

CAREER & TECHNICAL EDUCATION (CTE)



WHAT IS CTE?

Career and Technical Education (CTE) prepares students to enter the workforce or pursue post-secondary education or training after high school. Components of CTE can include work-based learning such as internships or apprenticeships, project-based or hands-on learning, and general workplace skills. Some CTE programs enable students to graduate from high school with industry-recognized certifications. During the 2017-18 school year, over 8.8 million high school students took at least one CTE course.¹

Over the last decade, there have been efforts to make CTE programs more rigorous and responsive to education and labor market trends. As more industries require post-secondary training of some kind, new CTE programs have started to adapt by preparing students to complete post-secondary training or education in emerging fields.



CONNECTION TO CLIMATE CHANGE

CTE is an opportunity to prepare students for industries and careers that will become increasingly important to society. The demand for renewable energy and green technology has been growing in recent years and will continue to expand. By the end of 2019, there were over 3.3 million Americans working in clean energy, accounting for over 40% of the energy workforce and 2.25% of overall employment.² Jobs in solar energy and wind turbines have been predicted to be the fastest growing occupations over the next decade and may be able to play an important role in the country's economic recovery.³

A variety of industries including architecture, agriculture, and energy are making efforts to become more sustainable and lessen their environmental impact. Giving students the knowledge and skills to think about and solve problems with sustainability in mind is valuable to employers. A recent report from Pew Research Center found both mechanical and analytical skills are in high demand in emerging occupations related to the green economy.⁴



Photo by Allison Shelley for American Education: Images of Teachers and Students in Action.

Green CTE Across States

Most states have adopted the Career Clusters framework from Advance CTE.⁵ The framework features 16 broad career clusters and 79 more specific career pathways. There are some variations by state, which can allow states to be responsive to their own labor and industry needs. While state policies and programs can heavily influence CTE options, they do not solely determine which, if any, CTE programs are offered in a given school or district.

TERMINOLOGY

- **Career cluster:** Category of related career paths (e.g. agricultural and natural resources, STEM)
- **Pathway:** Program designed to prepare students for a certain industry (e.g. environmental service systems, energy)
- **Program of study:** Progression of classes a student takes to complete CTE program

Generally, state education agencies have approved options for programs and courses that districts and schools can adopt at the local level depending on their interest and capacity. As a result, the state education agency may support or approve programs that are not currently implemented at the local level within the state. There may also be schools or districts that

provide CTE opportunities related to green careers or renewable energy that are not reflected in state frameworks or options. This analysis does not capture states that have schools or districts with their own local programs or partnerships in place.

Twenty-nine states have at least one of the following in their CTE program offerings:

- An explicit focus on sustainability or clean energy in pathway options
- A certification program in renewable or alternative energy industries
- At least one course specifically about renewable or alternative energy or that includes renewable or alternative energy in course standards

Most states with programs or classes that focus on clean energy do so through an engineering lens or in the context of an environmental services or agricultural pathway. Many states also have pathways that focus on natural resources without an explicit emphasis on sustainability or green technology. Often programs that have a class on renewable energy also have classes on nonrenewable energy—while the inclusion of classes on green energy is promising, it does not mean that is the sole focus of a program. Agricultural programs often mention sustainable practices but do not include this as a clear focus of a program or course.



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Promising Initiatives

At least two states (MD, ND) offer green pathways or courses through Project Lead the Way (PLTW). As a non-profit, PLTW provides curricula and teacher training for hands-on STEM learning from PreK-12. Their high school programs for computer science, engineering, and biomedical science are designed to prepare students for both college and career. PLTW has an environmental sustainability course within their high school engineering program.⁶

At least four states (AL, NM, NC, SC) have a clean energy CTE program through the Southern Regional Education Board (SREB), a non-profit with 16 member states. The organization's Advanced Career programs prepare high school students for STEM careers, with Clean Energy Technology as one of nine pathways.^{7,8}

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DISTRICT BRIGHT SPOT

The NYC Solar Schools Education Program is a cross-sector collaboration created to engage students in the process of installing solar panels on public schools in the city.⁹ Through the non-profit Solar One, the Solar CTE program provides a short-term opportunity for students at technical high schools to learn about solar energy, installation, and careers.¹⁰ The program is integrated into existing CTE programs and includes supplies, professional development for teachers, two weeks of co-teaching, and access to a solar careers expo.





DO STATE CTE PATHWAYS OR PROGRAMS OF STUDY INCLUDE GREEN CAREERS?

	YES	NO
Alabama	✓	
Alaska		x
Arizona		x
Arkansas		x
California	✓	
Colorado	✓	
Connecticut	✓	
Delaware		x
DC		x
Florida	✓	
Georgia	✓	
Hawaii	✓*	
Idaho		x
Illinois		x
Indiana	✓	
Iowa		x
Kansas	✓	
Kentucky		x
Louisiana		x
Maine		x
Maryland	✓	
Massachusetts	✓*	
Michigan		x
Minnesota	✓	
Mississippi		x
Missouri		x
Montana		x

Nebraska	✓	
Nevada	✓	
New Hampshire	✓	
New Jersey	✓	
New Mexico	✓	
New York		x
North Carolina	✓	
North Dakota	✓	
Ohio	✓	
Oklahoma		x**
Oregon	✓	
Pennsylvania		x
Puerto Rico		x
Rhode Island	✓	
South Carolina	✓	
South Dakota	✓	
Tennessee	✓	
Texas	✓	
Utah		x
Vermont		x
Virginia	✓	
Washington	✓*	
West Virginia	✓	
Wisconsin		x
Wyoming		
TOTAL	29	22
PERCENT	57%	43%

* Some indication of pathway or program but limited information available

** OK has wind turbine technician program but limited information on whether program is in schools or separate "training centers"

Note: Percentages are out of 51 (includes DC)



Photo by Allison Shelley for American Education: Images of Teachers and Students in Action.

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