

Energy Workforce Trends and Outlook

Key Insights

- The share of LinkedIn members working in the Oil and Gas industry has declined by a median of 21% (38 countries) between January 2016 and August 2023. The share of members in the Renewable Energy Power Generation has increased by a median of 26% (26 countries) over the same period.
- While Oil and Gas remains the much larger sector in terms of members, hiring (based on our LinkedIn Hiring Rate) in Renewable Energy (+24%) and Solar Energy Power Generation (+32%) sectors in the United States has increased since February 2020 and has outpaced hiring in Oil and Gas which has declined (-40%) over the same period.
- Based on LinkedIn's Skills Diffusion Index, Singapore (+223%), New Zealand (217%), and Australia (138%) have seen the most rapid expansion in members with at least two Renewable Energy Power Generation skills.
- Over 80% of workers transitioning into a green job have some prior green experience or possess green skills. Encouraging transitions requires investment in reskilling and upskilling workers alongside investment in standing up new clean energy infrastructure.
- Jobs with overlapping skills across adjacent sectors may also provide a viable pathway to workers without prior green experience. Our data shows that jobs like Solar Consultant and Wind Turbine Technician are experiencing fast growth and have a sizeable volume of members transitioning into them without prior green experience.

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Energy Workforce Trends and Outlook

Renewable Energy Deployment and the Changing Energy Mix

A narrow pathway to limiting the global temperature increase to 1.5°C remains open as countries and businesses continue to commit to reducing emissions.¹ This has been most readily apparent in clean energy policy most notably by encouraging the uptake of electric vehicles,² heat pumps, and by making landmark investments in clean energy. Policies like the Inflation Reduction Act (IRA) have had a material impact on the pace of the green transition with the IEA projecting that half of all new US car registrations in 2030 will be electric.³ The IRA has also incentivized clean energy investment which has had the effect of upward revisions in clean energy deployment projections.⁴ Latest reports show that oil demand is set to slow down in the United States,⁵ and while there is debate amongst forecasters,⁶ we may be on track to see the peak of fossil fuel demand by 2030.⁷ Per the IEA, energy employment will shift rapidly because of these changes and high fidelity, near real-time data is required to enable productive energy policy conversations and ensure a people-centered transition⁸ to the clean energy economy.⁹

Energy Employment Shifting Towards Renewables

Data from the LinkedIn Economic Graph shows that there has been a 21% decrease (median, 38 countries) in the share of members working in the Oil and Gas industry between January 2016 and August 2023. This stands in stark contrast to the 26% increase (median, 26 countries) in the Renewable Energy workforce over the same period. While the pace of change in the industry mix of energy employees is encouraging, the Oil and Gas industry is still 5x larger than the Renewable Energy industry. Below, we show the contrast in the share of employment in the two industries as well as the pace of growth since 2016 for a select group of countries:

¹ [Net Zero Roadmap: A Global Pathway to Keep the 1.5 °C Goal in Reach, IEA](#)

² [Accelerating the Transition to Electric Vehicles, LinkedIn](#)

³ [Electric Vehicle Sales projection comparison between 2021 and 2023 projections under the Stated Policies \(STEPS\) scenario, World Energy Outlook 2023](#)

⁴ [Solar and Wind installed capacity comparison between 2021 and 2023 projections under the STEPS scenario, World Energy Outlook 2023, New announcements for clean energy technology manufacturing in the United States, Table 5.3, World Energy Outlook 2023](#)

⁵ [US 2023 oil output to rise by less than forecast, consumption to fall - US Energy Information Administration, Reuters](#)

⁶ [IEA, OPEC predictions of 2024 oil demand growth diverge further, Reuters](#)

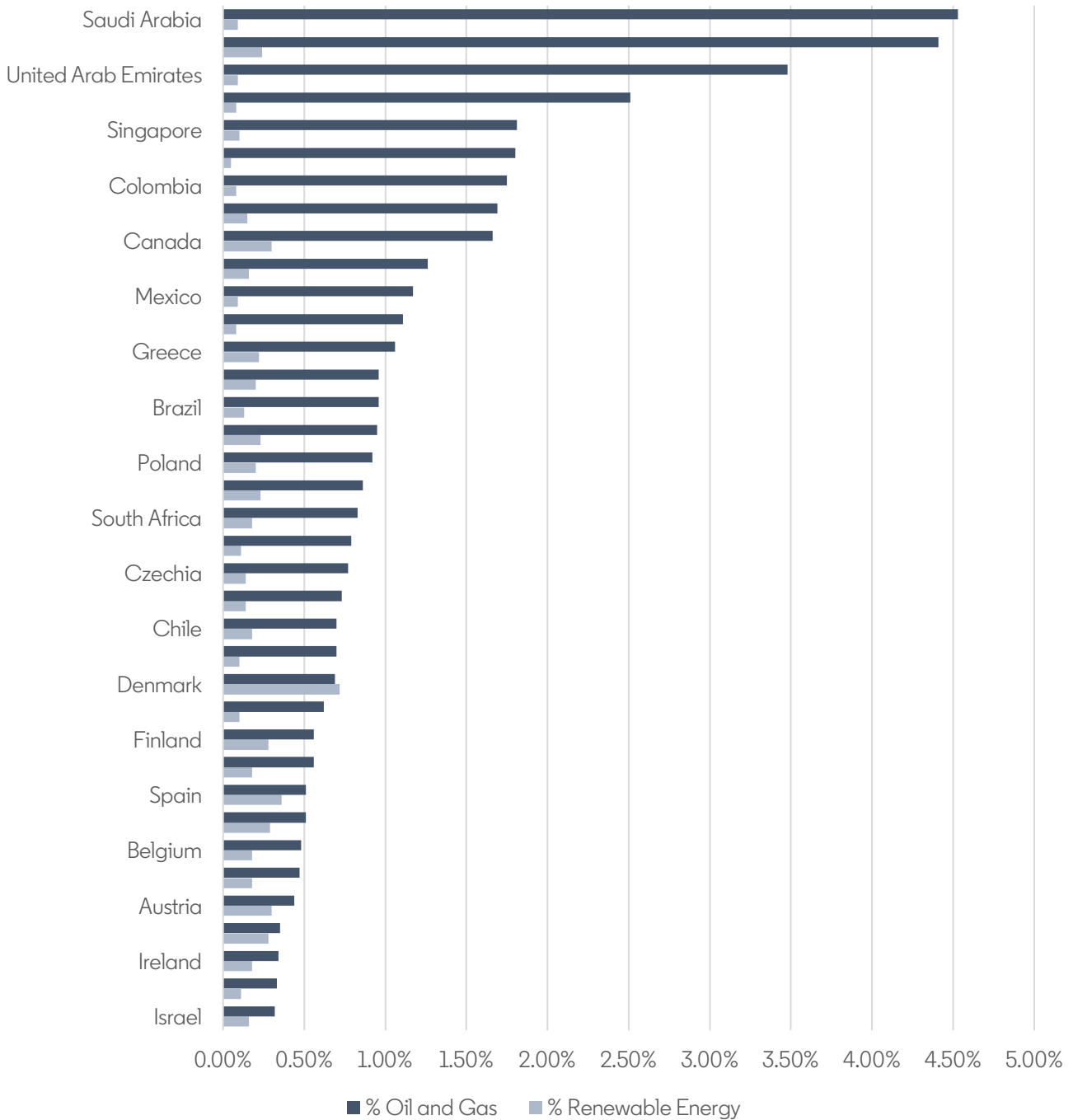
⁷ [World Energy Outlook 2023](#)

⁸ [People-Centered Clean Energy Transitions, IEA](#)

⁹ [World Energy Employment Report, September 2022](#)

Energy Workforce Trends and Outlook

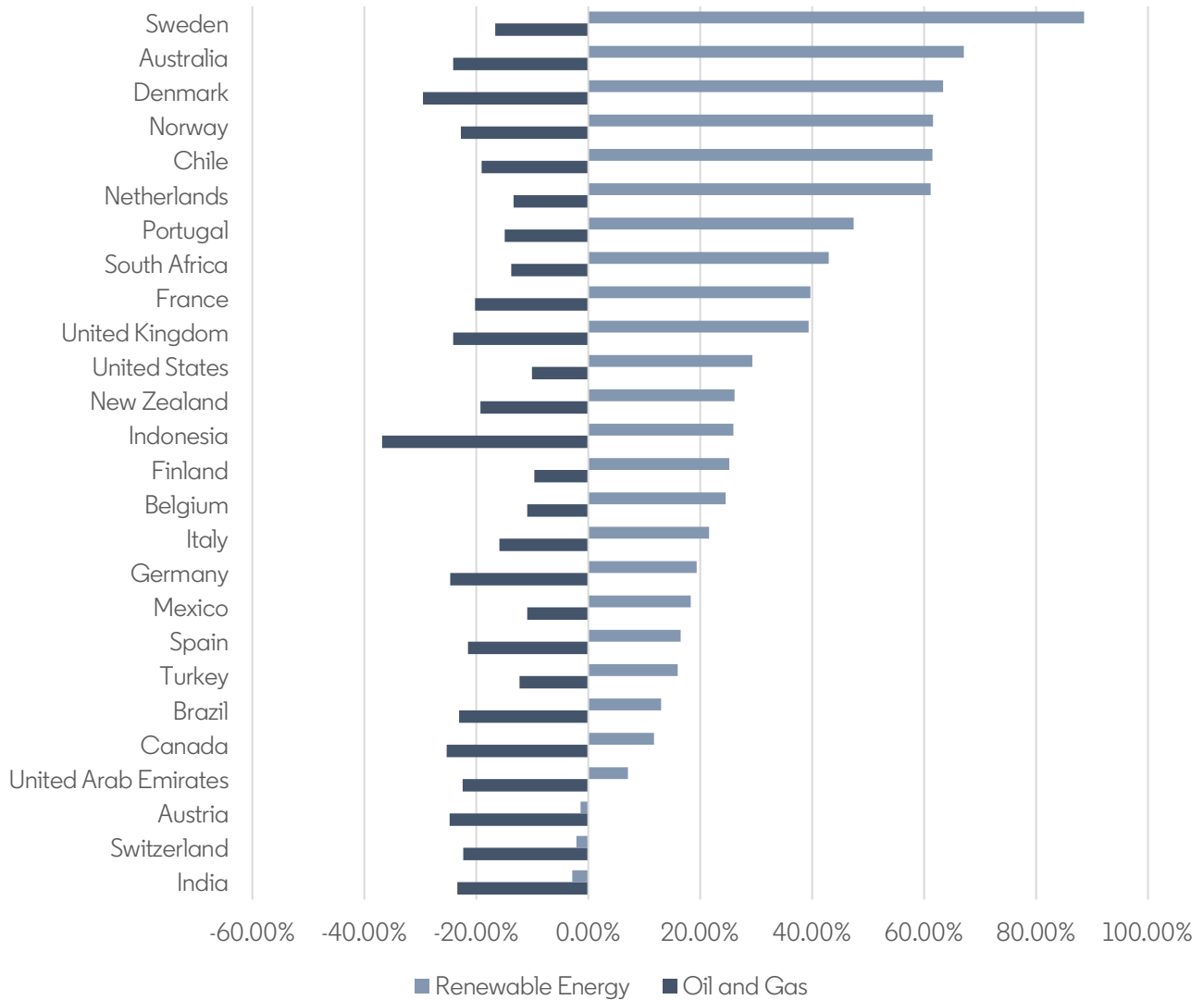
Share of Workforce in Renewable Energy, Oil and Gas Industries (August 2023)



Source: LinkedIn Economic Graph

Energy Workforce Trends and Outlook

% Change in Share of Workforce in Renewable Energy and Oil and Gas (August 2023 vs January 2016)



Source: LinkedIn Economic Graph

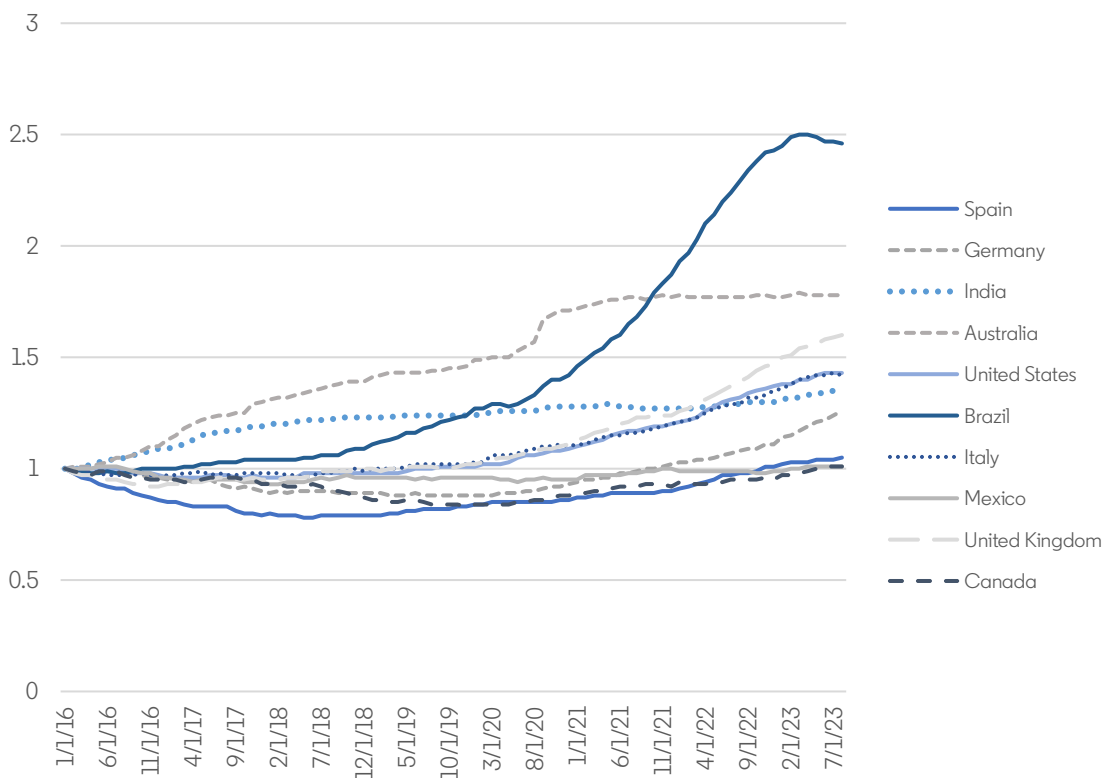
As of August 2023, the share of members employed in Renewable Energy is highest in Denmark (0.72%). Sweden has experienced the highest growth of this workforce since January 2016 (89% increase), as well as in year over year terms (29% increase). The pace at which the Renewable Energy workforce has expanded in the United States is slower compared to other countries (+29% since January 2016, +7% year over year).

Energy Workforce Trends and Outlook

Wind and Solar Leading the way

The expansion of the Renewable Energy workforce (26% increase since January 2016) is being powered by a strong showing in Solar and Wind energy industries. LinkedIn data shows that the share of members employed in Solar Energy Power Generation has increased by 39% since 2016 (median, 10 countries). The share of members employed in Solar Energy Power Generation is the highest in Spain (0.23%) followed by Germany (0.12%), and India (0.11%), mirroring the estimated installations trend of solar PVs.¹⁰ Brazil has seen the largest increase in the size of this workforce, increasing by 146% since January 2016 and by 17% year over year consistent with the rapid expansion of solar capacity in the country.¹¹ The United Kingdom also registered a strong showing with its share of members in this sector increasing by 21% year over year. Like the overall trend for Renewable Energy, the United States lags other countries in both the size and growth of this workforce. However, Solar Energy Power Generation continues to grow faster than other energy industries we have analyzed.

Share of Workforce in Solar Energy Power Generation (Indexed to January 2016)



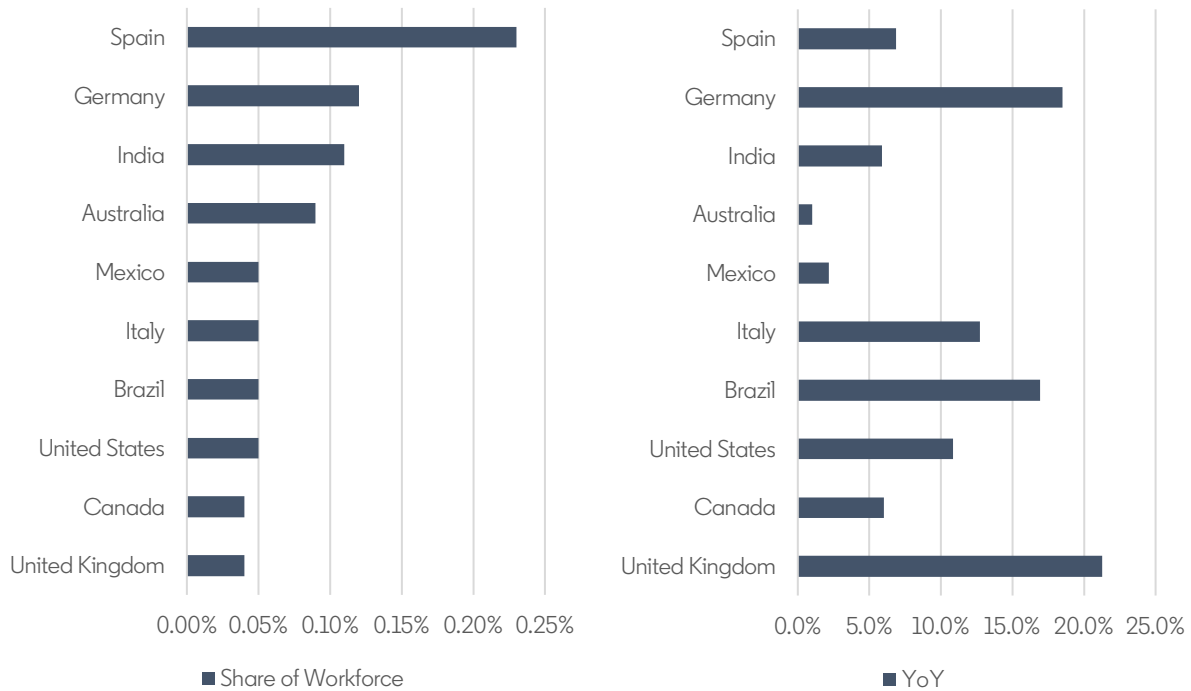
Source: LinkedIn Economic Graph

¹⁰ [Rystad Energy's Renewables & Power Solution 2023](#)

¹¹ [Solar electricity output is up 75% through first 9 months of 2023 from the same period in 2022, Reuters](#)

Energy Workforce Trends and Outlook

Solar Energy Power Generation Share of Workforce and YoY Growth



Source: LinkedIn Economic Graph

Even amidst robust growth, there are concerns about a talent shortage in the sector considering expanding capacity deployment.¹² Employers in the EU have mentioned providing solar PV installation training to transition workers from carbon intensive industries to this growing sector while also addressing the potential skills shortage.¹³ With experts revising Solar capacity projections upwards,¹⁴ we expect this sector to continue to grow in the United States, and globally.

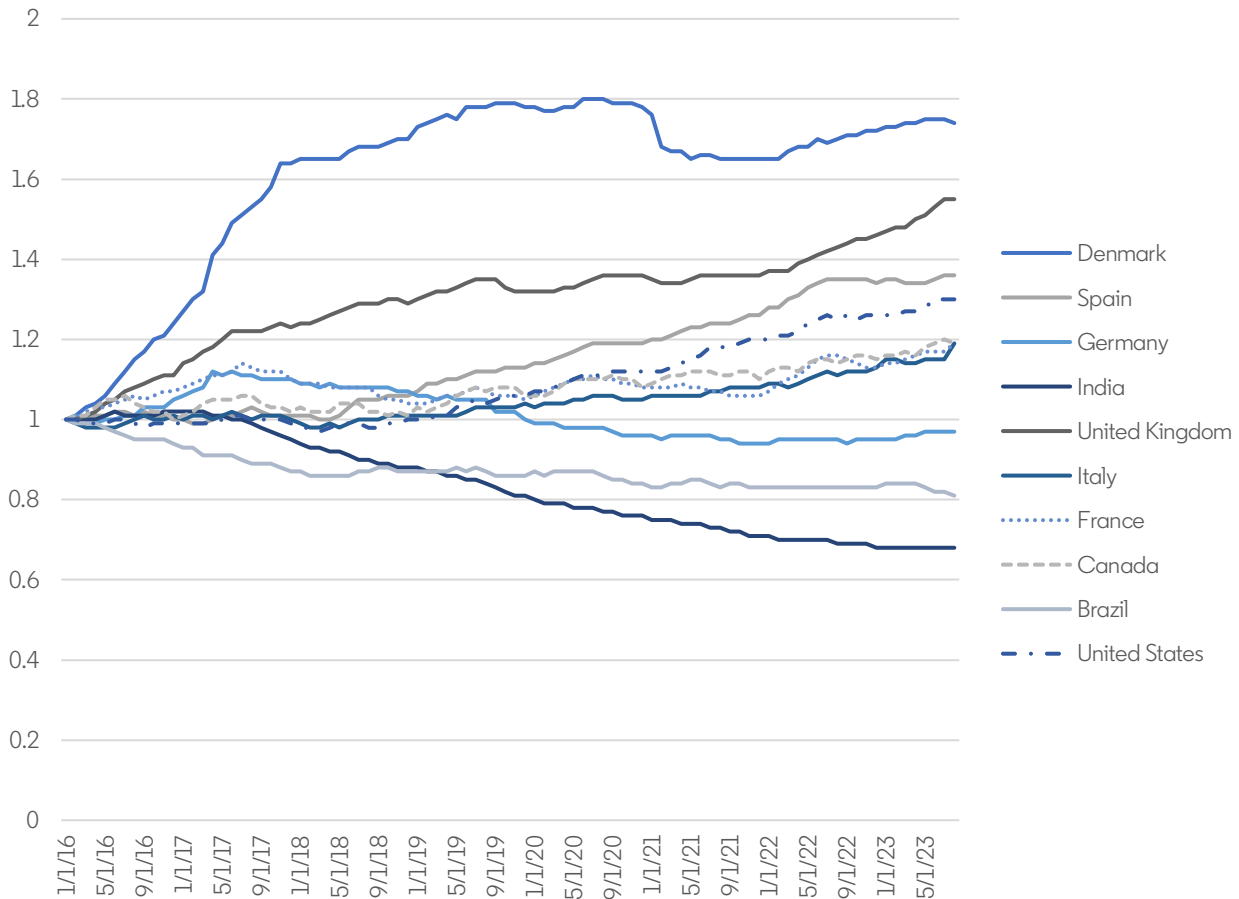
¹² [Solar skills shortage threatens EU targets, Reuters](#)

¹³ [Solar skills shortage threatens EU targets, Reuters](#)

¹⁴ [Renewable Energy Market Update, June 2023, BloombergNEF 3Q 2023 Global PV Market Outlook](#)

Energy Workforce Trends and Outlook

Share of Workforce in Wind Energy Power Generation (Indexed to January 2016)

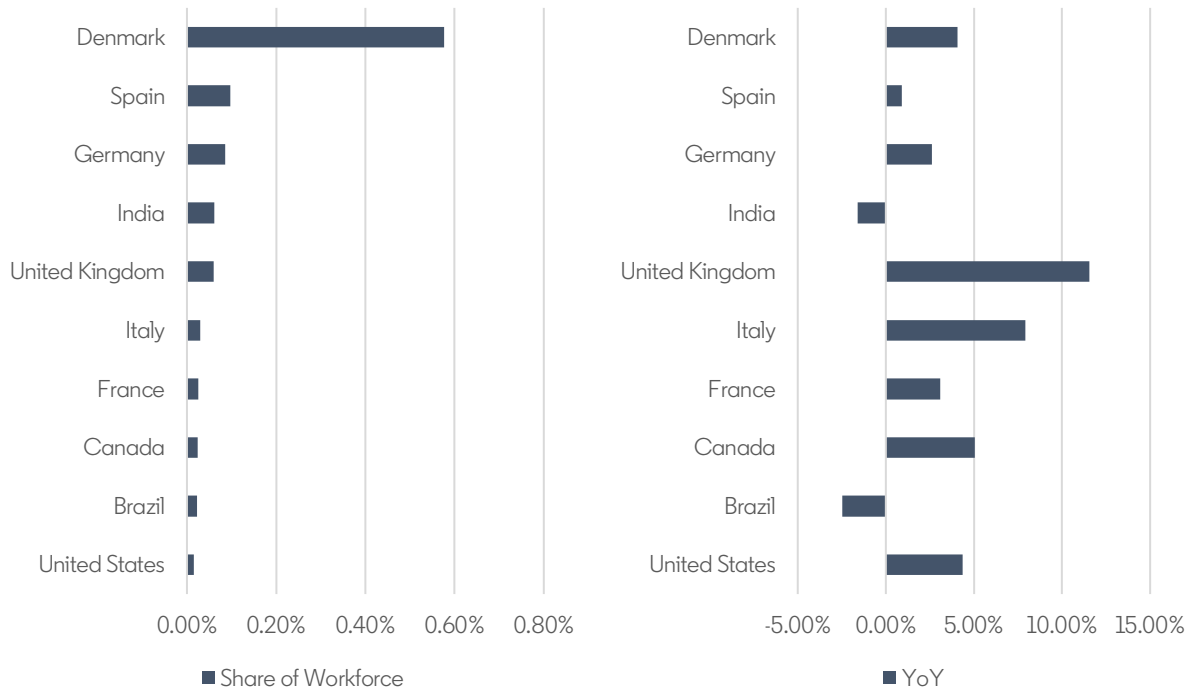


Source: LinkedIn Economic Graph

Employment in Wind Electric Power Generation has also increased by 19% over the same period (median, 10 countries) with Denmark (0.58%), Spain (0.1%) and Germany (0.09%) having the highest share of members working in the sector. Compared to January 2016, employment in the sector has grown the most in Denmark (+74%), the UK (55%), Spain (36%), and the United States (30%). Over the last year, the UK (+12%), Italy (8%), and Canada (5%) have had the largest increases in the share of members in the sector.

Energy Workforce Trends and Outlook

Wind Energy Power Generation Share of Workforce and YoY Growth



Source: LinkedIn Economic Graph

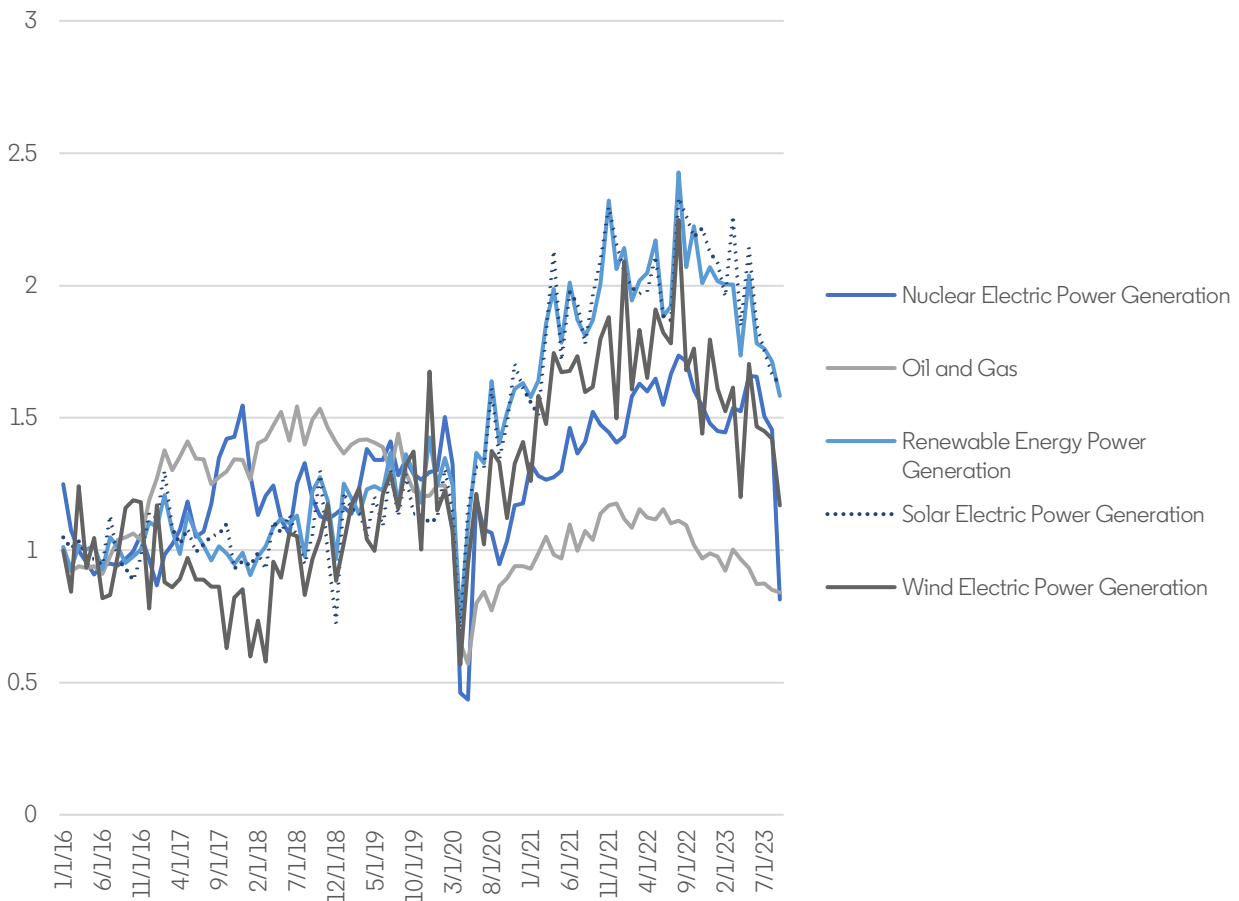
Renewable Energy Hiring is outpacing Oil and Gas Hiring in the United States

The expansion of clean energy capacity and the workforce growth that is powering the transition is the result of hiring¹⁵ in the sector outpacing that in Oil and Gas in the United States, continuing the trend from our Global Green Skills Report 2023. The trend clearly shows that while pandemic recovery has contributed to a hiring rebound across all energy sectors, hiring for Oil and Gas has continued to lag Renewable Energy as well as Solar and Wind Electric Power Generation sectors. Hiring in Renewable Energy (+24%) and Solar Energy Power Generation (+32%) has increased since February 2020 whereas it has declined by 40% for Oil and Gas. There has also been a minor decrease in hiring for Wind Energy Power Generation (-6%) since February 2020.

¹⁵ Hiring is measured using the LinkedIn Hiring Rate which is the count of hires (LinkedIn members in each industry who added a new employer to their profile in the same month the new job began), divided by the total number of LinkedIn members in the U.S. By only analyzing the timeliest data, we can make accurate month-to-month comparisons and account for any potential lags in members updating their profiles. This number is indexed to the average month in 2016 for each industry; for example, an index of 1.05 indicates a hiring rate that is 5% higher than the average month in 2016.

Energy Workforce Trends and Outlook

LinkedIn Hiring Rate for Energy and Power Generation Industries (US, Seasonally Adjusted and Indexed)



Source: LinkedIn Economic Graph

Accelerating the uptake of Renewable Energy Skills to address talent shortages

We have seen a rapid expansion in the clean energy workforce on our way to reducing emissions. However, as mentioned in our [Global Green Skills Report 2023](#),¹⁶ only one in eight workers possess a green skill. The fears of a talent shortage as we seek to rapidly expand and deploy renewable energy persist.¹⁷ To allay these concerns, it is critical to ensure uptake of Renewable Energy Skills amongst the workforce to ensure sufficient supply of talent to transition our energy mix.

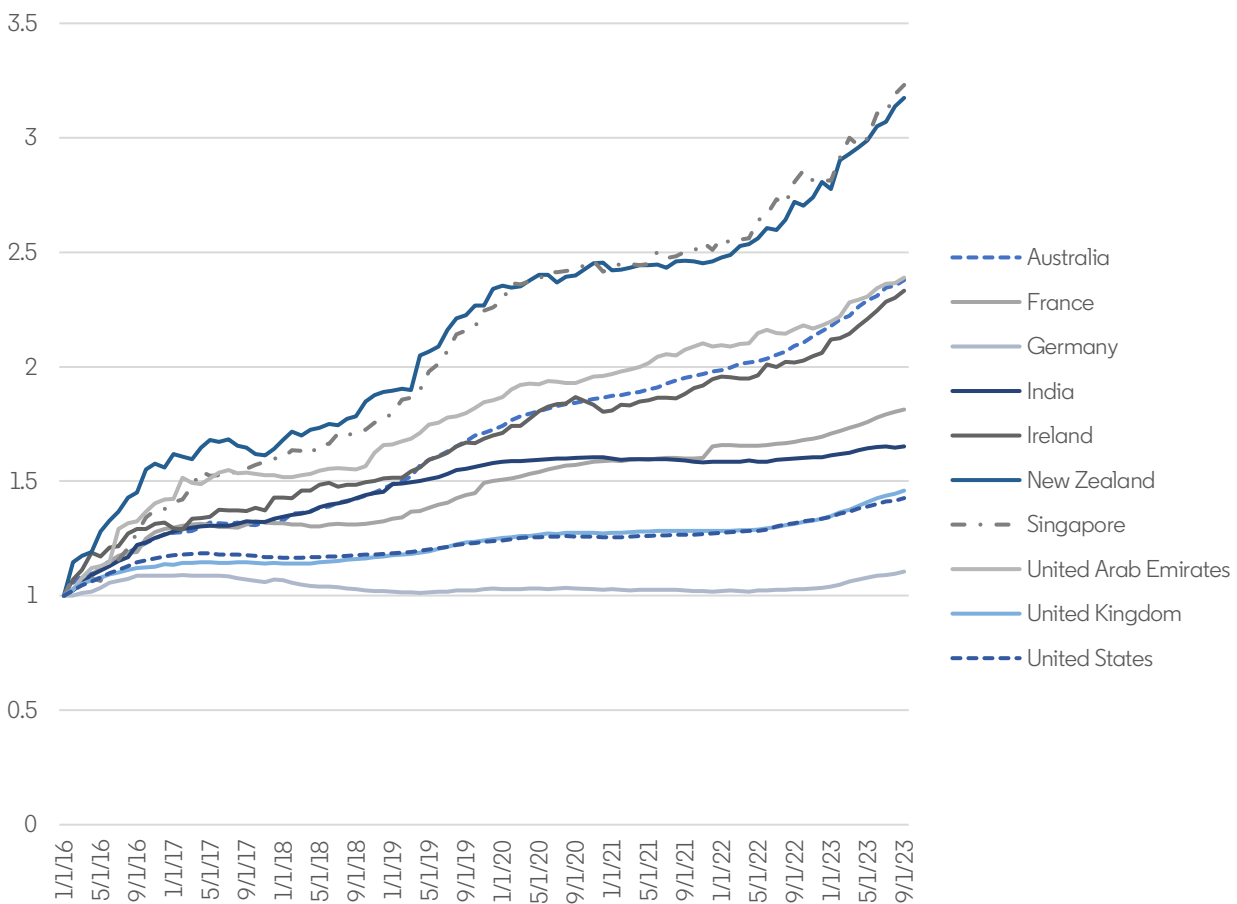
¹⁶ [Global Green Skills Report 2023, LinkedIn](#)

¹⁷ [Talent is the next energy crisis. Here's what we can do about it, WEF](#)

Energy Workforce Trends and Outlook

LinkedIn’s Skills Diffusion Index measures the pace at which members are acquiring relevant skills by comparing the current share of skilled members to the same value in January 2016. Based on this metric, Singapore (+223%), New Zealand (217%), and Australia (138%) have seen the most rapid expansion in members with at least 2 Renewable Energy Power Generation skills. As investment in clean energy infrastructure continues to ramp, it will be critical to also invest in training and education programs to ensure that the supply of this talent does not lag the requirements to hit our net zero goals.

Renewable Energy Skills Diffusion Index (January 2016 – September 2023)



Source: LinkedIn Economic Graph

Ensuring a Just Transition to Clean Energy

As an increasing number of countries have committed to net-zero goals, the share of employment in the Oil and Gas sector continues to decline. The IEA estimates that investments in Oil and Gas remain at twice the level required to reduce emissions to net zero by 2030.¹⁸ This means that we need to focus on

¹⁸ [World Energy Outlook 2023](#)

Energy Workforce Trends and Outlook

reskilling workers in the sector and ensuring a just transition. Across various scenarios modeled by the IEA, employment in the clean energy sector is set to grow.¹⁹ LinkedIn data showing the continued growth of Renewable Energy, as well as the resilient hiring rate for the sector also signal the same. Qualitative research shows that there are overlapping, energy sector specific skills required in Oil and Gas and Renewable Energy alike.²⁰ Helping workers transition from carbon intensive to decarbonizing alternatives with such overlapping skillsets can be a path forward to ensuring a just transition.

This however, is easier said than done. Our research shows that the barriers to breaking into a green job are high with most green jobs requiring prior green experience. Over 80% of workers transitioning into a green job have some prior green experience or possess green skills.²¹ The similarity of skills is a key factor here with workers transitioning into jobs requiring highly similar skills. The average skill similarity for workers who have successfully transitioned into a green job is 0.72 and is significantly higher than the 0.16 skill similarity for workers who have transitioned into a green job with no previous green experience. Our research shows that some of the jobs where transitions without prior experience are happening are also in high growth areas of the renewable energy workforce such as wind and solar.²²

| Country | Green Job | No Green Experience Transitions | YoY Growth (2021-2022) |
|-----------|------------------------------------|---------------------------------|------------------------|
| Australia | Energy Specialist | 52.20% | 36.86% |
| | Energy Manager | 26.25% | 16.86% |
| | Environmental Technician | 24.02% | 16.16% |
| France | Wind Turbine Technician | 37.07% | 33.08% |
| | Solar Consultant | 35.12% | 16.54% |
| | Sustainability Manager | 33.89% | 37.45% |
| Germany | Energy Specialist | 37.99% | 23.13% |
| | Solar Consultant | 32.95% | 46.67% |
| | Sustainability Manager | 28.81% | 61.99% |
| India | Agronomist | 32.21% | 35.75% |
| | Environmental Scientist | 28.85% | 20.77% |
| | Director Environment Health Safety | 24.86% | 31.46% |
| Indonesia | Energy Analyst | 40.98% | 24.56% |
| | Agronomist | 35.13% | 37.32% |
| | Sustainability Manager | 21.59% | 18.98% |
| Ireland | Safety Manager | 45.58% | 12.87% |
| | Sustainability Manager | 32.06% | 50.42% |
| | Wind Turbine Technician | 25.26% | 14.63% |

¹⁹ [World Energy Employment Report, September 2022](#)

²⁰ [World Energy Employment Report, September 2022](#)

²¹ [Global Green Skills Report 2023, LinkedIn](#)

²² [Global Green Skills Report 2023, LinkedIn](#)

Energy Workforce Trends and Outlook

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|----------------------|----------------------------------------|--------|--------|
| New Zealand | Health Safety Environment Officer | 39.30% | 10.91% |
| | Environmental Health Safety Specialist | 33.13% | 8.38% |
| | Sustainability Manager | 21.69% | 27.43% |
| Singapore | Energy Specialist | 45.07% | 1.74% |
| | Sustainability Manager | 29.35% | 45.82% |
| | Safety Manager | 26.46% | 5.54% |
| United Arab Emirates | Energy Specialist | 29.27% | 6.62% |
| | Safety Manager | 21.04% | 7.14% |
| | Geologist | 18.47% | 7.44% |
| United Kingdom | Waste Management Specialist | 57.28% | 19.79% |
| | Solar Consultant | 43.79% | 42.77% |
| | Energy Auditor | 43.14% | 15.84% |
| United States | Solar Consultant | 50.53% | 12.71% |
| | Waste Management Specialist | 49.72% | 9.31% |
| | Environmental Technician | 32.93% | 12.68% |

Energy Workforce Trends and Outlook

Methodology

- This body of work represents the world seen through LinkedIn data, drawn from the anonymized and aggregated profile information of LinkedIn's 950+ 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.
- This analysis is focused on the following industries based on LinkedIn's industry taxonomy. The taxonomy for industry can be viewed in detail [here](#). Our industry codes v2 are [designed to have corresponding NAICS codes](#).
 - Oil and Gas
 - Hydroelectric Power Generation
 - Biomass Electric Power Generation
 - Solar Electric Power Generation
 - Renewable Energy Power Generation
 - Wind Electric Power Generation
 - Geothermal Electric Power Generation
 - Nuclear Electric Power Generation
- The following countries have been included in the analysis however, country availability may vary by industry and metric based on data quality and privacy considerations: Argentina, Australia, Austria, Belgium, Brazil, Canada, Chile, Colombia, Costa Rica, Croatia, Cyprus, Czechia, Denmark, Finland, France, Germany, Greece, India, Indonesia, Ireland, Israel, Italy, Latvia, Malta, Mexico, Netherlands, New Zealand, Norway, Peru, Poland, Portugal, Romania, Saudi Arabia, Singapore, Slovenia, South Africa, Spain, Sweden, Switzerland, Turkey, United Arab Emirates, United Kingdom, United States
- Unless otherwise mentioned, the latest data available is from August 2023
- Unless otherwise mentioned, global estimates of various metrics use the median across available countries/industries etc.
- The LinkedIn Hiring Rate is the count of hires (LinkedIn members in each industry who added a new employer to their profile in the same month the new job began), divided by the total number of LinkedIn members in the US. By only analyzing the timeliest data, we can make accurate month-to-month comparisons and account for any potential lags in members updating their profiles. This number is indexed to the average month in 2016 for each industry; for example, an index of 1.05 indicates a hiring rate that is 5% higher than the average month in 2016.
- LinkedIn's Skills Diffusion Index shows the speed at which members are adding a selected group of skills to their profiles across industries and countries. For example, a country that has an index of 10 in June 2023, means its share of members with at least two segment skills has grown by 10x since January 2016. For the purposes of this analysis, we utilize the list of Renewable Energy Power Generation skills such as: Photovoltaics, Solar Cells, Solar PV, Wind Turbines, Renewable

Energy Systems, Offshore Wind, Wind Engineering, Hydrogen Storage, Thermal Energy Storage (TES), Geothermal Heating & Cooling.