

Tradespeople wanted : The need for critical trade skills in the US

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US manufacturing and construction face a hiring crunch for skilled workers such as carpenters, electricians, welders, and plumbers. A few creative actions can help overcome gaps and boost performance.

The US skilled labor market is facing record- high pressure, particularly for companies with manufacturing and construction operations. Increasing **labor scarcity**, amplified by the COVID-19 disruptions, has intensified competition for talent, raising the sectors' average wages by more than 20 percent since the first quarter of 2020. Since money wages have rarely, if ever, fallen in the United States, this cost reset is effectively permanent, threatening margins and long-term growth. And this squeeze on labor is set to get worse as **demographic headwinds** intensify. To understand the scope of the problem and identify potential countermeasures, we looked at several critical skilled roles, including welders, construction laborers, electricians, and other skill categories that are vulnerable to increased churn (see sidebar, "Our methodology"). For these roles, we found that from 2022 to 2032, annual hiring is expected to be more than 20 times the projected annual increase in net new jobs (Exhibit 1). This **extraordinary rate of churn could cost companies more than \$5.3 billion every year** in talent acquisition and training costs alone. The **additional lost productivity** as new talent is brought up to speed could amount to significantly more.

Reduced supply versus demand

Two important supply-side trends are decreasing the number of skilled laborers in the US workforce: the aging US population and too few younger people entering the trades.

An aging workforce with fewer young replacements

The aging of the United States is becoming increasingly evident: between 1984 and 2027, the ratio of post-working-age individuals to working- age individuals is projected to rise by about 75 percent, from 2:10 to 3.5:10. In some sectors, the impact is already acute. Since the pandemic, labor force participation rates for people 55 and older have declined by about 2 percent, while for 16- to 24-year-olds, both participation rates and employment population ratios remain below pre- COVID-19 levels.

- Moreover, Gen Z workers report persistent cultural barriers to vocational training. Despite a recent 3 percent rebound in vocational enrollment (up from 2018 levels), a survey of 1,000 US-based 18- to 20-year-olds found that 74 percent perceive a stigma associated with choosing vocational school over a traditional four-year university. An overwhelming 79 percent of respondents said their parents wanted them to pursue a college education after high school, while only 5 percent said the same about vocational school. Younger workers' employment preferences pose an additional challenge. McKinsey recently compared worker attitudes and behaviors across five small, consistently sized age groups: Gen Z (18- to 24-year-olds), younger millennials (25- to 34-year-olds), older millennials (35- to 44-year-olds), Gen X (45- to 54-year-olds), and younger baby boomers (55- to 64-year-olds). We found that when taking a new job, contrary to all other age groups, Gen Z prioritizes career development and advancement potential as their top factors. When deciding to stay in a job, Gen Z, younger millennials, and older millennials prioritize workplace flexibility. The on-site and highly structured nature of construction and manufacturing jobs typically doesn't map to these preferences.

Our methodology

Our analysis is grounded in the US Bureau of Labor Statistics (BLS) Occupational Outlook Handbook calculations and projections of current and future occupational employment from the latest dates available (2022–32). Skilled-trades roles were selected based on **frequent migration to other jobs** or significant portions of the workforce entering retirement, along with extensive barriers to entry, slow career progression, and criticality to the advancement of public and private infrastructure (including clean-energy projects and advanced manufacturing).

- Comparing the most recent BLS net new job growth of skilled roles between 2022 and 2032 with the average annual job openings, there is an imbalance of **20 job openings for every one net new employee**. In other words, for the 26,000 net new employees that are projected to fill these 12 roles, there will be an estimated 584,000 annual openings. For most roles, the number of program completions lags substantially behind the number of job openings (for example, construction laborers and helpers show 3,400 program completions versus 151,000 projected annual openings).
- On average, many of these roles require approximately three years of apprenticeship, which can create extensive training demands, reduce wages for longer periods of time, and result in skills mismatches in rapidly evolving industries, such as wind and solar energy infrastructure. These dynamics are exacerbated by the significant number of retirements and steep turnover rates—often much higher than the national separation rate of 3.5 percent.¹ Valuable knowledge is being lost, hampering the training and development of new colleagues.

Finally, technical roles have long suffered from stark underrepresentation of women, whose share of the **skilled-trades workforce** remains in the single digits, and persons of color, whose share generally lags behind the average of about 40 percent (exhibit). This **lack of diversity** could further inhibit overall skilled-workforce growth.

Exhibit

Comparing job openings with training-program completions reveals trades with high churn rates.

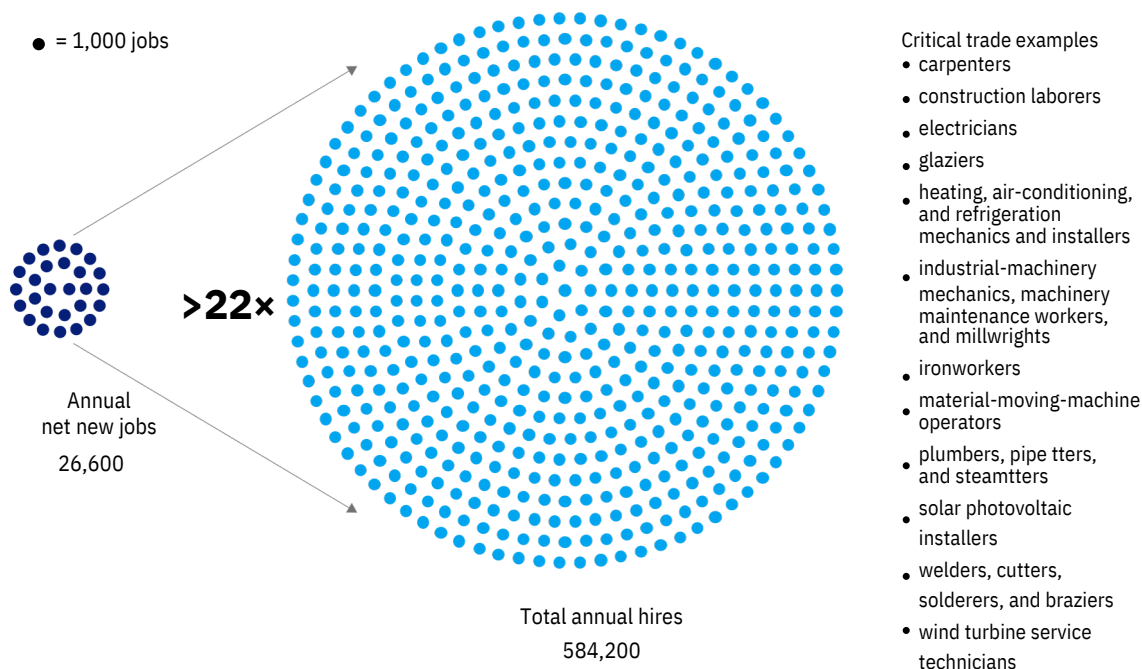
US employment in construction and manufacturing

	2022 employment	Projected annual net new employment, thousands	Projected average annual job openings, thousands	Estimated annual retirement rate, ¹ thousands	2023 program completions, thousands	Typical apprenticeship length, years	2021 female share of workforce	2021 non-White share of workforce
Construction laborers and helpers	1,625,000	6.0	151.0	25.6	3.4	2–4	11%	26%
Material-moving- machine operators	880,000	3.0	89.0	86.4	0.3	4	27%	41%
Carpenters	956,000	1.0	80.0	23.1	7.4	4	2%	30%
Electricians*	763,000	5.0	74.0	23.1	29.6	4–5	2%	23%
Industrial-machinery mechanics; maintenance workers; millwrights*	508,000	6.0	49.0	20.4	16.8	3–4	4%	22%
Plumbers; pipe fitters; steam fitters	483,000	1.0	43.0	13.4	72.2	4–5	2%	24%
Welders; cutters; solderers; braziers*	432,000	1.0	43.0	13.7	46.0	2	6%	25%
Heating, air-conditioning, and refrigeration mechanics and installers*	416,000	2.0	38.0	12.1	29.1	4–5	2%	22%
Ironworkers*	94,000	-	8.0	2.1	45.9	3–4	2%	24%
Glaziers*	55,000	-	6.0	1.8	1.5	3–4	2%	23%
Solar photovoltaic installers	29,000	1.0	4.0	0.6	4.2	1–2	3%	38%
Wind turbine service technicians	11,000	1.0	2.0	0.4	7.8	1–2	6%	24%

Exhibit 1

Annual hiring in the United States for critical skilled roles could be more than 20 times the projected annual increase in net new jobs from 2022 to 2032.

Annual job creation in critical trade categories,¹ number of jobs (average flows per year, 2022–32)



¹Identified based on 3 criteria: frequent migration to other jobs (or significant portions of workforce entering retirement), extensive training requirements, and criticality to public and private infrastructure, clean-energy projects, and advanced manufacturing.

Skyrocketing demand

Even as worker numbers fall, demand in US industry is projected to remain high due to infrastructure needs, a **surge in real estate redevelopment**, and **the energy transition**. The Bipartisan Infrastructure Law's (BIL's) spending levels and subsequent workforce needs are slated to peak around 2027–28, when new BIL construction expenditure could expand job market supply by 345,000 jobs, spanning sectors across the value chain. Construction and manufacturing, specifically, may experience strong competition for entry-level skilled-trades talent.

- Simultaneously, the repurposing of commercial real estate in response to hybrid work could also increase demand for construction trade workers. In a moderate scenario, we found that in the median city we studied, demand for office space in 2030 could be 13 percent lower than it was in 2019. That figure would translate into a reduction in value of 26 percent in our moderate scenario and up to 42 percent in our severe scenario. Yet demand for housing in most of these cities appears unlikely to fall: our modeling instead suggests that it will rise less quickly than it did before 2019, with little improvement in housing affordability. This could mean an opportunity to rebuild offices as residences. To help with the daunting economics of commercial-to-residential conversion, some cities are already creating **incentive packages that subsidize some of the costs**.

As the push toward net zero gains momentum, between now and 2030, the global renewables industry will need an additional 1.1 million blue-collar workers to develop and construct wind and solar plants and another 1.7 million workers to operate and maintain them. Not only will energy projects require a significant number of skilled-trades workers, but also the skills and capabilities necessary to execute the work will shift, requiring both rapid workforce scale-up and upskilling.

- As supply declines and demand accelerates, companies are having a harder time finding and retaining skilled-trades labor. Moreover, average weekly earnings for construction and manufacturing roles are 23.5 percent and 20.1 percent, respectively, above pre-COVID-19 levels. With labor both scarcer and more competitive than ever before, the stakes for companies are high.

What fewer workers means for manufacturing and construction

Although the high turnover among skilled-trades labor is evident across many occupations, there are a few critical roles that have an outsize impact on operations and the broader economy. Using US Bureau of Labor Statistics (BLS) data, we identified critical skilled roles based on **three criteria**:

I: Frequent migration to other jobs or significant portions of the workforce entering retirement

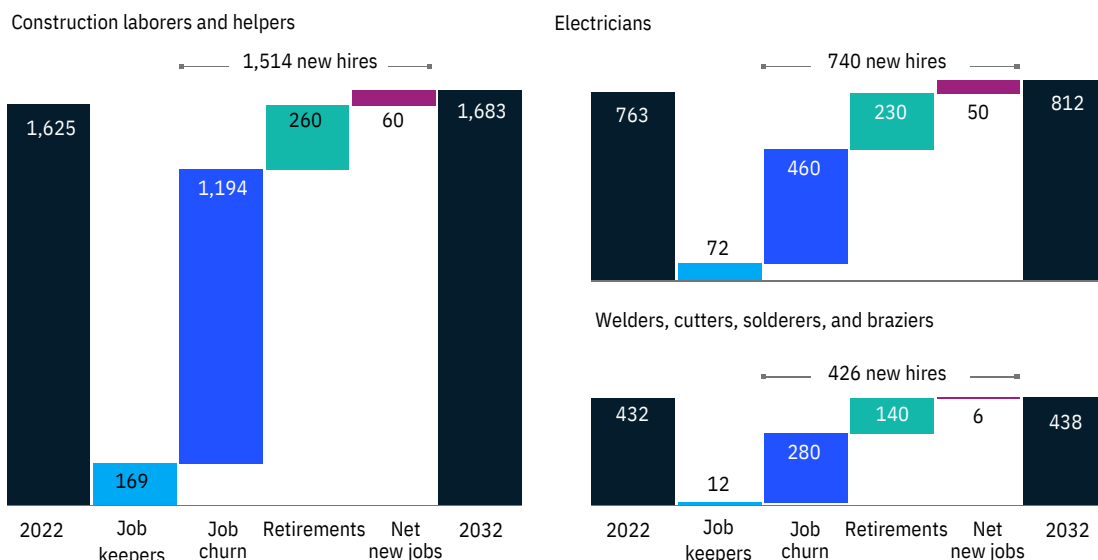
II: Extensive training requirements and consequent slow career progression

III: Criticality to the advancement of public and private infrastructure, clean-energy projects, and advanced manufacturing

Exhibit 2

In critical skilled roles in the United States, only a small percentage of workers will stay in their jobs from 2022 to 2032.

Jobs flows within critical trades, thousands of jobs (average flows, 2022–32)



Construction laborers and helpers

The US construction industry had roughly 374,000 job openings in December 2023. According to a 2023 Associated General Contractors of America survey, 70 percent of respondents are concerned about an insufficient supply of workers or subcontractors, and 80 percent are having a hard time filling some or all positions. The problem is so acute that 83 percent of construction workers themselves list inexperienced workers as the largest safety concern. Persistent challenges in filling vacancies are already delaying projects, hampering quality control, and raising costs—and are likely to worsen as demand for megaprojects accelerates under the BIL.

Electricians. Critical to both the construction and manufacturing industries, an estimated 30 percent of union electricians are expected to reach retirement age in the next decade. With a typical apprenticeship timeline of four to five years, organizations risk losing “tribal” knowledge, while individuals risk failing to acquire skills that they have few opportunities to use before their experienced colleagues retire. At the same time, rapid technology changes mean that by the time the worker is fully credentialed, some skills may become obsolete. Additionally, 70 percent of supervisors in the electrical industry are baby boomers (according to the National Electrical Contractors Association), implying that experienced frontline leaders could become particularly scarce. Among other risks, this shortage threatens the pace of the energy transition.

Welders, cutters, solderers, and braziers. A staggering 584,000 job openings bedeviled the US manufacturing industry in January 2024.⁹ Since approximately 70 percent of all manufactured products require the skills of welders and both manufacturing and construction firms compete for the same talent, this shortage has a disproportionate impact as it strains production, introduces quality concerns, hinders economic growth, and lowers productivity. When looking at job flows projected by the BLS over a decade, it is estimated that in approximately ten years, just 2.7 percent of 2022 welder jobs are likely to be considered “job keepers,” a finding attributed to both churn and retirement.

Plugging leaks in the talent pipeline

Tackling these workforce challenges will likely need to involve collective action across private, public, and social sectors. The organizations that have been most successful at securing required skills have shifted from reactive, siloed, and inward-facing approaches toward more open and transparent forecasting, including the sharing of data with new partners.

Regional solutions to fill talent pools :

A few regions are leading the **charge in addressing vast hiring needs.** A workforce development council in the eastern United States positioned itself as the single source of truth on **the skilled-trades gap** in its region. The council brought together employers, educators, and government to work together in new, data-driven ways to increase the ROI of talent supply initiatives. By studying the historical ROI of its workforce investments and rebalancing its portfolio toward those that had performed the best, the council is now on a path to increase skilled-trades job placements by more than one-third over the previous year, with the same level of funding.

Solutions developed for other sectors can also be adapted to skilled trades. A multistate region seeking to fill tech job openings brought together employers, educators, and other stakeholders to align talent strategies with economic planning and tailor offerings to what tech talent wants (such as “expert” career paths with no people management obligations). One result was an “employer signaling system” combining labor market information, employer insights, and feedback from schools to help participants better understand demand signals.



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Companies taking action on skilled-trades talent At the same time, there are steps individual companies can take to reduce churn in their own skilled-trades roles—and boost productivity as well. The two goals are intertwined. Productivity can rise when organizations transform their talent and operating model, invest in capital and technology, and manage economic headwinds, such as inflation and interest rate pressures (Exhibit 3). The overlaps among these broad areas of focus yield greater operating effectiveness, improved capital strength, and higher growth, which collectively accelerate improvement across the enterprise.

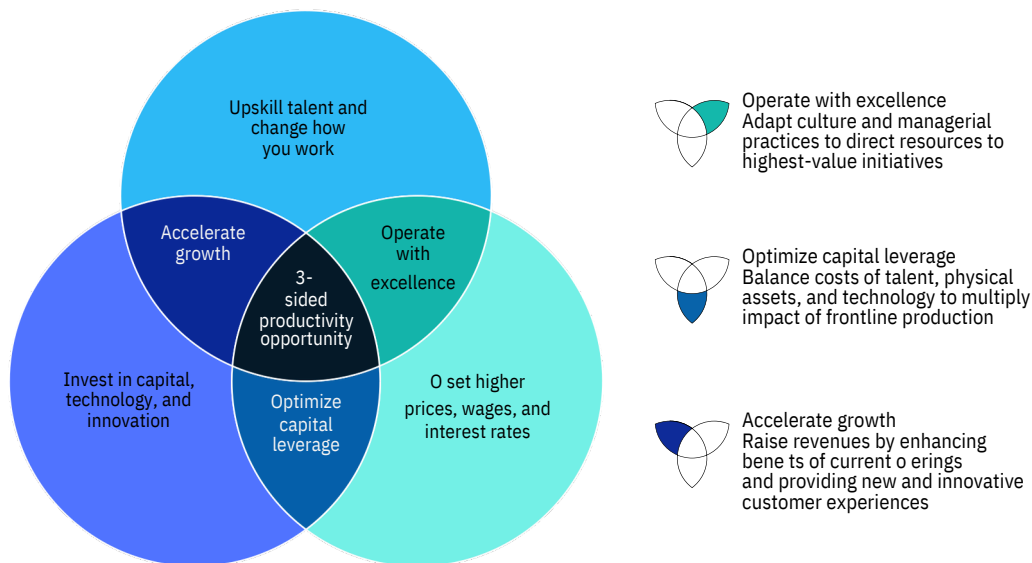
Several manufacturing and construction companies illustrate how leaders can address job friction while boosting productivity.

- **An engineering company** working on a high-profile project took particular care in planning for its workforce needs. By offering attractive sign-on bonuses and relocation packages, it was able to secure scarce skilled workers, including welders and electricians, and keep the project on target for on-time completion.
- **A heavy-equipment manufacturer** uses cobots alongside human workers to automate repetitive tasks and free up employees for more complex and analytical work. The use of cobots has enhanced productivity by 40 percent and improved resource utilization by 50 percent.

Exhibit 3

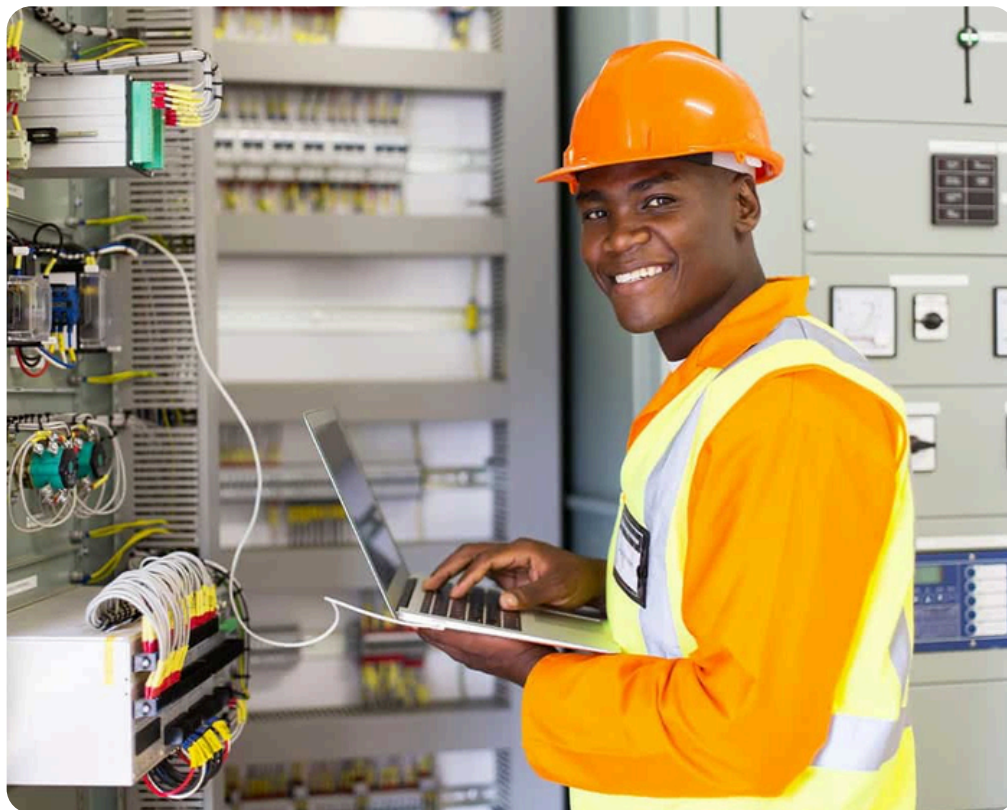
Upskilling talent is critical to raising productivity.

Productivity is driven by total value added: earnings retained and distributed to shareholders, compensation paid to employees, and capital inputs applied



An *electronics manufacturer* has used digital twins and remote control technologies to enable technicians to operate and debug factory equipment from anywhere in the world. The resulting increased flexibility has reduced vacancies by 25 percent and nearly doubled productivity.

High turnover in the skilled trades poses a serious challenge to the US economy—but also an incredible opportunity. Addressing attrition in critical skilled roles could encourage leaders in the manufacturing and construction industries to think differently about how they invest in human capital and re-excite the next generation on the value of skilled trades. In the short term, with labor increasingly scarce and expensive, **productivity is the answer to prosperity.**



Bibliography

US Bureau of Labor Statistics (BLS) – Occupational Outlook Handbook, Projections 2022–2032

<https://www.bls.gov/ooh>

McKinsey & Company – "What Gen Z workers really want", insights on generational labor preferences

<https://www.mckinsey.com/capabilities/people-and-organizational-performance/our-insights/what-gen-z-workers-really-want>

Associated General Contractors of America (AGC) – 2023 Workforce Survey Results

<https://www.agc.org/news/2023/08/30/2023-workforce-survey-results>

National Electrical Contractors Association (NECA) – Labor force insights

<https://www.necanet.org/industry-priorities/workforce-development>

U.S. Department of Energy – Energy Workforce Needs under the Bipartisan Infrastructure Law

<https://www.energy.gov/infrastructure/articles/workforce-development-bipartisan-infrastructure-law>

International Renewable Energy Agency (IRENA) – Renewable Energy and Jobs – Annual Review 2023

<https://www.irena.org/publications/2023/Sep/Renewable-Energy-and-Jobs-Annual-Review-2023>

McKinsey & Company – "The future of work in America: People and places, today and tomorrow"

<https://www.mckinsey.com/featured-insights/future-of-work/the-future-of-work-in-america-people-and-places-today-and-tomorrow>

Brookings Institution – "Commercial real estate and the post-pandemic city"

<https://www.brookings.edu/articles/commercial-real-estate-and-the-post-pandemic-city/>

Construction Industry Institute (CII) – Strategies to Improve Skilled Labor Productivity

<https://www.construction-institute.org/>

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