**Where the Jobs Are: The New Blue Collar**

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Joseph Poole will make more than $100,000 in wages and overtime by the end of the year.

The 21-year-old works in what looks like NASA's mission control, monitoring the manufacturing process at Chevron Phillips petrochemical plant in Houston. Poole didn't get the job with the engineering degree he originally considered. Instead, Poole landed it with a two-year course at a local community college.

"The potential to make just as much money as an engineer, but for half the cost of the education, was here," Poole says. "Just seeing firsthand how things are made is something I really enjoy doing."

By 2017, an estimated 2.5 million new, middle-skill jobs like Poole's are expected to be added to the workforce, accounting for nearly 40% of all job growth, according to a USA TODAY analysis of local data from Economic Modeling Specialists Intl. and CareerBuilder.

Not all pay as much as Poole's, but all pay at least $13 an hour; many pay much more. These jobs require some training but far less school than a bachelor's degree. Technology has given many a makeover, leaving them worlds away from their assembly-line predecessors and challenging the notion that good blue-collar jobs are dead and that the only path to a good career is a four-year degree.

There's a new middle. It's tougher, and takes more skill," says Anthony Carnevale, director of the Georgetown University Center on Education and the Workforce.

USA TODAY looked at jobs data in 125 of the nation's largest metros, finding that prospects look good.

• Houston is expected to add more than 100,000 middle-skill jobs by 2017, with 40% paying $20 per hour or more. Several other Texas metros — Dallas, McAllen, Austin, Killeen and San Antonio — are among those expecting the fastest growth in middle-skill jobs.

• Atlanta needs construction workers, lighting experts and others to work in its fast-growing film industry. Skill is required, but not necessarily film experience for the 77,000 film workers (average pay $84,000) and support personnel in 2012, who turned out movies such as *The Fast and the Furious* and *The Hunger Games* franchises, according to the Motion Picture Association of America.

• In Augusta, Ga., Salt Lake City, Knoxville, Tenn., and Vallejo, Calif., livable-wage, middle-skill jobs will be the primary driver for overall job growth, accounting for nearly half of all new jobs.

• In most metro areas, some of the best-paying middle-skill jobs include radiation therapists, elevator installers and repairers, and dental hygienists, all with a median wage of more than $70,000.

• In such places as Texas and North Dakota where the gas and oil industries are booming, petroleum workers are needed. But so are the electricians, pipefitters, carpenters and others who build the infrastructure.

"This country is facing a shortage of that kind of talent. So the demand is there, big time, " says Peter Cella, CEO of Chevron Phillips Chemical. Chevron and competitor ExxonMobil Chemical are both building giant plants that will triple the output of plastics from Houston. "What we need to work on is the supply."

The loss of blue-collar jobs — accelerated by the recent recession — has resulted in the "hollowing out of the middle," which has left behind either low-paying jobs or higher-paying jobs that require significant skills say some economists. But some economists say the middle is not gone; rather, it's growing.

"We have not become a barbell economy," says Paul Osterman, an economist and professor at the MIT Sloan School. "There will be tremendous demand for these jobs [when the Baby Boom generation retires](https://www.documentcloud.org/documents/1300767-osterman-report.html)." Currently, Boomers make up about 20% of the workforce.

Although manufacturing jobs have declined 35% since 1980, according to the U.S. Bureau of Labor Statistics, there's actually been a resurgence in recent years as American companies have found that moving jobs offshore was not a good approach for production that requires highly skilled labor.

"There's a lot of re-shoring," says Andrew Crapuchettes, CEO of Economic Modeling Specialists Intl. "They're coming back, but they are coming back different. More technician jobs, which pay more. There may be fewer jobs, but they are better jobs."

But that means more training, given that nearly 80% of the new blue-collar jobs require some, typically less than a year, according to [Carnevale's research](https://www.documentcloud.org/documents/1300768-five-ways-that-pay.html). Some companies can provide it, but many require prospective workers to find their own classes.

Even in red-hot Houston, you'll need training.

"If you have no skills, you're not necessarily going to pop down here and find a job," says Cally Graves, senior industry liaison for the Gulf Coast Workforce Board in Houston. "You need to get some training or education … otherwise, you'll end up in the same old situation you were in back home."

At E.J. Ajax, a precision manufacturing company near Minneapolis, training eats up 5% of the company's payroll, just to ensure a pipeline of workers is available to move up as employees retire.

"The global competition doesn't keep me up at night," says Erick Ajax, co-owner and grandson of the founder. "I know we can go toe-to-toe with any company in the world. But having people that have the right skill set … that wakes me up at 3 o'clock in the morning."

Society's push to get all young people into four-year colleges — what William Symonds calls the "one road to heaven" approach — contributes to a shortage of skilled workers.

"People degrade or demean jobs that don't require a four-year degree. …That's not what they want their kids to do," says Symonds, who is launching the Global Pathways Institute at Arizona State University to study this issue and urge policymakers to help students find the best "pathway" to success.

At the same time, high schools have dropped vocational and technical education programs over the past 30 years, eliminating a key way young people are introduced to these careers.

"Over the last 40 or 50 years, we've portrayed work differently and we reward some forms of education far more passionately than others," says Mike Rowe, host of *Someone's Gotta Do It* and *Dirty Jobs.* After working blue-collar jobs across the country for his show, Rowe started a foundation, mikeroweWORKS, to address the image problem.

"Higher education is in one column and everything else is called alternative. And those kinds of pursuits are reserved for people who are somehow deficient or somehow not cut out for the desirable path."

Rowe worries there are too many young people going to four-year colleges, racking up huge amounts of debt and ultimately ending up unemployed, when they could've taken a less-expensive path and ended up with a good-paying job.

Rowe also points out that language matters.

"What's aspirational about 'middle skill'?" says Rowe. "It's going to take a generation to get people to really challenge the stereotypes that come along with skilled-labor type jobs."

Change won't happen without students getting better information about career planning, says Andy Van Kleunen, executive director of the [National Skills Coalition](https://www.documentcloud.org/documents/1279775-national-skills-coalition-report.html).

"They need to know what the real employment prospects are going to be, including financial," Van Kleunen says. "What will school cost you? What will the pay be?"

Community and technical colleges are trying to fill the gap by enrolling young adults who either drop out of a four-year college or can't find a job after graduation.

Instructors at Lee College, near Houston, say they are seeing an increasing number of students apply for the school's petrochemical-related programs after initially pursuing a bachelor's degree in petroleum or chemical engineering.

"These are 'gold collar' jobs," says Charles Thomas, the head of the school's process technology division. "Technicians in our program start out with $62,000 base salary plus overtime."

Laci Patty, 30, a physics teacher, was frustrated by the emphasis on standardized testing and other changes in education. When a Lee College instructor came to her class to recruit students for the program, they ended up recruiting her. She started night classes earlier this year.

"There's actually a chance for advancement and more money," says Patty, who will graduate next summer.

Researchers say there are some legitimate reasons employers might be having trouble finding qualified workers in certain locations or positions. This could include markets with low unemployment, jobs with relatively new skills and rural areas with a limited labor pool. And some areas of the country, may see few new jobs.

"It is such a local problem," Crapuchettes says, referring to what he calls an "information gap." In Durham, N.C., for example, programmers are in high demand commanding big salaries; in Virginia Beach, programmers earn a third as much.

"Employers don't know the talent is in Virginia Beach and (workers) don't know they can make three times as much three hours away," he says.

Depressed housing prices have made it harder for workers to move, economists say. And in places such as Milwaukee, three-quarters of the jobs are in the suburbs where there are few mass transit options, says Marc Levine, senior fellow at the Center for Economic Development at the University of Wisconsin-Milwaukee.

[Peter Cappelli, director of the Center for Human Resources at The Wharton School](https://www.documentcloud.org/documents/1302356-cappelli-report.html), says other factors — such as automated screening algorithms in online application systems — might also play a role. In his book *Why Good People Can't Get Jobs,* Cappelli notes one case where a company received 25,000 applications for an engineering job, but none matched the qualifications.

Cappelli also argues that employers may say they can't find workers for political leverage: to loosen immigration laws, particularly for higher-skilled workers, and to get educational systems and public tax dollars to take over the burden of training workers.

If employers can't persuade the government to take action, Cappelli says, "then I think we'll see employers get creative, figure out ways to train people and the market will work this out."

Vice President Biden leads the White House effort to "widen the pipeline" and create innovative job-training programs across the country.

"These are not minimum-wage jobs. There are so many good jobs. But people don't know how to get to them," Biden said in a White House interview.

"It's not the federal government creating jobs. We're facilitating. We're putting the mechanism together to identify real jobs. We're just saying here's where the jobs are, here's the requirements, here's how you get those requirements and we'll help you pay for it, if you qualify."

Biden cites a program he visited in Detroit that taught programming skills to two dozen women with no previous experience. All graduated, and within days, were hired at salaries of $55,000 to $100,000.

The [administration's report](https://www.documentcloud.org/documents/1279773-white-house-report-july-2014.html), released in July, stresses the importance of employers working with schools to make sure students are getting the right skills, and promotes more apprenticeships. It also highlights programs that encourage accountability, such as a "report card" program in New Jersey where schools are graded based on where their graduates were placed and how much they earn.

Biden says he is confident some of the basic initiatives will be funded. On Monday, he announced $450 million in new-job-training grants for partnerships between businesses and community colleges. Altogether, $2 billion has been given out in the past three years.

"In this divided town, there is an emerging consensus. There's a lot of opportunity. Businesses are coming back *if* we have qualified workers."

Some state and local economic development organizations and community colleges are trying to generate data to help close the information gap.

• In Georgia, for example, the state government is trying to systematically assess which jobs are not being filled. That's especially important for a state where the growing film industry has lost projects for a lack of workers.

• Monroe Community College in Rochester, N.Y., released a report linking programs at the school to data on supply, demand, wages and required skills for local occupations. For example, there are 42 job openings for students in the Applied Integrated Technology program — also referred to as mechatronics — in the area. Salaries can reach as high as $31 an hour, but there aren't students being trained for these jobs. The college is starting a mechatronics program next fall.

• Many colleges, like Monroe, are trying to respond to the ebb and flow of job demand by offering fast-track, non-degree courses that get trained students into the workforce faster, but also can be easily scaled back or dismantled when the supply of workers meets demand.

"We need students who are college-ready and ready for an intensive experience," said Todd Oldham, vice president of economic and workforce development at Monroe Community College. "We're doing this to create a worker."

Ajax's company near Minneapolis isn't waiting for schools to take the lead.

He and several of his competitors worked with Anoka Technical College to launch the Precision Sheet Metal Academy five years ago. They got nearly $1 million in equipment, tooling, safety, software and material donations to start the 100-hour, fast-track program. To date, it has put almost 300 people to work and has an employment rate of 98%, according to the college.

"If we go to one of those schools and say we need a program to train the five new people we hired, they're going to laugh at us 'cause there's no way they can develop a program, buy the equipment, hire instructors, get the floor space for five people," Ajax said. "But if we get 10 companies and we're training 50 to 100 per year, that's a sustainable model."

It's also a model for workers who want to retool their own careers.

At 29, Emily Cramble had shifted from job to job after high school. She lost her job at a gas station, lost her home to foreclosure, had her car repossessed and racked up thousands of dollars in debt.

Then, the single mother heard companies were having a hard time finding precision sheet metal workers. She got a grant to cover tuition and within two days of finishing the three-month training, she had a job.

"It was totally worth it," said Cramble, who is now making more than $41,000 per year between her salary and overtime — more than double what she made at the gas station and enough to make her feel confident that she can take care of her 5-year-old daughter on her own.

I couldn't have imagined a year, year-and-a-half ago that this is where I'd be," Cramble said. "And I can't imagine where I'm going to be a​ couple years from now."