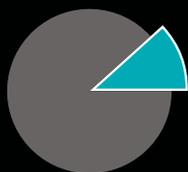


# CTE: THE KEY TO ECONOMIC DEVELOPMENT

## Energy:



Accounted for  
**8.3%**  
of U.S. GDP in 2010<sup>1</sup>

Employs many of the  
**2.7 million**  
U.S. workers in  
the clean economy<sup>2</sup>

Is projected  
**to grow**  
in key sectors such as  
shale oil and gas production<sup>3</sup>

What is the pathway to these  
fulfilling and essential careers?

**Career and Technical Education!**



*Proud supporters of ACTE.*



Association for Career and Technical Education  
1410 King Street, Alexandria, VA 22314  
Phone: 800-826-9972 // Fax: 703-683-7424  
[www.acteonline.org](http://www.acteonline.org) // *Connecting Education and Careers*

# Energy

## Energy is a vital economic driver that:

- includes petroleum (oil), natural gas, coal and nuclear, as well as renewable energy through hydropower, solar, geothermal, wind and biomass
- is used in residential and commercial buildings, in transportation and by business and industry
- requires high-skilled workers

## What jobs are available in energy?

The energy sector is facing significant workforce shortages—an estimated 55 percent of the energy workforce may need to be replaced by 2023.<sup>4</sup> Among the most critical jobs that will need filling are engineers and skilled utility technicians.<sup>5</sup> Talent shortages encompass the entire sector. Renewable energy fields are in need of qualified workers: Up to 290,000 potential new jobs are projected in solar energy by 2030.<sup>6</sup> Shale energy is expected to create up to 1.7 million permanent jobs by the end of this decade.<sup>7</sup> And almost 3 million workers will be needed by 2020 in oil and gas exploration and extraction.<sup>8</sup>

Many energy jobs are middle-skill occupations that provide a family-sustaining wage. In almost every large metropolitan area, the majority of clean economy jobs are mid-level occupations, and these jobs pay a median wage 13 percent higher than the national median wage.<sup>9</sup> Annual earnings in the oil and natural gas industry averaged \$107,000 in 2012, and 47 percent of a shale well's workforce consists of jobs that require less than a four-year degree.<sup>10</sup>

Many jobs in this sector are attainable for individuals with an industry certification, a postsecondary certificate or an associate degree, as well as for those who have completed an apprenticeship.<sup>11</sup> These energy occupations require academic, employability and technical skills, including skills in construction, safety, engineering and drilling procedures, as well as skills in accounting and business management. However, almost three-quarters of energy employers report they are having trouble filling job openings with qualified candidates.<sup>12</sup> Careers in this growing sector include:

- engineers
- HVAC mechanics and installers
- construction managers
- lineworkers
- chemists
- utility technicians
- welders
- plant operators

## Endnotes

1. U.S. Energy Information Administration. (2012). *Annual Energy Review: Table 1.5 Energy Consumption, Expenditures, and Emissions Indicators Estimates, 1949-2011*. Retrieved from <http://www.eia.gov/totalenergy/data/annual/showtext.cfm?t=ptb0105>.
2. The Brookings Institution. (2011). *Sizing the Clean Economy: A National and Regional Green Jobs Assessment*. Washington, DC: The Brookings Institution.
3. Lund, S., Manyika, J., Nyquist, S., Mendonca, L., & Ramaswamy, S. (2013). *Game Changers: Five Opportunities for U.S. Growth and Renewal*. McKinsey Global Institute.
4. Center for Energy Workforce Development. (n.d.). *Gaps in the Energy Workforce Pipeline: 2013 Survey Results*. Washington, DC: Center for Energy Workforce Development.
5. Center for Energy Workforce Development. (n.d.). Presentation to the EAC. Retrieved from <http://energy.gov/sites/prod/files/Presentation%20to%20the%20EAC%20-%20Center%20for%20Energy%20Workforce%20Development%20-%20Ann%20Randazzo.pdf>.
6. National Research Council. (2013). *Emerging Workforce Trends in the U.S. Energy and Mining Industries: A Call to Action*. Washington, DC: The National Academies Press.
7. Lund, S., Manyika, J., Nyquist, S., Mendonca, L., & Ramaswamy, S. (2013). *Game Changers: Five Opportunities for U.S. Growth and Renewal*. McKinsey Global Institute.
8. Adams, A. (2014). "Workforce shortages still challenge energy companies." *Houston Chronicle*, March 21, 2014.
9. The Brookings Institution. (2011). *Sizing the Clean Economy: A National and Regional Green Jobs Assessment*. Washington, DC: The Brookings Institution.
10. Cruz, J., Smith, P.W., & Stanley, S. (2014). "The Marcellus Shale gas boom in Pennsylvania: employment and wage trends." *Monthly Labor Reviews*; Natural Gas Resource Center. (2011). *Want a Gas Job? Local Training Sessions Begin*. Retrieved from <http://naturalgasresourcecenter.com/2011/11/want-a-gas-job-local-training-sessions-begin>.
11. Center for Energy Workforce Development. (n.d.). *Career Pathways Roadmaps*. Retrieved from <http://www.cewd.org/roadmap>.
12. Bennett, A. (2014). "Combatting the Utility Skills Shortage." *Breaking Energy*, October 3, 2014.
13. Indian River State College. (n.d.). *IRSC Power Plant Institute Named One of Nation's Top Training Partnerships*. Retrieved from <http://www.tcpalm.com/news/irsc-update-irsc-power-plant-institute-named-one-o>.
14. Oxnard Union High School District. (n.d.). *Green Technologies Academy*. Retrieved from <http://www.ouhsd.k12.ca.us/wp-content/uploads/docs/-OHS-GTA-Green-Techs.-Acad..pdf>; Kallas, A. (2012). "Students create mock power company, creating detailed plans to create solar energy for their homes." *Ventura County Star*, August 24, 2012.
15. Albright, M. (2012). "Local college receives another \$4 million for oilfield training center." *Houma Today*, December 5, 2012; BP. (2014). *BP, Fletcher Technical Community College, and Gov. Jindal Celebrate Grand Opening of State-of-the-Art Offshore Training Facility*. Retrieved from <http://www.bp.com/en/global/corporate/press/press-releases/bp-fletcher-technical-community-college-energy-training-facility.html>; Fletcher Technical Community College. (n.d.). *Integrated Production Technologies*. Retrieved from <http://www.fletcher.edu/index.cfm?md=pagebuilder&tmp=home&pid=491>; additional information from Fletcher staff.



Proud supporters of ACTE.



Association for Career and Technical Education

1410 King Street, Alexandria, VA 22314

Phone: 800-826-9972 // Fax: 703-683-7424

[www.acteonline.org](http://www.acteonline.org) // Connecting Education and Careers

## How does CTE prepare the energy workforce?

Career and technical education prepares high school, postsecondary and adult students for careers in energy through:

- the national Career Clusters® Framework—including Career Clusters and pathways in manufacturing, STEM, and architecture and construction (plus some states have an energy Career Cluster devoted to preparation for this sector)—which outlines course progressions that help students explore career options and prepare for college and career success
- CTE courses in various types of energy generation, wind turbine construction, computer-integrated manufacturing and welding, all integrated with challenging academics
- business-education partnerships, such as the Power Plant Technology Institute at Indian River State College, developed with Florida Power and Light and the International Brotherhood of Electrical Workers, from which more than 90 percent of graduates have been placed in high-paying energy-related positions<sup>13</sup>
- career and technical student organization enrichment experiences, such as Technology Student Association and SkillsUSA events
- opportunities to earn stackable postsecondary certificates, degrees and industry-recognized certifications, as outlined in resources such as the Center for Energy Workforce Development's Get Into Energy Career Pathways Roadmaps

## What are promising programs in energy?

In California, **Oxnard High School's Green Technologies Academy** offers students an opportunity to take hands-on courses to gain skills and knowledge for a green technology workplace. Classes include Project Lead the Way (PLTW) Principles of Engineering and AP Environmental Science, and next year the curriculum will add PLTW Environmental Sustainability and a capstone elective, PLTW Engineering Design and Development. Students build on this learning through internships, mentorships, leadership activities and such projects as creating a mock power company. Through this mock company, students have identified homes that would benefit from solar panels, as well as determined panel placement and the amount of energy the panels would generate. Students also participate in activities such as teaching environmental awareness and planning an environmental awareness/alternative energy fair. The school's business partners include California Solar Electric, Reliant Energy and SunPower Corporation.<sup>14</sup>

Louisiana's **Fletcher Technical Community College** and BP America, Inc., have joined together to develop the Integrated Production Technologies Center, funded by a \$4 million investment from BP and a \$4 million match from the state. These funds enabled the college to build a state-of-the-art, nearly 30,000-square-foot training facility near BP's Houma location. Fletcher's BP Integrated Production Technologies Building, which has been designated a Deepwater Center for Workforce Excellence, prepares students in deepwater production and safety. Students develop skills in computer applications, instrumentation, mathematics, electronics, fluid mechanics, process diagrams and process systems, while completing the curriculum for an Associate of Applied Science in Integrated Production Technologies or a Certificate of Technical Studies. The program's industry advisory board projects starting salaries of \$60,000 for graduates.<sup>15</sup>

This Sector Sheet is the focus of one of ACTE's Microdocs! To learn more, visit [www.acteonline.org/microdocs](http://www.acteonline.org/microdocs)