



**NESCO**  
RESOURCE

# SKILLED TRADES IN THE AGE OF AUTOMATION

*A Guide for Employers and Job Seekers*

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# Introduction

We're currently in the midst of the Smart Machine Age – an era of rapid AI adoption, automation, and human-machine collaboration. In this landscape, skilled trades are becoming more essential than ever.

From electricians wiring smart buildings to welders working alongside AI-powered tools, skilled professionals are in high demand. As Forbes notes, [“skilled tradespersons are not just in demand. They’re the backbone of America’s future.”](#)

At the same time, AI and advanced technologies are increasing productivity and supporting smarter decision-making on the job. These tools are creating new opportunities for workers to expand their skills, retrain when needed, and grow within their chosen fields. Rather than replacing people, technology is amplifying the value of human expertise and judgment.

For employers, the Smart Machine Age presents both opportunity and responsibility. Organizations must adopt new technologies to remain competitive while also investing in training and development to help their workforce keep pace. Without that investment, companies risk widening skills gaps, higher turnover, and slower growth.

For job seekers, the shift opens new doors. Those who build technical literacy, strengthen soft skills, and commit to continuous learning will be well positioned for the next generation of skilled roles, where technology enhances human capability rather than replacing it.

This guide is designed for two audiences:

- **Employers** looking to future-proof their workforce, retain talent, and adapt to new technologies.
- **Tradespeople and job seekers** who want to stay competitive, learn in-demand skills, and build long-term careers in an evolving industry.

We'll separate myth from reality, highlight where human skills and automation intersect, and share practical steps for thriving in this new era of skilled work.

# Automation and Skilled Labor

## A New Relationship

Automation doesn't eliminate the need for skilled trades – it reshapes it. AI and robotics can now be used to handle repetitive, dangerous, or physically challenging tasks, allowing skilled workers to focus on higher-value, more complex work.

### Collaborative Robots

Cobots or collaborative robots are becoming [increasingly popular](#) and work alongside humans to enhance productivity without replacing jobs. They are designed to be user-friendly and safe for close human interaction, making them ideal for welding, assembly and even product inspections. As these cobots become more affordable, they are [bridging the gap between human ingenuity and machine precision](#) especially in small- and medium-sized shops.

### Artificial Intelligence (AI) and Machine Learning (ML)

Crucially, AI is helping anticipate maintenance needs before machinery breakdowns occur. This can minimize downtime and extend the life of equipment. AI-driven quality control, using advanced image recognition and machine learning algorithms, is making it easier for manufacturers to detect defects, reduce waste and ensure higher product quality. [“Even the smallest shifts with AI/ML innovation could have a huge impact on operations](#), bringing improved efficiency, better performance, and real-time access to insights.”

## Key Examples

### CNC Operators

Automation now handles repetitive CNC tasks with robotic arms, auto-tending, and AI/IoT for tool monitoring. Skilled operators are still needed for programming, maintenance, and troubleshooting.

### Welders & Fabricators

Robotic and AI-assisted welding have become common, especially where high consistency or throughput is required. For instance, [at Kawasaki Motors Manufacturing](#), about 80% of arc welding is done by robots; human welders now handle manual welds.

### Maintenance Technicians

Automation drives demand for technicians who can calibrate, troubleshoot, and repair advanced systems. Predictive maintenance with AI and sensors boosts uptime but requires workers who can interpret data and complete repairs.

### Electricians & Smart Systems

Electricians are increasingly installing and servicing IoT-enabled building systems, automation controls, and remote diagnostics blending trade skills with digital know-how. The Bureau of Labor Statistics predicts [9% growth](#) in this field between now and 2034.



## Bottom Line

**Automation doesn't eliminate the need for skilled trades, it reshapes it.** AI and robotics are not wholesale replacements for skilled trades, but rather tools that shift what is required from workers.

# For Employers — Adapting to the New Era

Employers in the skilled trades are navigating a turning point. On one hand, automation and AI-driven systems offer major gains in efficiency, safety, and output. On the other, businesses risk falling behind if their workforce isn't equipped to adapt. [Research from Brookings](#) notes that worker retraining efforts often fall short when companies treat them as one-off fixes rather than continuous investments. To remain competitive, employers must integrate technology adoption with deliberate workforce development.



Even if companies are doing their utmost to foster workforce development, there's still a significant skilled labor shortage. Mike Rowe of Somebody's Gotta Do It and Dirty Jobs fame noted that as of Sept. 1, 2025, that [there are 7.6 million skilled labor jobs open right now in the United States](#). And that for every five tradespeople that retire, there are only two who have the skills to replace them. So, what's a company to do?



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# Strategies for Success

## Retain and Retrain

Automation doesn't eliminate the need for people; it changes what people need to know. Employers who invest in ongoing training programs ensure their teams can operate, program, and maintain new equipment. Upskilling current workers is not only cost-effective but also strengthens loyalty by showing a long-term commitment to employees' careers.

## Build Apprenticeship Pipelines

The next generation of tradespeople is looking for clear pathways into stable, well-paying work. Partnerships with trade schools, community colleges, and workforce development programs create apprenticeship pipelines that bring in fresh talent. By aligning curriculum with industry needs, employers can secure a steady flow of workers trained for today's technology-driven roles.

## Foster a Strong Culture

Compensation matters, but so do growth and mentorship. Employers who provide competitive wages, career development opportunities, and hands-on guidance are more likely to attract and retain younger workers. A strong workplace culture not only reduces turnover but also helps skilled employees see a future for themselves in the trade.

## Incentivize Innovation

Frontline workers often know best where technology can improve processes. Employers who encourage employee-driven innovation – through suggestion boxes, good idea recognition, or financial rewards – build buy-in and make transitions smoother. Workers who feel empowered to shape change are more likely to embrace new tools rather than resist them.

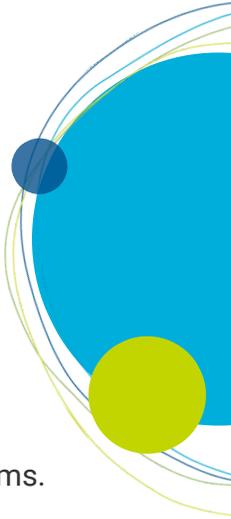
## Use a Staffing Agency

When you need to find skilled labor fast, turn to the professionals. Firms like [Nesco Resource](#) have a database of ready-to-work candidates and skilled recruiters who can tap into talent when you need it most. Nesco helped a leading automation systems company recruit and retain qualified field engineers and automation technicians. [By partnering with Nesco, the company reduced the hiring cycle by 60-70% and increased retention.](#)

By blending technological advancement with human investment, employers can avoid the pitfalls of labor shortages and high turnover. Retaining and retraining workers, cultivating apprenticeships, fostering a supportive culture, and rewarding innovation aren't just strategies for the future – they are essential practices for thriving in the present.

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# The Skilled Tradesperson's Guide to Thriving in a Tech-Driven World



The future of work is being reshaped by artificial intelligence (AI), robotics, and smart systems. Many workers will need to learn new skills, and some may even need to retrain for entirely different roles before they retire.

In the Smart Machine Age, iterative learning emerged as one of the most important skills. Edward Hess, Professor Emeritus at the University of Virginia and a leading expert on human high performance, says the ability to continuously learn through trial, feedback, and refinement will define success in the AI era.

"We as a society are on the leading edge of a confluence of technology advances that will dramatically change how we live and work," Hess says. "In the Smart Machine Age, many of us will have to relearn how to learn iteratively."

Despite headlines predicting widespread job loss, the reality is more nuanced. Research suggests the real story is not simply about jobs disappearing, but about how work is evolving and the opportunities available to those willing to adapt.

## Change ≠ Disappearance

Economists stress that "change" is not the same as "elimination." In fact, exposure to AI can mean opportunity. Jobs may evolve into higher-value roles, with workers freed from repetitive tasks to focus on judgment, creativity, and leadership.

Today's skilled tradespeople need more than technical ability—they need adaptability.

The more hands-on your job is, the less likely AI will replace you. Welders, electricians, and plumbers may see less disruption than white-collar clerical jobs, but no field is truly risk-free or guaranteed safe.

## Lessons from the Front Lines

How workers approach AI also makes a difference. In one study, paralegals asked to use AI only for productivity gains made modest improvements. Those encouraged to offload disliked tasks thrived, moving into higher-value legal work. When you embrace the technology to make yourself more efficient, you become a higher-value employee.

## The Human Advantage

What makes some jobs more susceptible to being replaced by a machine than others? MIT Researcher Isabella Loaiza and MIT Economist Roberto Rigobon [came up with an EPOCH score](#) as to what jobs would be harder replace with AI or automation.

The EPOCH score:

- **Empathy:** Connecting with others on a human level
- **Presence:** Physically showing up, collaborating face-to-face
- **Opinion/Judgment:** Applying ethics, critical thinking, & judgment calls
- **Creativity:** Imagining new ideas beyond existing data
- **Hope:** Leading, inspiring, and envisioning the future

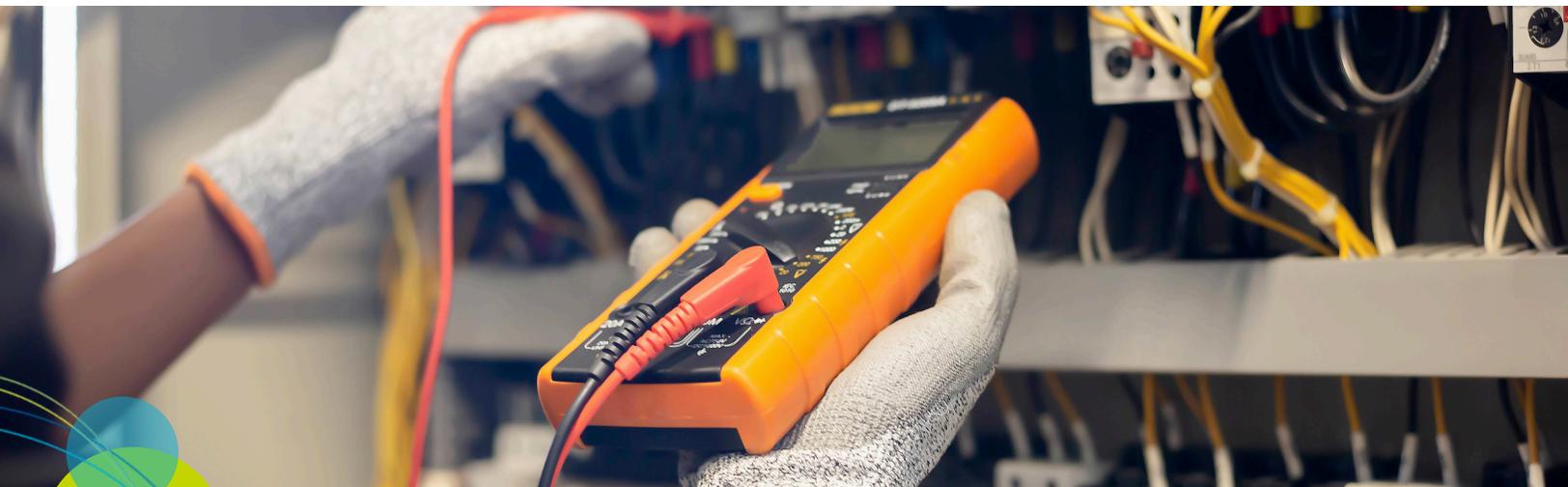
These “human skills” are increasingly valuable complements to technology. Jobs that emphasize EPOCH qualities – such as managers, emergency responders, and even tradespeople who mentor apprentices – score high in job resilience.

## Becoming Future-Proof

For job seekers and tradespeople, the path forward is not about predicting which jobs will vanish but about **building adaptability**:

- **Cultivate soft skills** like communication, empathy, and leadership.
- **Invest in tech literacy** by learning how to use AI tools ethically and effectively.
- **Pursue certifications** that demonstrate both traditional expertise and modern adaptability.
- **Commit to continuous learning** so you can pivot as industries evolve.

The most future-proof workers will be those who don't fear technology but learn to harness it – combining technical know-how with irreplaceable human strengths.



# In-Demand Career Fields

As technology reshapes industries, many of the most promising career opportunities are emerging in skilled technical roles. From advanced manufacturing to renewable energy, employers are looking for workers who can operate, maintain, and improve increasingly sophisticated systems.

The following careers represent some of the most in-demand fields today, offering strong job outlooks, competitive pay, and clear pathways often through technical training, certifications, or associate degrees.



## CNC Machinist

The job outlook for CNC machinists is generally strong because of an aging job force and demand driven by manufacturing growth in industries like aerospace and medical devices. Key steps to becoming a CNC machinist include a combination of technical education and on-the-job training. [According to the Bureau of Labor Statistics, CNC machinists earn a median salary of \\$57,700.](#)



## Maintenance Technician

While a maintenance mechanic can repair and maintain machinery, a maintenance technician goes a step further and can diagnose why the machine broke. Technicians focus on advanced diagnostics, electronics, and PLC (programmable logic controller) systems. Becoming a maintenance technician typically requires a 1-2 year certificate or associate's degree in industrial maintenance, electromechanical technology, or HVAC. [On average, this job pays between \\$56,000 and \\$62,000.](#)



## Welder

Overall employment for welders is projected to grow about 2% through 2034, with [a median annual salary of around \\$51,000.](#) However, demand remains strong in key sectors such as infrastructure and manufacturing. Opportunities and earnings can vary widely by region and specialization. Highly skilled welders, particularly those trained in TIG or rig welding, are in high demand and can earn \$60 to \$80 per hour. These specialized roles are especially sought after in regions such as Washington, D.C., Alaska, and Hawaii.

## Electrical Technician

Employment growth for electrical technicians is projected to be relatively slow at about 1%. However, the Bureau of Labor Statistics still expects roughly 8,400 job openings each year, largely driven by the need to replace retiring workers. This role tends to offer strong earnings, with [a median annual wage of about \\$77,180](#). Most electrical technicians enter the field through a four- to five-year apprenticeship program, often sponsored by a union, or by earning an associate's degree in electrical technology from a trade school.



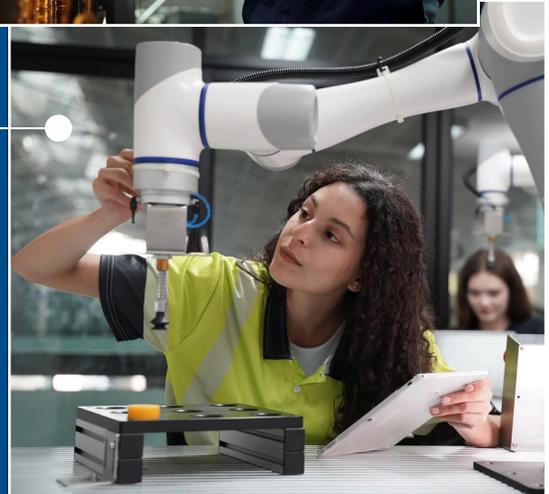
## Quality Assurance Inspector

While automation may reduce some inspection roles, demand is expected to remain steady for quality assurance and quality control inspectors in industries such as manufacturing, food production, and technical services. [The median annual salary is \\$47,460](#), and many inspectors enter the profession with a high school diploma and receive on-the-job training.



## Automation Technician

Automation technicians are in high demand as manufacturing increasingly relies on automated machinery, robotics, and PLCs (Programmable Logic Controllers). The median salary is about \$67,500, and many professionals enter the field by earning an Associate of Applied Science degree or an associate's degree in robotics and automation. Industry-recognized credentials, such as certifications from the Smart Automation Certification Alliance ([SACA](#)) or the Certified Automation Professional designation, can further strengthen job prospects and earning potential.



## Additional Career Fields On the Rise

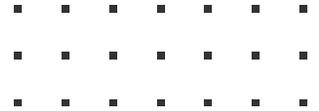
### Solar Voltaic Installer

Career opportunities in renewable energy are set to surge over the next decade. Solar photovoltaic installer roles are projected to grow by an impressive 42%. The job only requires a high school diploma and [pays \\$51,860](#) on average.

### Wind Turbine Technician

Similarly, wind turbine technician jobs are expected to climb even higher [with up to 50%](#) growth over the same period. The job requires either an associate's degree or a 1- to 2-year postsecondary certificate. On average, the job pays \$62,580. [The top states](#) to find a job are Texas, California, Kansas, Oklahoma, Iowa, Minnesota, Pennsylvania, New York, North Dakota, and New Mexico.

# Resources



## GOVERNMENT RESOURCES

### [Department of Labor Registered Apprenticeship Program](#)

With this program, employers can develop a highly skilled workforce and retain top talent. Job seekers can earn as they learn with a guaranteed wage increase as they develop skills. Federal education funds may help businesses make these investments in retraining.



## INDUSTRY ASSOCIATIONS

### [Heroes MAKE America](#)

Sponsored by the National Association of Manufacturers, trains veterans and military spouses to excel in manufacturing careers.

### [The National Center for Construction Education and Research](#)

Partnered with the Associated Builders and Contractors (ABC), offers certification programs that go beyond field experience and focus on essential leadership skills.

### [The Electrical Training Alliance](#)

In collaboration with the National Electrical Contractors Association (NECA), is “the number one resource for electrical industry training.”



## TRADE SCHOOLS AND TECHNICAL PROGRAMS

### [Find My Trade School](#)

Database of 1,500 trade schools and vocational programs across the country.

### [Careers School Now](#)

A list of trade schools, vocational and technical colleges that claims to be the largest U.S. database.



## HELPFUL ARTICLES

### [Jobs That Won't Get Eliminated by AI Anytime Soon](#)

Train for the automation-resistant jobs to future-proof your career.

### [What Jobs Are Most at Risk by AI?](#)

This article looks at the jobs most at risk for disruption due to AI and offers lower-risk alternatives.

### [Human Excellence in the Smart Machine Age: An Introduction](#)

Professor Hess discusses the challenges and opportunities for people in the Smart Machine Age and how we need to adapt.



# About Us

Nesco Resource, a nationally ranked workforce solutions organization, was founded in 1956 in Cleveland, Ohio. Nesco focuses on personalizing your success, connecting top talent with great employers and opportunities.

We offer a range of services designed to reduce the workload on our clients' plates, allowing you to focus on what truly matters. By handling all aspects of staffing and workforce management, Nesco Resource streamlines operations and ensures seamless, cost-efficient solutions.



## Direct Hire

Direct hire is a strategic option if you need permanent employees but also need resources to support the entire search process from sourcing to interviewing to onboarding.



## Contingent Labor

Contingent labor provides the flexibility to scale your workforce, access specialized skills, reduce onboarding time, and quickly adapt to market changes and business demands, all while delivering cost savings and regulatory compliance.



## Onsite Partnership Program

With a Nesco Resource representative managing our associates at your location, you don't have to worry about onboarding or day-to-day employee management tasks.



## Recruitment Process Outsourcing

We're experts at every step of the recruiting journey with skilled recruiting teams and flexible solutions that allow us to source, vet, interview, and hire the best candidates for your organization.



## HR & Payroll Solutions

Whether your focus is to reduce the burden of employee payroll processing or establishing a full-service PEO solution, our customized programs reduce internal full-time employee expense and allow you to focus on your critical business goals.



## Managed Services

From master vendor through full cycle procure-to-pay, our streamlined solutions provide greater visibility into spend, quality, cost savings, and risk mitigation so you can achieve your strategic goals.



# Let's Talk

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