In collaboration
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WORLD ECONOMIC FORUM

Jobs of Tomorrow: Social and Green Jobs for Building Inclusive and Sustainable Economies

WHITE PAPER

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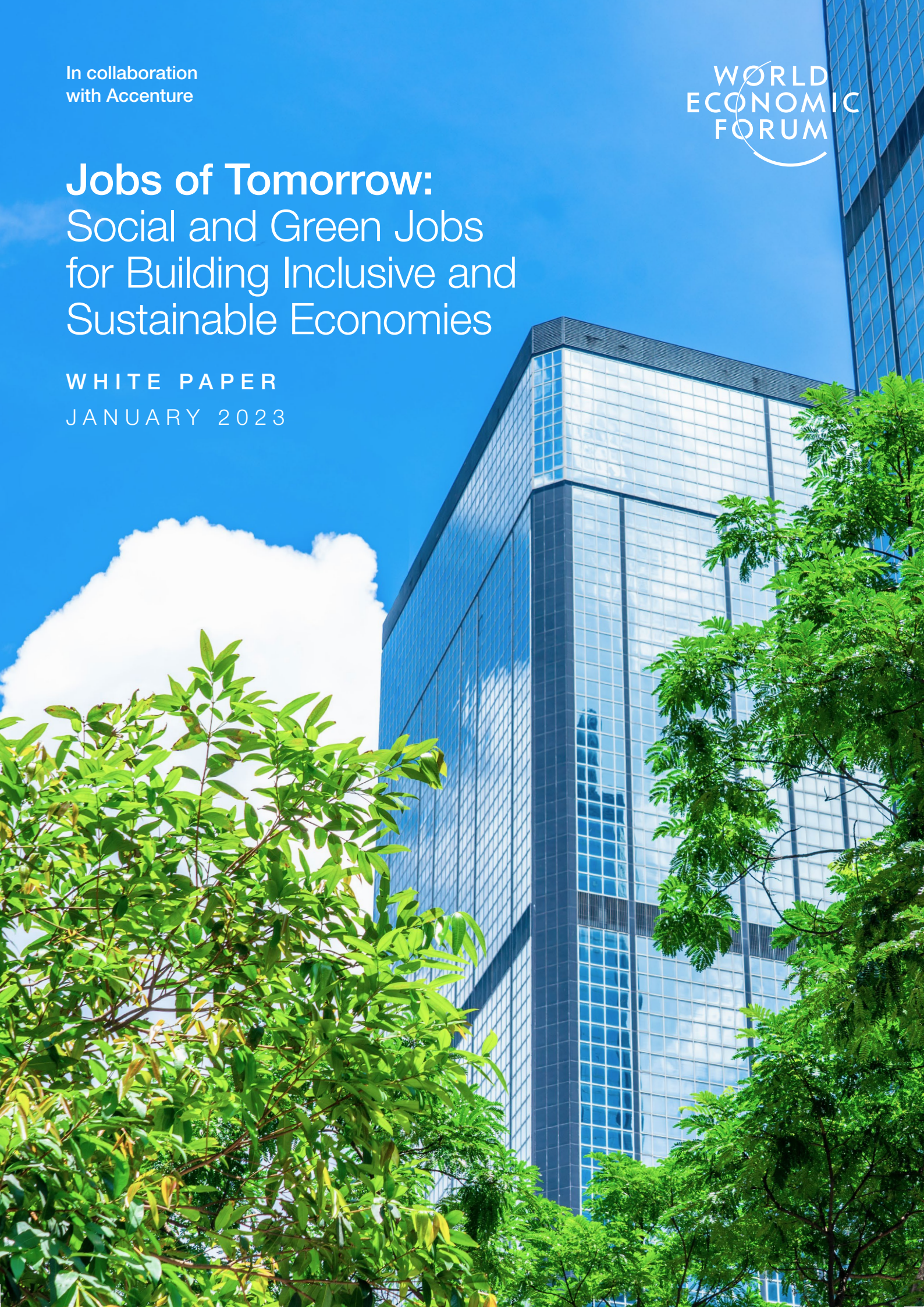

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Contents

Foreword

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Inclusive and sustainable economic growth is a key policy target in both advanced and emerging economies, particularly following the shock of the COVID-19 pandemic and in response to the growing climate crisis. Jobs that support more social inclusion and greater environmental sustainability will be critical to realizing such a vision for economic growth and development – as will finding the talent to deliver it.

At the height of the pandemic, the value of social-sector jobs – jobs that support a socially inclusive economy – such as teachers, caregivers and healthcare workers received deserved attention. It is evident that these roles are crucial to building inclusion, the efficient functioning of our societies and embedding social mobility and resilience. They will further rise in importance as developed and developing economies alike navigate both growing and ageing populations and as policy-makers look to strengthen social infrastructure.

In parallel, there is rising pressure to shift towards greener economies due to the climate crisis and as increased geopolitical tensions incentivize countries to seek greater energy independence in the medium to longer term. “Green” jobs – roles that support greener economies, such as environmental engineers and town planners – are therefore also rising in importance and demand.

This white paper continues our Jobs of Tomorrow series and seeks to quantify the need for social and green jobs in 10 countries by 2030 in order to meet inclusion and climate targets. It is a call to action for governments and businesses to prioritize investment in these jobs, the systems that ensure workers receive fair wages and the skills to thrive in these roles.

We are deeply grateful to the Centre for the New Economy and Society partners and constituents for their leadership of the jobs agenda as well as for the partnership of the Accenture team, whose members served as core collaborators on this report. The insights from this paper will serve as a key tool for the Jobs Consortium,[1] a global coalition of ministers and CEOs that promotes a better future of work through job creation and job transitions, as well as for jobs accelerators, country-level public–private collaboration platforms.

Executive summary

The world currently faces difficulties securing human capital, enabling social mobility and enhancing societal resilience – issues that are likely to increase with a growing and ageing global population. Meanwhile, the climate crisis and geopolitical tensions are accelerating the shift towards greener economies and greater energy independence. Providing a socially inclusive and environmentally sustainable economy is a key policy goal for many countries. This white paper explores the role social and green jobs can play in addressing these twin challenges. Specifically, it seeks to quantify the need for social and green jobs in 10 countries by 2030 to meet inclusion and environmental ambitions.

Social jobs, defined as key occupations within three foundational social institutions – education, healthcare and care – are crucial for building inclusion and enhancing social mobility. Green jobs, defined as roles that require specific "green skills" to perform them, are crucial for enabling a transition to a more sustainable economy.

Social jobs represent 11% of the total workforce in the 10 countries. To meet inclusion and social mobility goals, these countries will need 64 million more social jobs – an increase of 37%. Key findings by sector, occupation and country include:

- Unmet need is greatest in the healthcare sector, which requires an additional 33 million jobs. However, the education (21 million) and care (10 million) sectors also have significant unmet need.
- Occupations with the greatest unmet need are personal care workers in health services (18 million), childcare workers, teacher aides and early childhood teachers (12 million) and primary and secondary education teachers (9 million).
- At the country level, South Africa's unmet need is the greatest – requiring several times more social jobs than it currently has. Brazil and Spain have the next greatest unmet need, with increases of 80–90% required.

The green workforce is much smaller, representing just 1% of total employment in the 10 countries. To meet environmental objectives, these countries require over 12 million, or 66%, more green jobs. Key findings by sector, occupation and country include:

- The agricultural and forestry sector has the greatest unmet need (11 million), while the infrastructure (480,000), government (160,000) and energy (50,000) sectors also have significant unmet need.
- Although agricultural, forestry and fishery workers form the occupation with the greatest unmet need, environmental construction roles (80,000) and environmental, civil and chemical engineers (70,000) also have significant unmet need.
- South Africa, China, the United Kingdom and Brazil have the greatest unmet need for green jobs; however, all countries will need to increase their green workforce to meet environmental objectives.

By quantifying the unmet need for social and green jobs, this white paper serves as a call to action for government and business leaders around the world. To create socially inclusive and environmentally sustainable societies, leaders need to facilitate greater job-creation investments that would fill the unmet need for social and green jobs. This requires a multistakeholder approach in which businesses, governments and unions are aligned on a new vision for a better future of work that is built on labour market foresight, focuses on good job creation, and supports fair wages and dynamic job transitions.

1 Identifying the jobs of tomorrow

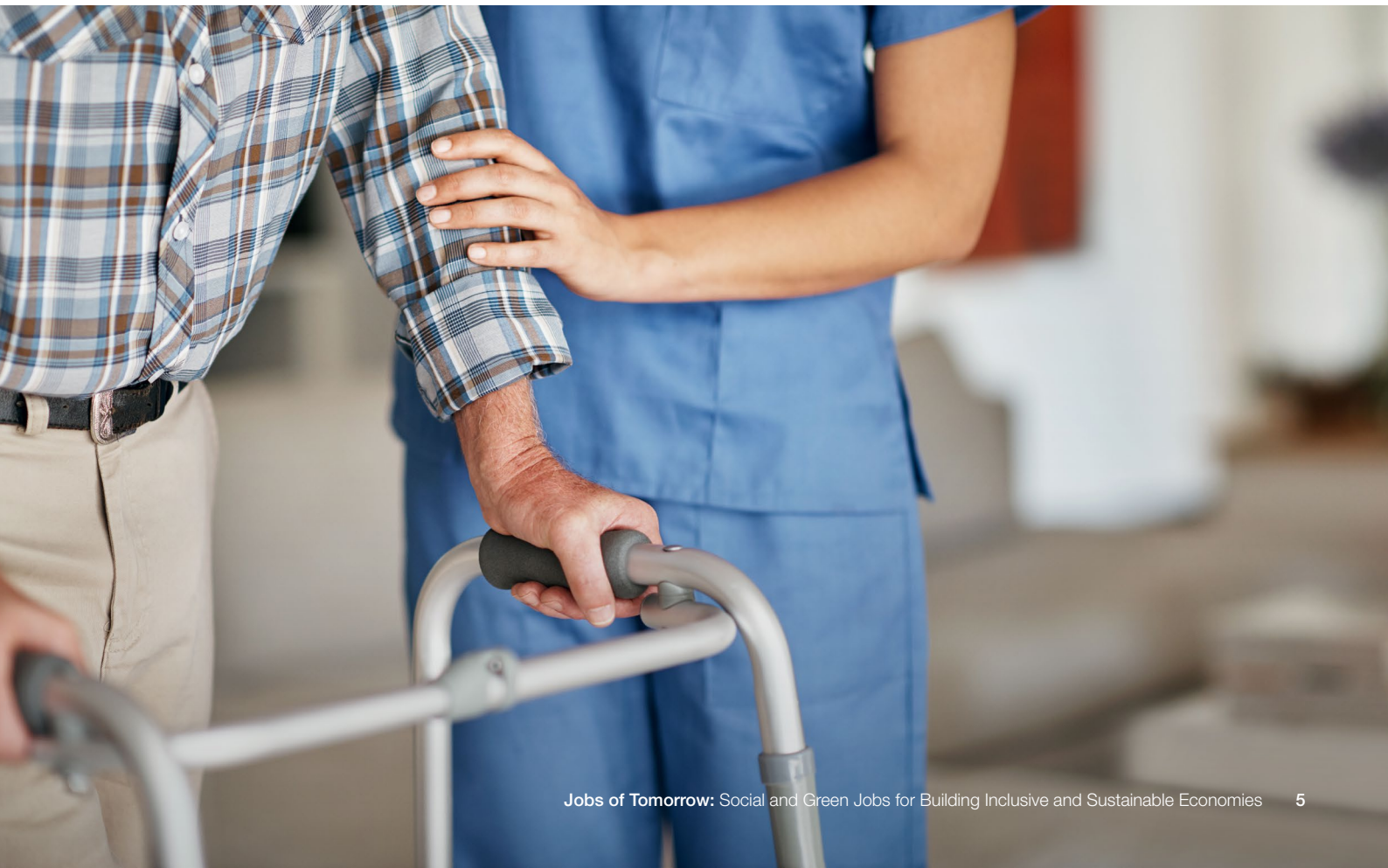
Knowing where there will be unmet need for social and green jobs by 2030 will help address social and environmental challenges.

At the height of the COVID-19 pandemic, much of the world's attention turned to the value of people in social jobs such as teachers, caregivers and healthcare workers. Social jobs are crucial for securing human capital,[2] enabling social mobility and enhancing societal resilience, and their importance will increase with a growing and ageing global population. In parallel, the climate crisis is making the green economy transition ever more urgent, alongside geopolitical tensions that are reinforcing the need to move towards more sustainable energy sources.

Social and green jobs can help countries improve societal resilience and address emissions-reduction targets. However, there is currently a gap between the social and green jobs in most economies today and the number of social and green jobs that could help countries achieve inclusion and emissions-reduction aspirations in 2030. This gap is referred to as "unmet need".

This report aims to identify this unmet need for social and green jobs in 2030 in 10 countries. By calculating the need, it is hoped that businesses and governments will be given the support to make investment decisions that will ensure the labour force is prepared to deliver the desired social and environmental outcomes.

The report builds on the World Economic Forum's *Jobs of Tomorrow: The Triple Returns of Social Jobs in the Economic Recovery*.[3] That report highlighted how investing in social sectors in the United States would yield increases in jobs, gross domestic product (GDP) and social outcomes. This paper extends the analysis by calculating the unmet need for both social and green jobs and expanding it geographically to 10 major economies: Australia, Brazil, China, Germany, India, Japan, South Africa, Spain, the United Kingdom and the United States.



Social jobs are crucial for securing human capital and enabling inclusive economic growth

Three foundational social institutions – education, healthcare and care – form the key building blocks that enable people to create human capital, participate in society and generate economic progress. These, in turn, generate socioeconomic mobility, allowing people to enhance their economic outcomes within their lifetime and across generations, as noted in the World Economic Forum's *Global Social Mobility Index*.[4] As demographics transform globally and the world's population ages and grows, ensuring adequate social infrastructure will require expanded education, healthcare and care systems.

Social jobs are thus defined as the key occupations within these three foundational social sectors.

The social jobs analysed in this report include the following:	
Personal care workers in health services	Other teaching professionals
Childcare workers, teachers' aides and early childhood teachers	University and higher education teachers
Primary and secondary education teachers	Professional services managers
Nursing and midwifery professionals and associates	Medical doctors
Other health professionals and associates	Medical and pharmaceutical technicians
Social work and counselling professionals and associates	Vocational education teachers

> UNESCO has projected a shortfall of 20 million teachers to achieve Sustainable Development Goal 4, Quality Education, and the World Health Organization expects a global shortfall of 15 million health workers by 2030.

In the 10 countries studied, these roles currently employ 11% of the workforce. However, there are well-documented shortfalls in the talent required in the education, healthcare and care sectors. For example, UNESCO has projected a shortfall of 20 million teachers to achieve Sustainable Development Goal 4, Quality Education,[5] and the World Health Organization expects a global shortfall of 15 million health workers by 2030.[6] In addition, despite well-established connections between investment in care and better social, economic and labour-market outcomes, care systems have endured longstanding neglect.[7] Moreover, roles in these sectors tend to be undervalued and underpaid, in many cases lack professional certifications and in some cases lack formalization, reducing opportunities for workers in these roles and reducing their attractiveness despite their value to society.

To quantify the unmet need, this report aims to determine the number of social jobs that would help countries improve their social mobility levels by 2030 to reach the same degree of social mobility performance as a set of benchmark countries that have high-performing education, healthcare and care institutions. The report then calculates how many additional social jobs each country would need to match the density of social jobs in the benchmark countries. For this analysis, Denmark, Norway, Finland and Sweden are the benchmark countries. These economies are the top four ranked countries on the World Economic Forum's *Global Social Mobility Index*.

Social jobs density is calculated relative to the relevant population, e.g. teachers per 1,000 children or nurses per 1,000 people.

In addition, the total growth needed in the number of social jobs has been limited to recognize country constraints by factoring in both projected employment and working age population in 2030.

Green jobs are crucial for an economic transition that enables environmental sustainability

To meet the goals of the Paris Agreement – a pledge to keep global temperature rises below 2ºC and pursue efforts to limit to 1.5ºC[8] – a labour force with green skills will be essential.

This report applies a skills-based definition of green jobs. This means jobs that require specific green skills to be done successfully are defined as green jobs, using the Lightcast database of job postings[9] and skills library[10] to identify those jobs that require green skills. Some examples include skills related to environment and resource management, ecology and clean energy. The list of green jobs below represents occupations with the largest proportion of positions requiring specific green skills and includes bespoke aggregations and exclusions from the International Standard Classification of Occupations' Unit Groups.

The green jobs analysed in this report include the following:	
Agricultural, forestry and fishery workers and labourers	Environmental protection professionals
Forestry and agricultural professionals and advisers, and life science technicians	Town and traffic planners
Production managers in agriculture, forestry and fisheries	Environmental government regulatory associate professionals
Refuse workers	Miners, quarriers and mining managers
Environmental building frame and related trades workers	Physical and earth science professionals
Environmental, civil and chemical engineers	Landscape architects

In the 10 countries studied, these roles today employ 1% of the workforce.

If climate targets are to be met, there will need to be an increase in these roles. The number of workers with green skills has been increasing, with an almost 40% increase in green talent between 2015 and 2021.[11] However, green and greening jobs continue to make up only about 10% of job postings on LinkedIn. As countries roll out their climate pledges, it is essential that the labour force can implement the actions associated with these pledges through a facilitated transition towards green jobs.

This report aims to determine the number of green jobs that could help countries reduce their carbon emissions by 2030. It does so by calculating how many additional green jobs each country would need to match the density of green jobs in a set of benchmark countries that are performing well on their energy transition. For this analysis, Sweden, Norway and Denmark are the benchmark countries. These economies are the top three ranked countries on the World Economic Forum's Energy Transition Index.[12]

In this case, density refers to the proportion of green jobs within a sector and occupation; e.g. the number of engineering jobs requiring green skills per 1,000 people employed in the transport sector.

The tables in the following section set out: the current number of social and green jobs by country; how many of these roles each country is expected to require by 2030 to meet social mobility and energy transition aspirations; and the resulting unmet need for each role.

2 Quantifying the jobs of tomorrow

The greatest unmet need by economy.

2.1 Social jobs unmet need by economy and sector in 2030

TABLE 1 **Australia**[13]

Employment (in 000s)	Current employment	Employment needed by 2030	Unmet need	% change required
Personal care workers in health services	220	508	288	131%
Childcare workers, teachers' aides and early childhood teachers	213	382	169	80%
Nursing and midwifery professionals and associates	378	447	68	18%
Primary and secondary education teachers	417	455	37	9%
Social work and counselling professionals and associates	215	242	27	13%
Other teaching professionals	146	165	19	13%
Medical and pharmaceutical technicians	46	61	15	33%
Other health professionals and associates	342	356	14	4%
University and higher education teachers	97	106	9	9%
Professional services managers	101	105	4	4%
Medical doctors	120	120	–	0%
Vocational education teachers	24	24	–	0%
Total	**2,319**	**2,971**	**650**	**28%**

TABLE 2 | **Brazil**

Employment (in 000s)	Current employment	Employment needed by 2030	Unmet need	% change required
Personal care workers in health services	740	3,301	2,561	346%
Childcare workers, teachers' aides and early childhood teachers	1,681	3,388	1,707	102%
Nursing and midwifery professionals and associates	1,521	2,674	1,153	76%
Primary and secondary education teachers	2,111	3,258	1,146	54%
Social work and counselling professionals and associates	477	1,059	582	122%
Other health professionals and associates	1,575	2,071	496	31%
University and higher education teachers	271	646	375	139%
Other teaching professionals	772	1,085	313	41%
Professional services managers	193	480	287	149%
Medical doctors	528	709	181	34%
Medical and pharmaceutical technicians	218	382	163	75%
Vocational education teachers	127	229	102	80%
Total	**10,214**	**19,282**	**9,066**	**89%**

TABLE 3 | **China**

Employment (in 000s)	Current employment	Employment needed by 2030	Unmet need	% change required
Personal care workers in health services	3,805	8,807	5,002	131%
Nursing and midwifery professionals and associates	4,744	7,290	2,546	54%
Primary and secondary education teachers	6,955	9,015	2,059	30%
Childcare workers, teachers' aides and early childhood teachers	15,607	16,504	897	6%
Other health professionals and associates	4,727	5,573	846	18%
Professional services managers	649	1,121	473	73%
Medical doctors	1,910	2,381	471	25%
Other teaching professionals	8,123	8,530	408	5%
University and higher education teachers	2,359	2,741	382	16%
Medical and pharmaceutical technicians	877	1,200	323	37%
Social work and counselling professionals and associates	12,582	12,875	294	2%
Vocational education teachers	6,877	7,056	179	3%
Total	**69,215**	**83,093**	**13,880**	**20%**

TABLE 4 | **Germany**

Employment (in 000s)	Current employment	Employment needed by 2030	Unmet need	% change required
Personal care workers in health services	476	1,700	1,223	257%
Nursing and midwifery professionals and associates	1,444	1,836	392	27%
Childcare workers, teachers' aides and early childhood teachers	935	1,190	255	27%
Primary and secondary education teachers	1,028	1,131	103	10%
Professional services managers	98	180	82	84%
Other health professionals and associates	1,252	1,319	67	5%
Vocational education teachers	520	558	38	7%
Other teaching professionals	731	763	32	4%
Medical and pharmaceutical technicians	175	207	32	18%
Social work and counselling professionals and associates	2,229	2,251	22	1%
Medical doctors	393	394	1	0%
University and higher education teachers	302	302	–	0%
Total	**9,583**	**11,831**	**2,247**	**23%**

TABLE 5 | **India**

Employment (in 000s)	Current employment	Employment needed by 2030	Unmet need	% change required
Personal care workers in health services	2,384	6,809	4,425	186%
Primary and secondary education teachers	11,635	14,946	3,311	28%
Other health professionals and associates	3,901	5,015	1,114	29%
Nursing and midwifery professionals and associates	4,852	7,878	3,025	62%
Other teaching professionals	3,409	4,445	1,036	30%
Childcare workers, teachers' aides and early childhood teachers	5,016	10,213	5,197	104%
Social work and counselling professionals and associates	2,335	3,536	1,201	51%
University and higher education teachers	1,764	2,620	856	49%
Medical doctors	1,382	2,010	628	45%
Professional services managers	668	1,349	682	102%
Medical and pharmaceutical technicians	818	1,205	386	47%
Vocational education teachers	273	489	215	79%
Total	**38,437**	**60,515**	**22,076**	**57%**

TABLE 6 | **Japan**

Employment (in 000s)	Current employment	Employment needed by 2030	Unmet need	% change required
Personal care workers in health services	2,090	2,648	558	27%
Childcare workers, teachers' aides and early childhood teachers	142	439	297	210%
Nursing and midwifery professionals and associates	1,397	1,533	136	10%
Other health professionals and associates	750	854	103	14%
Primary and secondary education teachers	958	1,049	91	9%
Social work and counselling professionals and associates	1,090	1,144	54	5%
Professional services managers	168	210	42	25%
Other teaching professionals	540	580	40	7%
Medical doctors	283	321	38	13%
University and higher education teachers	190	227	37	20%
Vocational education teachers	22	51	28	125%
Medical and pharmaceutical technicians	265	278	13	5%
Total	**7,895**	**9,334**	**1,437**	**18%**

TABLE 7 | **South Africa**

Employment (in 000s)	Current employment	Employment needed by 2030	Unmet need	% change required
Childcare workers, teachers' aides and early childhood teachers	145	1,783	1,639	1,131%
Primary and secondary education teachers	381	1,805	1,424	374%
Nursing and midwifery professionals and associates	193	712	519	268%
Other teaching professionals	58	393	335	574%
University and higher education teachers	39	329	289	735%
Social work and counselling professionals and associates	29	305	276	945%
Other health professionals and associates	270	534	265	98%
Personal care workers in health services	60	291	231	387%
Medical doctors	63	159	95	151%
Medical and pharmaceutical technicians	16	39	22	140%
Professional services managers	–	–	–	0%
Vocational education teachers	–	–	–	0%
Total	**1,254**	**6,350**	**5,095**	**406%**

TABLE 8 | **Spain**

Employment (in 000s)	Current employment	Employment needed by 2030	Unmet need	% change required
Personal care workers in health services	564	1,484	920	163%
Childcare workers, teachers' aides and early childhood teachers	234	685	450	192%
Social work and counselling professionals and associates	203	443	240	118%
Nursing and midwifery professionals and associates	298	536	238	80%
Other health professionals and associates	271	465	194	71%
Professional services managers	44	145	101	230%
Other teaching professionals	228	299	71	31%
Vocational education teachers	54	109	55	103%
Medical and pharmaceutical technicians	94	144	49	52%
University and higher education teachers	128	165	38	29%
Primary and secondary education teachers	599	630	32	5%
Medical doctors	246	255	9	4%
Total	**2,963**	**5,360**	**2,397**	**81%**

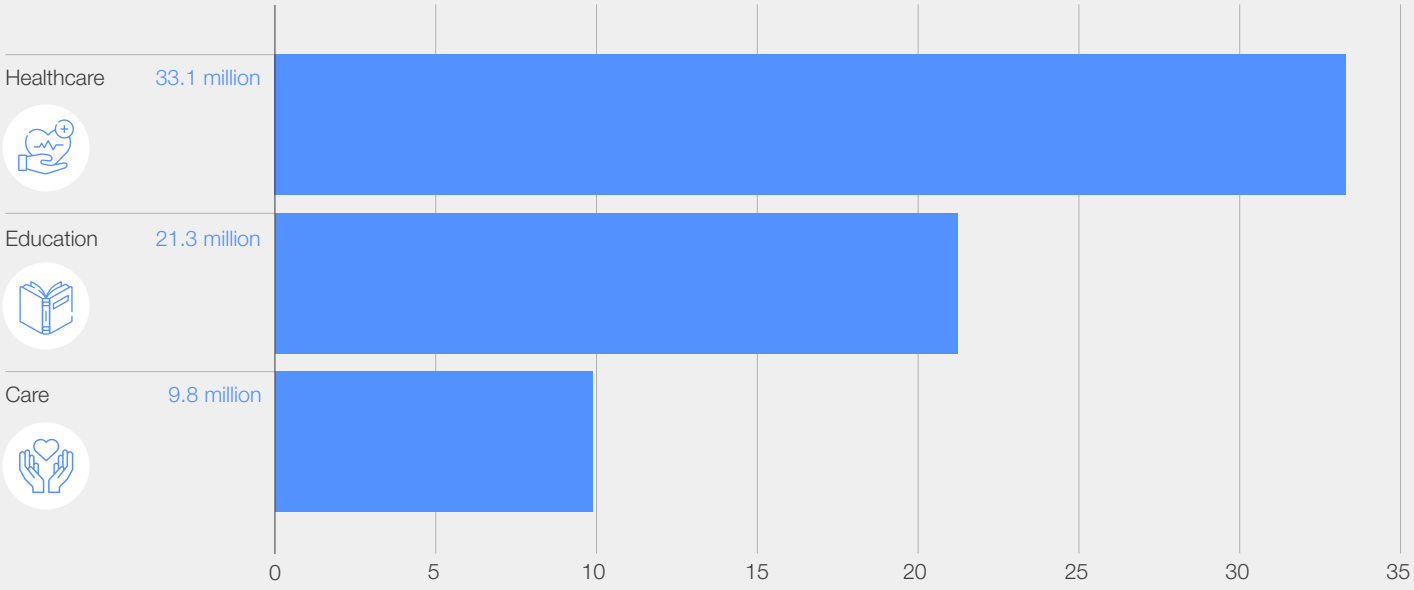
TABLE 9 | **United Kingdom**

Employment (in 000s)	Current employment	Employment needed by 2030	Unmet need	% change required
Personal care workers in health services	1,312	1,914	602	46%
Childcare workers, teachers' aides and early childhood teachers	796	1,146	349	44%
Primary and secondary education teachers	767	1,012	245	32%
Nursing and midwifery professionals and associates	579	713	134	23%
Other teaching professionals	458	513	54	12%
University and higher education teachers	218	252	35	16%
Other health professionals and associates	511	533	22	4%
Professional services managers	255	262	7	3%
Medical doctors	319	325	6	2%
Social work and counselling professionals and associates	611	614	2	0%
Medical and pharmaceutical technicians	141	141	–	0%
Vocational education teachers	76	76	–	0%
Total	**6,043**	**7,501**	**1,456**	**24%**

TABLE 10 | **United States**

Employment (in 000s)	Current employment	Employment needed by 2030	Unmet need	% change required
Personal care workers in health services	5,045	6,877	1,832	36%
Childcare workers, teachers' aides and early childhood teachers	2,255	3,768	1,514	67%
Primary and secondary education teachers	2,948	3,870	922	31%
Nursing and midwifery professionals and associates	3,933	4,557	623	16%
Social work and counselling professionals and associates	1,851	2,168	317	17%
Medical doctors	282	599	317	112%
Other teaching professionals	1,997	2,157	161	8%
Other health professionals and associates	4,111	4,242	131	3%
Professional services managers	1,235	1,328	93	7%
University and higher education teachers	1,395	1,429	35	2%
Medical and pharmaceutical technicians	1,120	1,145	25	2%
Vocational education teachers	178	178	–	0%
Total	**26,350**	**32,318**	**5,970**	**23%**

FIGURE 1 | **Aggregate unmet need for social jobs by sector**
For all 10 studied countries



Source: World Economic Forum

2.2 Green jobs unmet need by economy and sector in 2030

The figures in the tables below refer to the number of green jobs – those requiring specific green skills – within each occupation.

TABLE 11 **Australia**

	Current employment	Employment needed by 2030	Unmet need	% change required
Agricultural, forestry and fishery workers and labourers	3,400	7,700	4,300	127%
Production managers in agriculture, forestry and fisheries	4,100	5,900	1,800	44%
Environmental government regulatory associate professionals	2,800	4,300	1,500	52%
Miners, quarriers and mining managers	2,000	3,100	1,100	57%
Forestry and agricultural professionals and advisers, and life science technicians	10,800	11,600	800	8%
Refuse workers	2,300	2,700	400	19%
Environmental, civil and chemical engineers	7,100	7,300	200	3%
Environmental protection professionals	7,000	7,200	200	3%
Physical and earth science professionals	2,300	2,500	200	8%
Environmental building frame and related trades workers	1,700	1,800	100	8%
Landscape architects	2,700	2,800	100	3%
Town and traffic planners	5,100	5,100	–	1%
Total	**51,200**	**62,000**	**10,800**	**21%**

TABLE 12 **Brazil**

	Current employment	Employment needed by 2030	Unmet need	% change required
Agricultural, forestry and fishery workers and labourers	210,500	486,300	275,800	131%
Production managers in agriculture, forestry and fisheries	11,600	24,400	12,900	111%
Forestry and agricultural professionals and advisers, and life science technicians	18,000	25,200	7,300	41%
Refuse workers	66,000	72,200	6,200	9%
Environmental, civil and chemical engineers	71,300	77,400	6,100	9%
Environmental building frame and related trades workers	41,700	45,900	4,200	10%
Environmental protection professionals	15,300	15,600	400	2%
Physical and earth science professionals	2,700	3,100	400	14%
Town and traffic planners	1,400	1,500	–	1%
Landscape architects	–	–	–	0%
Environmental government regulatory associate professionals	2,800	2,800	–	0%
Miners, quarriers and mining managers	1,300	1,300	–	1%
Total	**442,500**	**755,700**	**313,200**	**71%**

TABLE 13 | **China**

	Current employment	Employment needed by 2030	Unmet need	% change required
Agricultural, forestry and fishery workers and labourers	12,196,800	21,764,100	9,567,300	78%
Refuse workers	296,100	407,600	111,500	38%
Forestry and agricultural professionals and advisers, and life science technicians	138,900	224,200	85,300	61%
Environmental, civil and chemical engineers	467,900	490,500	22,600	5%
Environmental building frame and related trades workers	63,900	82,900	19,100	30%
Production managers in agriculture, forestry and fisheries	9,900	19,800	9,900	100%
Physical and earth science professionals	66,700	70,900	4,200	6%
Miners, quarriers and mining managers	14,600	17,100	2,500	17%
Environmental government regulatory associate professionals	27,700	29,900	2,200	8%
Landscape architects	8,900	10,700	1,800	20%
Environmental protection professionals	59,900	60,600	700	1%
Town and traffic planners	19,500	20,200	700	3%
Total	**13,370,900**	**23,198,500**	**9,827,600**	**74%**

TABLE 14 | **Germany**

	Current employment	Employment needed by 2030	Unmet need	% change required
Agricultural, forestry and fishery workers and labourers	900	14,500	13,600	1,598%
Environmental, civil and chemical engineers	43,100	55,600	12,600	29%
Forestry and agricultural professionals and advisers, and life science technicians	29,000	36,700	7,800	27%
Landscape architects	9,900	12,300	2,400	25%
Environmental government regulatory associate professionals	33,900	35,200	1,300	4%
Refuse workers	7,800	7,900	200	2%
Environmental protection professionals	2,400	2,400	–	0%
Physical and earth science professionals	–	100	–	36%
Environmental building frame and related trades workers	15,600	15,600	–	0%
Town and traffic planners	–	–	–	0%
Production managers in agriculture, forestry and fisheries	–	–	–	0%
Miners, quarriers and mining managers	–	–	–	0%
Total	**142,400**	**180,300**	**37,900**	**27%**

TABLE 15 | **India**

	Current employment	Employment needed by 2030	Unmet need	% change required
Agricultural, forestry and fishery workers and labourers	2,562,400	3,887,900	1,325,500	52%
Forestry and agricultural professionals and advisers, and life science technicians	107,300	281,100	173,700	162%
Production managers in agriculture, forestry and fisheries	159,900	268,900	108,900	68%
Environmental building frame and related trades workers	125,700	141,400	15,700	12%
Refuse workers	38,100	49,800	11,800	31%
Environmental, civil and chemical engineers	149,700	159,700	10,000	7%
Environmental protection professionals	132,500	137,600	5,100	4%
Miners, quarriers and mining managers	232,200	235,500	3,300	1%
Environmental government regulatory associate professionals	40,400	42,700	2,300	6%
Landscape architects	6,300	7,600	1,400	22%
Town and traffic planners	15,100	16,300	1,200	8%
Physical and earth science professionals	9,700	10,300	700	7%
Total	**3,579,300**	**5,238,800**	**1,659,500**	**46%**

TABLE 16 | **Japan**

	Current employment	Employment needed by 2030	Unmet need	% change required
Refuse workers	9,700	23,900	14,200	147%
Environmental building frame and related trades workers	23,900	35,100	11,200	47%
Environmental, civil and chemical engineers	58,800	62,100	3,300	6%
Agricultural, forestry and fishery workers and labourers	7,400	9,200	1,800	25%
Forestry and agricultural professionals and advisers, and life science technicians	14,000	15,500	1,500	11%
Production managers in agriculture, forestry and fisheries	12,800	13,800	1,100	8%
Town and traffic planners	11,200	12,000	800	7%
Physical and earth science professionals	4,200	4,700	600	13%
Miners, quarriers and mining managers	2,700	3,400	600	24%
Environmental protection professionals	7,800	8,100	300	3%
Landscape architects	6,000	6,100	100	1%
Environmental government regulatory associate professionals	200	200	–	3%
Total	**158,700**	**194,100**	**35,400**	**22%**

TABLE 17 | **South Africa**

	Current employment	Employment needed by 2030	Unmet need	% change required
Agricultural, forestry and fishery workers and labourers	13,200	126,900	113,700	862%
Environmental building frame and related trades workers	–	14,500	14,500	85,471%
Production managers in agriculture, forestry and fisheries	300	12,300	12,100	4,335%
Refuse workers	2,200	11,100	8,900	404%
Environmental, civil and chemical engineers	1,000	4,900	3,800	364%
Town and traffic planners	1,100	4,900	3,800	349%
Forestry and agricultural professionals and advisers, and life science technicians	4,400	6,800	2,500	57%
Miners, quarriers and mining managers	3,400	3,500	100	4%
Environmental protection professionals	–	–	–	0%
Physical and earth science professionals	–	–	–	0%
Landscape architects	–	–	–	0%
Environmental government regulatory associate professionals	300	300	–	6%
Total	**25,800**	**185,300**	**159,500**	**617%**

TABLE 18 | **Spain**

	Current employment	Employment needed by 2030	Unmet need	% change required
Agricultural, forestry and fishery workers and labourers	18,500	45,000	26,500	143%
Environmental building frame and related trades workers	23,700	30,700	7,000	29%
Forestry and agricultural professionals and advisers, and life science technicians	13,000	16,300	3,300	25%
Production managers in agriculture, forestry and fisheries	2,900	6,000	3,100	106%
Landscape architects	8,600	9,600	1,000	11%
Physical and earth science professionals	1,600	2,000	500	29%
Refuse workers	15,700	16,100	400	2%
Environmental, civil and chemical engineers	13,700	14,100	300	2%
Environmental protection professionals	10,700	11,100	300	3%
Miners, quarriers and mining managers	2,700	2,900	200	8%
Town and traffic planners	400	500	100	23%
Environmental government regulatory associate professionals	–	–	–	0%
Total	**111,700**	**154,300**	**42,600**	**38%**

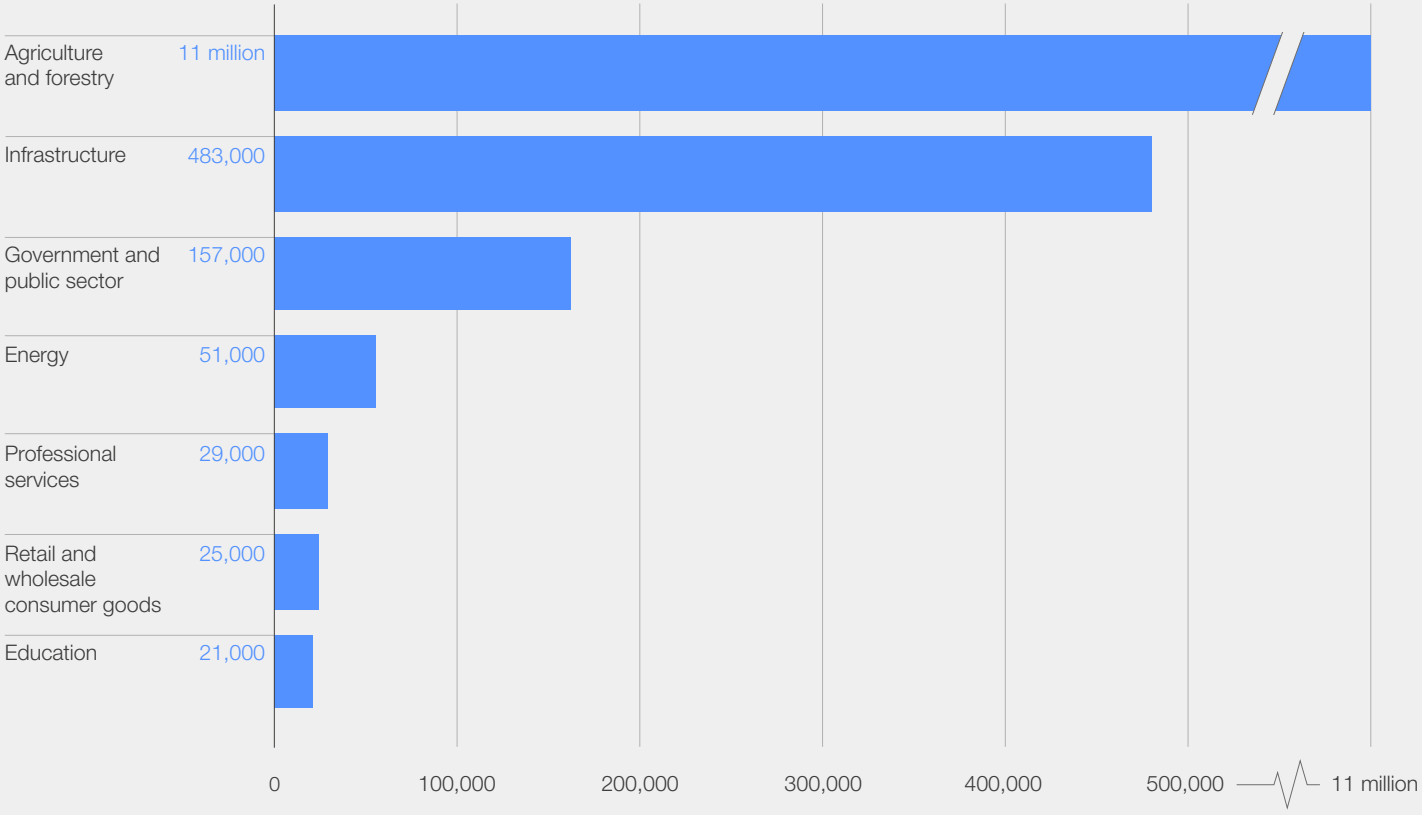
TABLE 19 | **United Kingdom**

	Current employment	Employment needed by 2030	Unmet need	% change required
Environmental protection professionals	15,400	32,700	17,300	113%
Environmental, civil and chemical engineers	3,000	14,200	11,300	380%
Agricultural, forestry and fishery workers and labourers	1,400	12,400	11,000	789%
Production managers in agriculture, forestry and fisheries	3,700	10,800	7,100	190%
Town and traffic planners	2,200	7,200	5,000	224%
Environmental government regulatory associate professionals	14,000	16,600	2,500	18%
Forestry and agricultural professionals and advisers, and life science technicians	900	3,200	2,300	244%
Physical and earth science professionals	2,600	4,300	1,800	68%
Miners, quarriers and mining managers	600	1,400	800	134%
Refuse workers	26,300	26,600	300	1%
Environmental building frame and related trades workers	13,300	13,300	–	0%
Landscape architects	–	–	–	0%
Total	**83,400**	**142,800**	**59,400**	**71%**

TABLE 20 | **United States**

	Current employment	Employment needed by 2030	Unmet need	% change required
Environmental building frame and related trades workers	24,300	31,200	6,800	28%
Agricultural, forestry and fishery workers and labourers	16,300	21,500	5,200	32%
Forestry and agricultural professionals and advisers, and life science technicians	54,600	55,900	1,300	2%
Miners, quarriers and mining managers	3,300	4,200	900	26%
Environmental, civil and chemical engineers	106,000	106,500	600	1%
Environmental protection professionals	67,200	67,800	600	1%
Production managers in agriculture, forestry and fisheries	1,000	1,600	600	56%
Physical and earth science professionals	19,800	20,300	500	3%
Refuse workers	38,700	38,900	300	1%
Town and traffic planners	11,800	11,900	100	1%
Environmental government regulatory associate professionals	400	500	100	14%
Landscape architects	2,700	2,700	–	1%
Total	**346,100**	**363,100**	**17,000**	**5%**

FIGURE 2 | **Unmet need for green jobs in selected sectors**



Source: World Economic Forum

3

Meeting the need for social and green jobs

Each of the 10 countries covered in this report needs a significant boost in the numbers of social and green jobs.

Doing so will effectively address a shift towards greater social mobility and enable an energy transition.

Inequality and sustainability are important issues for policy-makers, business leaders and populations globally. This provides an impetus for adequate and targeted investments to expand the social and green sectors and associated jobs, supported by public and private re-employment policies and job-transition support. In addition, such policies will need to be accompanied by training, upskilling and reskilling initiatives as well as innovative social-protection measures to secure livelihoods.

By quantifying the unmet need, this report aims to serve as a call to action for businesses and governments to invest in social-sector job creation and training, alongside greening all sectors, investing in green-skills development and helping prepare industries and the workforce for the demands and jobs of tomorrow.

Technical appendix

This report introduces an innovative calculation of "unmet need", defined as the gap between the social and green jobs in most economies today and the number of social and green jobs that could help countries achieve inclusion and emissions reduction aspirations in 2030.

The model compares **current baseline employment** in 10 countries of analysis (Australia, Brazil, China, Germany, India, Japan, South Africa, Spain, United Kingdom and the United States) with that of selected benchmark economies that are the top performers in terms of social mobility and energy transition. It thus calculates the relevant **current and target ratios** of social jobs (over the number of served population) and green jobs (over total employment, by industry) and uses them to **determine the needed employment** of all 10 countries by 2030, taking into consideration expected demographic shifts. **Country constraints** are then applied to reflect the available supply of labour and calculate the final "unmet need".

Denmark, Norway and Sweden have been selected as the benchmark economies to estimate unmet need in green jobs, as they top the ranking of the World Economic Forum *Energy Transition Index 2021*. The same three countries together with Finland were used as benchmarks to estimate unmet need in social jobs, as these four ranked top in the World Economic Forum *Global Social Mobility Index 2020*.

Estimating unmet need for social jobs

Assessing baseline employment

Social jobs are defined as the key occupations within three foundational social institutions – education, healthcare and care.

Data for the 10 countries of analysis and four benchmark economies was sourced from national statistical offices and converted into United Nations International Standard Industrial Classification and International Standard Classification of Occupations (ISIC-ISCO). To overcome the lack of publicly available data in China and India, four-digit ISCO occupation data was estimated using the latest available employment data by industry and aggregated groups of occupations from national statistical offices and the International Labour Organization (ILO).

Identifying target ratios

In the case of social jobs, target density ratios are calculated for all benchmark economies for each social occupation, dividing the number of people employed in each occupation by the population being served and taking a weighted average across the countries.

Estimating overall unmet need

For the 10 study countries, UN population projections were used to forecast density ratios in 2030, accounting for shifts in the population being served by each social occupation. For all social occupations in each of the 10 countries, the difference between target and forecasted density ratios was multiplied by the underlying served population to determine the number of professionals in deficit. In cases where forecasted density ratios were higher than the target density ratios, these professions were considered not to have any unmet need.

Estimating unmet need for green jobs

Assessing baseline employment

Identifying green jobs through intensity of green skills required at the occupation level

This report defines green jobs as occupations requiring specific green skills.

Using Lightcast's Skills Library, which consists of approximately 30,000 unique skills requirements across job postings, 390 were identified as green skills, representing required expertise or talent important to enabling environmental sustainability. These green skills largely fall under the following categories: sustainable farming, green architecture and building, environmental policy and analysis, clean energy, energy efficiency, climate change, nature conservation, ecology and resource management.

Lightcast job postings data available for the United States over the past 12 years was used to assess the percentage of roles with green skills by standard occupation and industry.

Roles were converted to ISCO and ISIC classification from US Standard Occupational Classification (SOC) and North American Industry Classification System (NAICS) classifications. Bespoke aggregations and exclusions were applied to better communicate green occupations, with occupations that have the highest proportion of green jobs featured in the report.

Estimating baseline green employment by country and industry

Baseline green employment for the remaining countries in the sample was estimated assuming a constant relationship between the green performance of industries by country (CO_2 emissions per unit of value-add – obtained from Oxford Economics) and their share of green employment. This means that industries with more green jobs are expected to have better green performance.

A series of elasticity coefficients between each industry's share of green jobs and its performance (i.e. CO_2 emissions per unit of value-add) was created using US data on total employment, share of green jobs and CO_2 emissions by industry. The distribution of country occupational profiles (sourced from national statistical offices) was used to estimate baseline green employment by occupation and industry for the remaining nine countries in the analysis as well as for the three benchmark countries (Denmark, Norway and Sweden).

Identifying target ratios

The estimated green employment levels in these benchmark countries were used to calculate the target ratios of green employment per 1,000 employees in each industry.

Estimating overall need

These target ratios were compared with the current ratio of green employment per 1,000 employees in each industry and each country of analysis to extrapolate the unmet need for green jobs.

Applying country-level labour market constraints

The unmet need for social jobs in each country was capped, where relevant, by applying a country constraint that consists of people available to fulfil these roles in 2030. The 2030 employment forecasts from Oxford Economics were used to assess that number. Given the size of unmet need for green jobs, no constraints were applied. The workforce needed to fulfil green jobs was deducted from the available labour supply and an adjustment factor was applied to social jobs based on the remaining projected unemployment population in 2030.

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Endnotes

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13. Where unmet need is blank, the economy has at least as high jobs density as the benchmark countries. Due to rounding, figures may not calculate exactly.

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