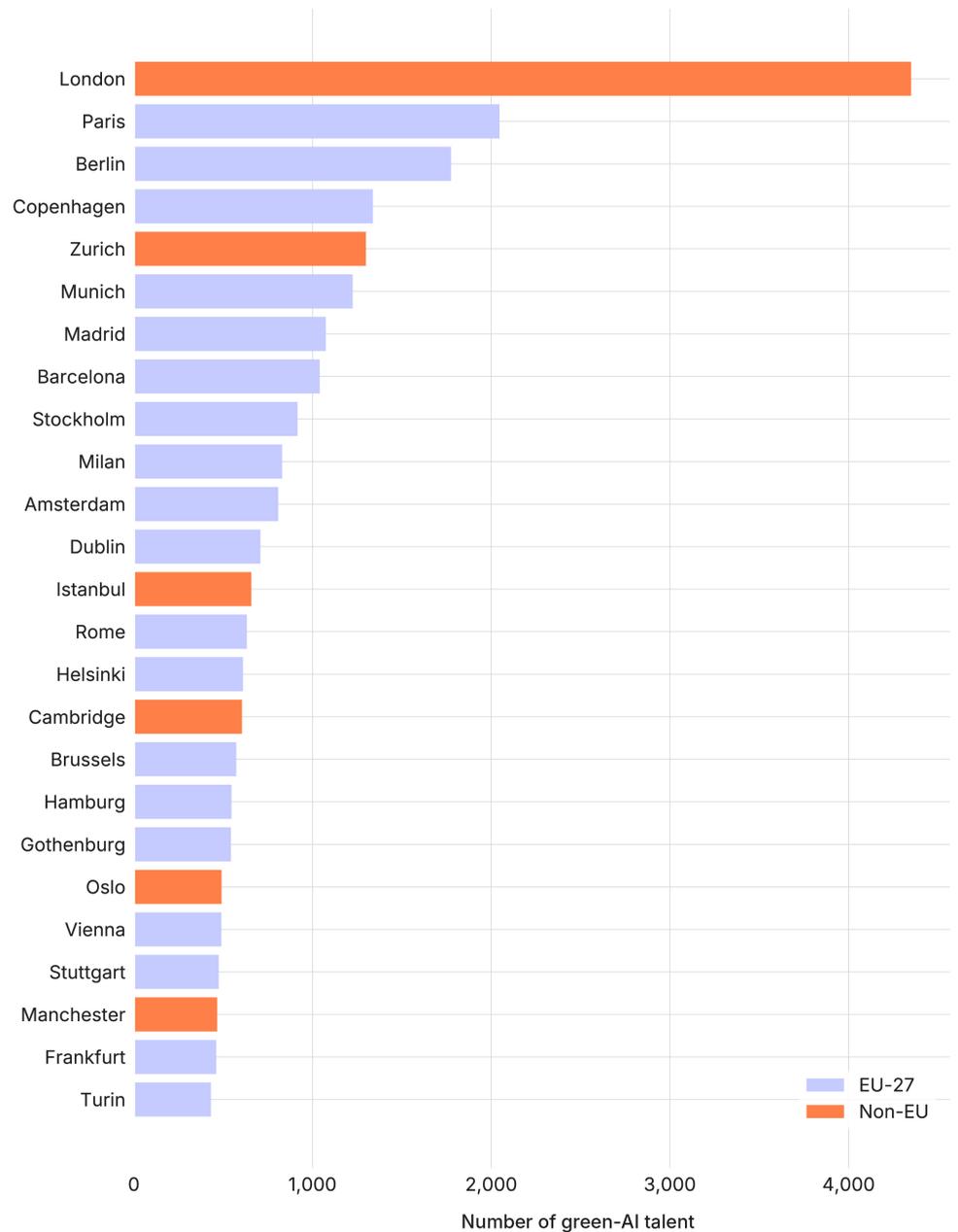
By contrast, our analysis reveals that AI talent lacks skills related to waste management, like food waste monitoring, recycling programme management and disposal systems are present in fewer than thirty AI professionals across the EU. Critically, twin transition skills are missing in people working for the development and enforcement of environmental standards and regulation. AI professionals do not commonly have skills related road transport legislation, airport environmental

regulations, urban planning law, health and safety regulations, undermining Europe's competitive edge in areas like the circular economy or sustainable urban planning. Investing in these skills provides a global competitive advance to European countries and allows them to lead emerging fields and industry without sacrificing innovation capacity.

Top 25 European Countries with Green-AI Talent



Top 25 European Cities with Green-AI Talent



Data source: Revelio Labs | Analysis by interface

What you see: The first figure shows the absolute number of AI talent with at least one ESCO green skill or knowledge concept by country. The second figure shows the absolute number of AI talent with at least one ESCO green skill or knowledge concept by city.

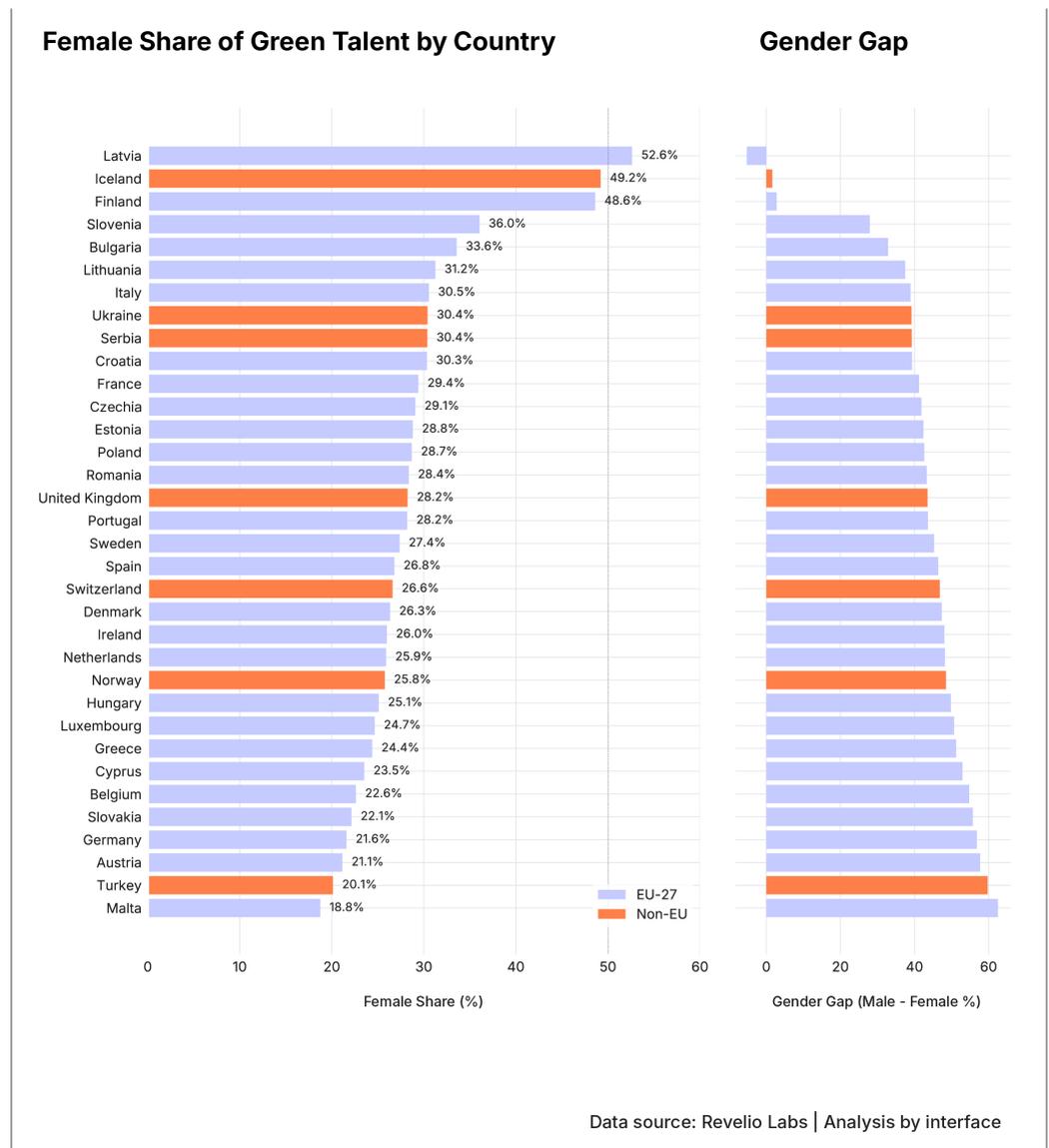
What it means: The European AI talent with ESCO green skills and knowledge are

concentrated in countries and cities with stronger green economies and national strategies. Countries in the east and north of the EU have less talent overall, potentially making them less attractive to AI talent working at the intersection of technology and the green transition. The UK leads Europe with the highest number of green AI talent, exceeding 16,000 individuals, with London being home to many of the workers in the twin transition. The net zero economy has become a cornerstone of the UK's economic growth, growing three times as fast as the general economy, generating £83.1 billion in Gross Value Added (GVA) between 2023 and 2024. Many of the green tech jobs are in the energy sector, either in renewables or energy efficient products, in which many roles are based in London. Growth in renewables outpaces the growth of other jobs. The UK's services-driven economy is also central to its role in driving green jobs, and previous governments have focused on areas like "legislating for skills required for jobs that support action on climate change" to drive green job growth.

Among EU member states, Germany and France have the greatest number of green-AI talent, with Paris and Berlin as the two cities with the highest number of green AI talent in the EU. In 2019, the German Federal Environment Ministry published a [report on AI](#) and its potential applications on different sectors, calling for greater integration of actors working on sustainability. France has also historically invested in sustainable transitions, publishing its [first roadmap](#) on AI and the green transition in 2021 and continues to update it with priorities that support the AI ecosystem and quality data for the AI transition. Other top AI talent pools with green skills are located like Copenhagen, Zurich and Munich.

It is notable that top AI talent destination countries like Ireland and Luxembourg have extremely modest green talent pools: fewer than 2000 of Ireland's AI talent has ESCO defined green skills, while Luxembourg has fewer than 200. This is especially important as previous interface research found that Luxembourg and Switzerland have more AI talent per capita than the UK or US. While countries might be AI talent hubs in Europe, they may not be strategic hubs for twin transition.

It is important to expand green tech talent across different countries to enhance European competitiveness. As the Draghi Report lays out the importance of expanding the cities and regions that "can participate in the sectors that will drive future growth, building on existing initiatives such as Innovation Valleys Net, Zero Acceleration Valleys and Hydrogen Valleys," ensuring that different cities, regions and countries in Europe also increase their attractiveness and role in driving European green innovation.



What You See: The figure above on the left shows the proportion of women AI professionals with at least one ESCO defined skill or knowledge by country. The figure on the right shows the corresponding gender gap percentage for that AI talent pool.

Revelio Labs predicts gender based on first names using a model trained on social security administration data. If a name has a probability above 50% of being female, the individual is counted as female in this analysis. Individuals without a predicted gender are omitted from this analysis. It is important to acknowledge that gender is a spectrum, and the binary findings presented by this report are used because of available data and do not align with many lived realities. Furthermore, predicting gender based on names is not always accurate, and readers should keep this limitation of the data in mind.

What It Means: Applying the ESCO taxonomy to our dataset reveals significant gender imbalances in the green-AI talent pool. These disparities risk widening at a time when demand for green talent is growing, potentially excluding half of Europe's population from key opportunities. Gender diversity within the workforce, among many other kinds of diversity, help ensure that companies can consider the impacts of climate change on different communities and evaluate the trade-offs and impacts of various interventions from different perspectives within impacted communities.

Northern Europe leads with more balanced gender distribution in AI talent with green skills. Latvia's green AI talent pool is 52.6% women, Iceland's 49.2%, and Finland's 48.6%. Conversely, many countries with larger economies have larger gender gaps. Despite having the EU's highest number of women AI professionals in absolute numbers, Germany's green AI talent pool sits at just 21.6% women. The UK, which has the largest concentration green AI talent, is composed of only 28.2%. Similar proportions exist across major green talent hubs: France has 29.4%, Spain 26.8%, and the Netherlands 25.9%. Malta has the worst gap in the EU at 18.8%.

The gender gap identified in this research might be obscured by the current definition of green skills, which may fail to capture fields with more women represented while magnifying fields in which men represent the majority, such as the [automotive industry](#). It also makes it more challenging to design targeted interventions for gender parity, as the workforce statistics may obscure the careers or skills with the fewest women.

Recommendations

With bold ambitions around strategic tech autonomy and climate neutrality, it is more crucial than ever for the EU to take action towards meeting those goals. Training programs can be developed and targeted to workers who need upskilling or reskilling in areas like waste management systems or the circular economy, helping industries stay competitive and driving European innovation across member states.

Moreover, the list of green skills and knowledge could be expanded to encompass additional green/digital competencies to keep pace with rapid technological development and demand across the labour market. Drawing from many of the EU-funded initiatives like Digital Twin Earth or GDDS can help the taxonomy capture specific green-AI competencies, like environmental monitoring, earth observation data, geospatial analysis of satellite imagery, among others. This sets up Europe to better monitor developments within the AI talent pool, while also keeping pace with innovative applications of technology to identify key opportunities for growth and innovation.

The twin transition is happening now, and competitive positioning depends on getting workforce intelligence right. A [study](#) requested by the European Parliament's special committee on Artificial Intelligence in a Digital Age (AIDA) found that although AI and other emerging technologies have potential to tackle different environmental challenges, like energy consumption optimisation, agricultural efficiency, or improving the circular economy, there are also clear negative impacts that AI infrastructure and use have on the environment that Europeans are already experiencing. Data centres, a crucial component of AI infrastructure, are already causing water scarcity and disproportionate consumption of electricity presently in many EU member states, including [Spain](#), [the Netherlands](#), [Ireland](#), [Greece](#), [Italy](#) and [Romania](#) while in Portugal, a data centre was accused of [destroying biodiversity](#).

The market has demonstrated that the most valuable workforce combines both domains. Europe's competitive challenge is not choosing between AI development and climate objectives, but nurturing professionals at that intersection to ensure a global advantage.

Conclusion

Europe's ambition for global competitiveness and leadership around the green transition cannot be accomplished without a robust understanding of the workforce achieving these goals. This paper provides a clearer picture of the workforce behind the twin transition. Our results show that while 1.369.484 members of the AI talent pool have at least one skill from the taxonomy, that number drops nearly 40% to 830.506 with at least three taxonomy skills. 554.698 have a high degree of specialisation in green skills with five or more skills. Most of these individuals are geographically concentrated in existing AI talent hubs like London, Berlin and Paris, or in countries across Europe with mature green economies. Many of these workers are concentrated in industries of European strength, like manufacturing, pharmaceuticals and renewable energy. Areas like waste management and environmental policy, by contrast, have few AI workers and remain opportunities for investment, training and growth.

It is tempting to look at technology like AI systems and assume that they will be functional to solve many of the largest and most pressing existential challenges for the planet. Meeting the European Green Deal's objectives to become the first climate neutral economy by 2050 requires significant commitment, foresight, and investment in the workers and industries responsible for those outcomes. Increased investment in AI without simultaneously expanding the green workforce will leave Europe unable to adapt, measure, and investment in a workforce ready and able to tackle climate change. The path to climate neutrality by 2050 requires not just policy ambition and financial investment, but fundamental recognition of who performs

the work of environmental innovation in the digital age.

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