

## CTE: THE KEY TO ECONOMIC DEVELOPMENT



### Energy:

Accounted for

**8.3%**

of U.S. gross domestic product in 2010<sup>1</sup>

Employs many of the

**2.7 million**

U.S. workers in the clean economy, and is projected to grow in key sectors such as shale oil and gas production<sup>2</sup>

What is the pathway to these fulfilling and essential careers?

**Career and Technical Education!**



Association for Career and Technical Education  
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*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 for a variety of jobs, from tapping into energy sources to energy conversion to maintaining and modernizing the infrastructure for energy delivery

## What jobs are available in energy?

The energy sector is facing significant workforce shortages—an estimated 62 percent of the energy workforce may need to be replaced by 2020.<sup>3</sup> These 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, while shale energy is expected to create up to 1.7 million permanent jobs by the end of the decade.<sup>4</sup> Among the most critical jobs that will need to be replaced are engineers and skilled utility technicians.

Many energy jobs are middle-skill occupations that provide a family-sustaining wage. For almost every large metropolitan area, the majority of clean economy jobs reside in mid-level occupations, and these jobs pay a median wage 13 percent higher than the national median wage.<sup>5</sup> Forty-seven percent of a shale well's workforce consists of jobs that require less than a four-year degree.<sup>6</sup>

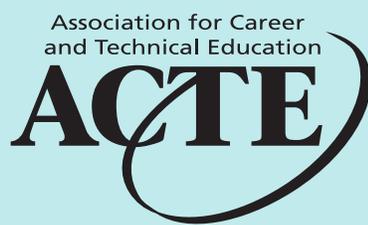
These energy occupations require academic, employability and technical skills, including skills in construction, safety, engineering and drilling procedures, as well as skills in accounting and business management. However, employers report that workers are often not adequately prepared for energy jobs—utility companies have found that 30-50 percent of applicants are not able to pass pre-employment tests.<sup>7</sup> Careers in this growing sector include:

- engineer (electrical/power, nuclear, environmental, mechanical, wind and solar)
- HVAC mechanic and installer
- construction manager
- lineworker
- chemist
- utility technician
- welder
- plant operator
- accountant
- marketing manager



## Endnotes

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12. League for Innovation in the Community College. (2013). *Member Spotlight: Wharton County Junior College. Nuclear Power Technology Program: An Energizing Partnership Between Educators and Industry*. Retrieved from <http://league.org/blog/post.cfm/member-spotlight-wharton-county-junior-college>; additional information from WCJC staff.



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## 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, architecture and construction, business management and administration, marketing and information technology, among other fields—which outlines course progressions that help students explore career options and prepare for college and career success. Some states also have an Energy Career Cluster devoted to preparation for this sector.
- CTE courses in power, structural and technical systems; computer-integrated manufacturing; and welding, all integrated with challenging academics.
- business-education partnerships that support a powerful combination of education and work-based learning, such as the Power Plant Technology Institute at Indian River State College, developed in partnership with Florida Power and Light and the International Brotherhood of Electrical Workers. More than 90 percent of graduates have been placed in high-paying energy-related positions.<sup>8</sup>
- career and technical student organization enrichment experiences, such as SkillsUSA's Sustainability Solutions demonstration contest, as well as Technology Student Association competitive events.<sup>9</sup>
- opportunities to earn certificates, degrees and industry-recognized certifications. The Center for Energy Workforce Development's Get Into Energy Career Pathways Roadmaps outline pathways for many energy occupations, including length of training, credentials earned and average salary.<sup>10</sup>

## 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 Introduction to Design and Principles of Engineering courses, as well as AP Environmental Science, aligned with rigorous academics. 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 panel placement and the amount of energy the panels would generate. Additionally, they studied their own school and realized that solar panels could potentially save the district \$43.9 million in energy costs over 25 years. The school's business partners include California Solar Electric, Reliant Energy and SunPower Corporation.<sup>11</sup>

**Wharton County Junior College (WCJC)** in Texas has brought together a process technology program and a new nuclear power technology program to prepare the current and future workforce for major employers in the county, including the South Texas Project (STP) nuclear power generation plant and the Celanese and Equistar petrochemical plants. The nuclear power technology program integrates theory with practical, hands-on learning for students specializing in either operations, electrical technician or instrumentation and controls technician occupations. Many nuclear power technicians for the Matagorda County power generation industry have graduated with WCJC's two-year Associate of Applied Science in nuclear power technology, while others who hold a degree in process technology have broadened their employment opportunities with a certificate in nuclear power. STP scholarships, along with the U.S. Nuclear Regulatory Commission's Nuclear Education Scholarship Grants, help qualified students study nuclear power technology. The program is also supported by the Nuclear Power Institute at Texas A&M University in bringing together K-16 educational institutions with the nuclear power industry; state and local organizations; and state, federal and international agencies to meet the challenge of providing the trained workforce needed to operate new and existing reactors in Texas and across the United States.<sup>12</sup>