

## Growing the Green Buildings Workforce

The U.S. buildings sector needs qualified workers to design, build, install, operate, and market energy-efficient buildings and technologies as part of a net-zero carbon economy. State-of-the-art education and training programs can prepare workers with the skills and knowledge necessary to maximize energy and cost savings in residential and commercial buildings. **Ensuring career pathways for a diverse and qualified green buildings workforce will enable high performance buildings nationwide.**

### A Skilled Workforce Maximizes Energy Savings

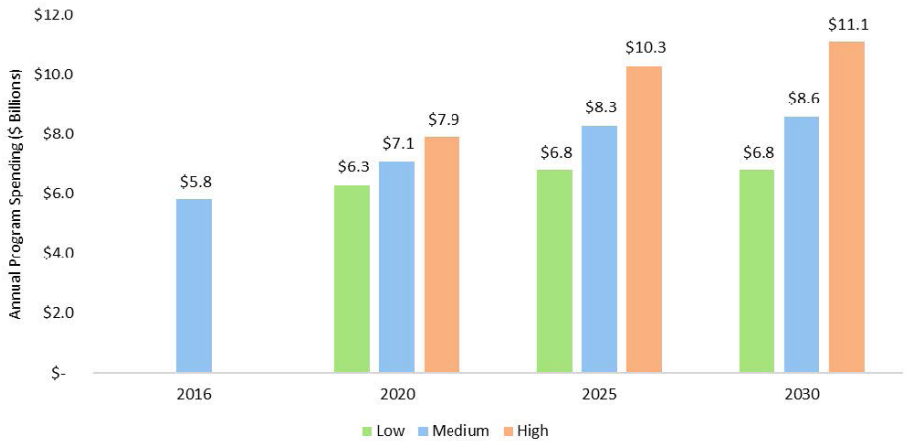
#### Proper Installation Drives Savings

Without proper installation, efficient technologies cannot deliver their full energy savings potential. Studies show that improper installation and maintenance can prevent energy efficiency technologies from meeting their performance expectations in both residential and commercial buildings (*U.S. DOE, 2018; McKinsey 2010*).

A highly skilled green buildings workforce can properly install and maintain technologies that maximize energy efficiency and cost savings, contributing to goals of cutting the buildings sector's carbon emissions by 50% by 2050 (*U.S. DOE, 2021*). Properly installed and maintained equipment delivers better value to building owners and occupants through improved comfort and lower costs.

#### A Skilled Workforce Supports Proper Installation and Smart Investments

Building science education and skills prepare building professionals to effectively assess a building as well as properly install



**Figure 1. Projected electricity efficiency program spending in the U.S. through 2030 under three different spending scenarios highlights the growing need for an energy efficiency workforce.** Source: Building the Efficiency Workforce, NREL 2020 <https://www.nrel.gov/docs/fy20osti/75497.pdf>

and maintain efficiency technologies and solutions. They gain an understanding of key concepts that affect building energy performance, including:

- How different building systems interact with one another;
- Impacts of new technologies, quality of installation, and maintenance on energy use, comfort, air quality, and moisture;
- Building energy modeling and tools that can inform a building owner's investment choices; and,
- Benefits of high-quality building envelope upgrades, such as reduced heating and cooling loads, and the resulting lower costs for heating and cooling equipment.

With a foundation in building science, and on-the-job practical training, our nation's buildings workforce can more effectively meet the long-term needs of building owners, residents, and our energy systems.

"As buildings become more automated, digitized, and interconnected, the workforce that supports the design, build, operation, and maintenance of these buildings must also evolve."

Sarah Truitt et al, 2020. Building the Efficiency Workforce, NREL. NREL/CP-5500-75497. [www.nrel.gov/docs/fy20osti/75497.pdf](http://www.nrel.gov/docs/fy20osti/75497.pdf)

### Green Buildings: A Growth Opportunity

According to the *2021 U.S. Energy & Employment Report*, more than 2.1 million people are employed in the U.S. energy efficiency sector (*U.S. DOE, 2021*). This does not include professionals such as commercial building operators, efficiency program managers employed by local governments and utilities, or retailers of energy-efficient technologies. Within the construction sector alone, more than 1.3 million people work on energy efficiency. Most of these people are construction trade workers, including installation technicians for ENERGY STAR® certified insulation, lighting, or heating, ventilation, and air conditioning (HVAC) systems.

With rapid growth in market demand for efficiency technologies and services, many employers have found it difficult to fill openings for energy efficiency workers. In 2019, hiring difficulties were reported by 91% of construction, 87% of manufacturing, and 80% of business services employers in energy efficiency (*EFI & NASEO, 2020*). These employers cite challenges including a lack of technical skills or training, small applicant pools, and lack of industry-specific skills.

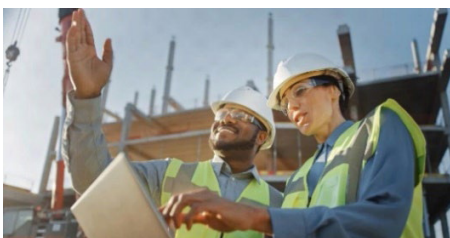
The pandemic dramatically altered the sector's employment demographics, with Hispanic and Latino workers suffering a disproportionate share of the job losses (*E2, 2020*). As the economy rebuilds, the energy efficiency sector is expected to resume strong employment growth (*EFI & NASEO, 2020*). DOE will focus on strategies that prioritize diversity, equity, and inclusion in the green buildings workforce.

	Workforce Development Priorities	BTO Programs, Activities & Resources
	Build awareness of green buildings careers. Showcase these careers as welcoming, rewarding, and impactful.	<ul style="list-style-type: none"> <li>• <a href="#">Green Buildings Career Map</a></li> <li>• <a href="#">Solar Decathlon®</a></li> <li>• <a href="#">JUMP into STEM</a></li> </ul>
	Integrate energy efficiency technology skills and competencies into standard education and training programs.	<ul style="list-style-type: none"> <li>• <a href="#">Building Science Education Solution Center</a></li> <li>• <a href="#">Solar Decathlon - Building Science Education Series</a></li> </ul>
	Streamline paths from training and education to entry-level jobs and long-term careers.	<ul style="list-style-type: none"> <li>• <a href="#">Better Buildings Workforce Resources</a></li> <li>• <a href="#">Better Buildings Workforce Accelerator</a></li> </ul>
	Ensure job stability to enable full employment and identify models to support demand growth for American-made clean energy technologies and products.	<ul style="list-style-type: none"> <li>• <a href="#">Building Energy Codes Program Training</a></li> <li>• <a href="#">Home Energy Score Assessor Training</a></li> </ul>

## Demand for Energy Efficiency Workers is Growing

From 2016 to early 2020, jobs in energy efficiency grew by 20%—three times the rate of the overall economy (*EFI & NASEO, 2020*). This job growth resulted from increased demand and spending on energy efficiency. Figure 1 shows that electricity efficiency program spending is projected to grow through 2030 to upwards of \$6.8 billion. This projected growth in spending will in turn spur continued efficiency job growth (*NREL, 2020*). Key drivers of these trends include:

- **Energy efficiency resource standards** have been enacted in 30 states (*ASE, 2020*), leading to more energy efficiency improvements.
- **Growing certification of homes and technologies**, including through EPA’s ENERGY STAR® program, are leading to increased demand for efficient buildings.
- **Efficiency rebates and incentives** totaling \$3.6 billion/year from utilities (*CEE, 2020*) are leading to increased demand for efficiency technologies.



The U.S. Department of Energy aims to support the growth of a highly skilled, well-compensated green buildings workforce as part of a high-quality, net-zero carbon economy.

## Challenges To Address

The Department of Energy’s (DOE’s) Building Technologies Office (BTO) is working with partners to ensure that a qualified and sufficient workforce is prepared to meet these demands. Putting skilled people to work in the energy efficiency sector with high-quality jobs will help support the U.S. economy and address national energy goals. A multi-pronged effort is required to address the multiple issues affecting the green buildings workforce size, skill, diversity, and compensation (*Jobs for the Future, 2020*).

As new digital tools and efficiency technologies are deployed broadly in the market, there are opportunities for existing education, training, and apprenticeship programs to update their curricula to include clean energy and building efficiency technologies. Tying into courses on digital tools, cybersecurity, robotics, and data analytics can also broaden the appeal of efficiency to those interested in high-tech, future-proof careers.

## BTO’s Solutions

### Provide Insight through Research

A series of field validation studies led by BTO has shown the potential for education and training to generate significant energy and cost savings in residential and commercial buildings (*U.S. DOE, 2020*).

In response to these findings, BTO is undertaking a strategy to support research, educational programs, and career development that enables a strong green buildings workforce. BTO invests in activities that grow interest in and awareness of green buildings careers, drive achievement of relevant skills in training and education programs, illuminate a path

to entry level jobs and career development opportunities, and support building efficiency technology market growth and stability.

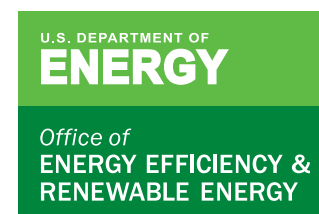
### Action to Accelerate High-Quality Jobs

To meet BTO’s workforce development goals, the office is actively supporting the green buildings workforce by conducting strategic analysis, funding development and deployment of training materials and programs, and supporting partnerships among industry stakeholders.

The following websites feature up-to-date workforce development resources for an array of audiences:

- Resources for prospective workers and learners can be found on the [Better Buildings Workforce Page](#).
- Resources for teachers and educators can be found at the [Building Science Education Solution Center](#).

Visit our website to see the latest array of resources from BTO’s workforce development initiatives: [energy.gov/eere/buildings/reports-and-resources](https://energy.gov/eere/buildings/reports-and-resources)



For more information, visit: [energy.gov/eere/buildings/btos-workforce-development-initiative](https://energy.gov/eere/buildings/btos-workforce-development-initiative)  
DOE/EE-2573 • June 2022