



Shaping Tomorrow's
Built Environment Today

**ASHRAE Response to RFI on Clean Energy Careers for All Program (EERE T 540.111-02: RFI)
January 17, 2024**

ASHRAE is delighted to provide comments on this RFI, with our responses focused on the buildings and HVACR industry, which offers many options for STEM-related careers in clean energy, but has seen a dip in the number of young professionals or students pursuing jobs in the industry, threatening to create a diminishing workforce at a time when the need for HVACR workers is only growing. The 2022 U.S. Energy and Employment Report (USEER) found that 91% of survey participants who engaged in energy efficiency jobs within the construction sector reported significant challenges in finding employees.¹

Supporting the growth of the HVACR workforce will be essential to maintaining the skills, capacity, expertise and commitment of these critical employees. Moreover, engineers and other professions require these individuals to maintain their qualifications and licensures by earning professional development hours or continuing education credits, respectively. Approaches that have proven to be successful include personnel certification programs, hosting webinars, workshops and courses for building professionals. Through these activities, ASHRAE has certified over 4,000 professionals since 2007, and last society year educated 9,680 professionals through the use of 280 hours of online training, 145 presentations and 243 courses available across the range of competencies.

The HVACR industry is an often overlooked source of economic activity. In the United States, the HVACR industry employs 1.3 million people and generates \$256 billion in annual economic activity.² This highly skilled workforce is educated through public and private universities, community colleges, trade schools, apprenticeships, career and technical education programs, and professional organizations such as ASHRAE. Moreover, there has been increased growth in jobs related to STEM that need to be filled. The U.S. Bureau of Labor Statistics projects that employment in architecture and engineering occupations is expected to grow 4% from 2021 to 2031, with a median annual wage of \$79,840 compared to \$45,760, the median wage across all occupations.³ Additionally, about 168,500 openings for construction employment are projected each year on average over the next decade.⁴ Below, we provide responses to the questions presented in the RFI.

¹ U.S. Department of Energy, 2022 U.S. Energy and Employment Report.
https://www.energy.gov/sites/default/files/2022-06/USEER%202022%20National%20Report_1.pdf. 138.

² The Air Conditioning, Heating, and Refrigeration Equipment Manufacturers (AHRI). AHRI Comments – Title 24-2022 Pre-Rulemaking January 26, 2021 Staff Workshop – Heat Pump Baseline [Docket No. 19-BSTD-03].

³ U.S. Bureau of Labor Statistics. 2022. Occupational Outlook Handbook: Architecture and Engineering Occupations.

⁴ U.S. Bureau of Labor Statistics. 2022. Occupational Outlook Handbook: Construction Laborers and Helpers.

1. What can DOE do, directly or indirectly, to support the target groups?

Training a new workforce entering the job market should be pursued in parallel with training the existing workforce on the latest in energy codes, HVACR systems, and building construction trends and technologies. A potential FOA can support a professional workforce by providing resources and assistance through organizations with an established track-record in training and education on HVACR systems, new technologies and building standards, and importantly with the means to implement the training so that it reaches all areas of the country, including underserved communities. A potential FOA should require supporting evidence to demonstrate the organization can reach a broad range of communities. To support the target groups, DOE should:

- Increase government funded research to improve teaching and learning of STEM concepts and critical thinking skills.
- Recruit, train, and retain qualified STEM teachers through the development of programs recognizing educators who excel in STEM education and incentives that encourage the best and brightest scientists, engineers, technologists, and technicians to act as role models and teachers, to pave the way for future generations.
- Foster partnerships among educational institutions, industry and non-profit organizations and their members to introduce students of all backgrounds to STEM career opportunities, including those careers that do not necessarily require a university degree.
- Support and encourage students who choose to enroll in community college, or other career and technical education programs that prepare and qualify individuals for careers as HVACR technologists, technicians, facility operators, and buildings managers by providing these students with affordable tuition options.
- Create opportunities and incentives for women and those of diverse backgrounds to pursue STEM coursework and careers.

2. What barriers exist for generating interest in clean energy-focused STEM careers among the target groups?

There is a societal focus on four-year degree programs to the exclusion of technical education, and a lack of emphasis on the necessary skill sets for advanced manufacturing. In addition, many engineers choose other STEM related career areas such as IT and computer science because of a lack of awareness of the benefits of HVAC&R to the health, safety and welfare of our population. To address this, DOE should support and encourage students who choose to enroll in community college, or other career and technical education (CTE) programs that prepare and qualify individuals for careers as HVACR technicians and potentially small business owners by providing these students with affordable tuition options. We should also support campaigns that educate teachers and career/guidance counselors on the benefits and opportunities available in the HVACR industry.

Additionally, DOE should support personnel certification programs which recognize various education plus work experience paths (e.g., Bachelor's degree +3 years of work experience; Associate's degree +5 years of work experience; high school diploma +7 years of work experience) as meeting eligibility requirements to sit for a certification exam. Such certification programs engage underrepresented communities to pursue and earn credentials which may be a springboard to greater recognition, increased credibility, improved career opportunities, and increased earning power.

Students that are underrepresented in STEM are a particular source of talent that will be necessary for filling much needed skilled labor as our aging workforce retires. Some of the methods (e.g., affinity groups) for attracting this talent are being cut off from public funding and opportunities at public universities. ASHRAE seeks to provide a welcome and inclusive STEM-focused entry at many of these same institutions, through 450 active ASHRAE student chapters. ASHRAE also recognizes the importance of a sense of belonging in STEM that may be gained via affinity groups and is building partnerships with many such groups. DOE can help by publicizing information about ASHRAE student chapters and supporting design contests and science fairs in primary and secondary schools, especially in areas with less affluence or established sources of funding.

3. What types of organizations support (financially or in-kind) engagement with the target groups?

The support for HVACR workers comes from partnerships among educational institutions, industry and non-profit organizations, including both professional and trade associations, and their members to introduce students of all backgrounds to STEM career opportunities, including those careers that do not necessarily require a university degree. ASHRAE is an example of such an organization.

4. If your organization receives funding for its engagement with the target groups, what portion of funding is from the government—federal, state, or local—versus other sources, such as philanthropic or other community-based organizations?

The majority of fundraising to ASHRAE is for research and is from individuals. However, ASHRAE was a recent recipient of funding from the Resilient and Efficient Codes Implementation program to advance energy codes training, and has previously engaged in contractual agreements with federal agencies (e.g., HVAC training with the Department of Defense) to provide education and training.

5. Which types of funding source and mechanism (government or philanthropy; grant, cooperative agreement, prize, or contract) or other support do you find most effective and/or useful, and why?

Government or philanthropy; grant, cooperative agreement, prize, and contracts are all good funding sources, but grants and contractual agreements clearly define the goal and encourage engaged project development to promote education and professional development, and implement advanced, cutting-edge research. Donations are also an effective driver for the work done at ASHRAE by empowering members to further the causes they are passionate about.

6. Other than science and engineering non-profits, what kinds of organizations would be most effective as partners with DOE in inspiring interest in clean energy-focused STEM careers?

With respect to strengthening the pipeline of an entering workforce, DOE should recognize and pursue opportunities to foster partnerships between non-profits, professional and technical societies, trade associations, industry and institutes of higher education to introduce the science, technology, engineering and mathematical aspects of building codes, energy efficiency indoor environmental quality, and other concepts to K-12 students. These partnerships would not only bolster STEM education, but also introduce the buildings industry to students and get them excited about potential career pathways in this sector. Importantly, DOE needs to help build bridges between community organizations that have established trusting relationships with disadvantaged communities and technical/scientific organizations. ASHRAE could better reach underserved communities by working with community organizations interested in bolstering STEM education and careers in the HVACR and buildings industry.

7. In your experience, what kinds of programming are most effective in inspiring interest in clean energy-focused STEM careers among the target groups?

In the HVAC&R industry, supporting young engineers with a comprehensive understanding of the technical details is crucial, but it's equally important to educate them on the broader impact of their work. This approach not only enhances their technical expertise but also instills a sense of purpose that extends beyond their day-to-day tasks. By emphasizing the significant role that HVAC&R systems play in ensuring health, safety, and welfare, young engineers can see their work in a new light. They learn that their expertise in designing, maintaining, and innovating HVAC&R systems directly contributes to the well-being and comfort of society. This perspective can transform their job into a rewarding career, driven by the knowledge that their skills and dedication have a meaningful impact on people's lives. Industry-recognized personnel certification programs which validate competency in job knowledge and skills inspire interest in clean energy-focused STEM careers among target groups. Target groups recognize that third-party credentials, in particular those which allow for various education plus work experience paths to eligibility level the playing field and that employers covet certified employees.

8. Please suggest approaches/services other than student-focused programming to inspire interest in clean energy-focused STEM careers among the target groups.

To inspire interest in clean energy-focused STEM careers in the HVACR industry, a multifaceted approach is essential. This includes implementing 'train the trainer' programs to update educators on clean energy technologies, offering adult and continuing education courses tailored for professionals seeking to enhance or shift their careers towards sustainable practices, and conducting public awareness campaigns highlighting the environmental significance of HVAC&R. Additionally, incentive programs for training and certification, as well as community projects, can actively engage and motivate individuals by showcasing the direct impact and benefits of clean energy solutions in the HVAC&R field.

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groups. Target groups recognize that third-party credentials, in particular those which allow for various education plus work experience paths to eligibility (e.g. Bachelor's degree +3 years of work experience; Associate's degree +5 years of work experience; high school diploma +7 years of work experience), level the playing field and that employers covet certified employees. ASHRAE's own research indicates that certified employees enjoy greater recognition, increased credibility, improved career opportunities, and increased earning power. These benefits of certification inspire interest in clean energy-focused STEM careers. Professionals who enjoy these benefits of certification are more likely to succeed and remain engaged in their clean-energy career.

9. Concerning funding for planning and implementing a program to inspire interest in clean energy-focused STEM careers among the target groups,

a. What size audience could you deliver programming to at these maximum funding levels:

ASHRAE could develop an entry-level certification in any clean-energy focused STEM job at a cost of \$90,000. This program would be ANSI National Accreditation Board (ANAB) accredited against the ISO/IEC 17024 standard, which would help ensure impartiality and fair treatment of underrepresented populations. With testing centers across the United States, the program could be delivered nation-wide.

Up to \$150,000; \$250,000; \$350,000?

Through expert instruction, publication resources, on-line training, and performance tracking, ASHRAE provides vendor neutral guidance that can be readily applied in "real world" environments. (e.g., 6-Hour Course, 2 Instructors)

6-Hour Course with 2 Instructors	Number of Registrants				
	20	25	30	50	100
Total	\$8,430	\$8,655	\$8,880	\$9,780	\$12,030
Added Publication	\$2,400	\$3,000	\$3,600	\$6,000	\$12,000
TOTAL	\$10,830	\$11,655	\$12,480	\$15,780	\$24,030

Courses per Budget Amt.	Number of Registrants				
	20	25	30	50	100
\$150,000	14	13	12	10	6
\$250,000	23	21	20	16	10
\$350,000	32	30	28	22	15

b. In what ways would the funding level impact your ability to maximize outreach and impact?

The impact would be fewer face-to-face events, which are considered more effective. We could do more virtual training for the same dollars.

c. What funding amount would be necessary to develop a plan?

To only develop a plan, and not create the course, we estimate \$150,000.

10. How do you typically become aware of DOE funding opportunities and other forms of assistance? Which means of communication do you find most effective, and why?

ASHRAE becomes aware of funding initiatives and other forms of assistance from DOE through regular communication channels, such as newsletters, email alerts, and online platforms such as the Federal Register. We also partner with DOE groups on funded projects, such as the ASHRAE-DOE Pilot Program for Efficient and Healthy Schools. Additionally, ASHRAE often hosts and participates in conferences, workshops, and collaborative research projects where we directly interact with DOE representatives and stay informed of existing and emerging opportunities.

Conclusion

ASHRAE is a global leader in advancing healthy, sustainable, efficient buildings through standards and guidelines development and contributing to the growth of a capable and skilled workforce. We are committed to providing technical guidance, training, courses, resources, and other materials that will foster and grow a clean energy-focused STEM workforce to address the challenges of the present and the opportunities of the future. We look forward to continuing to assist DOE in its efforts of advancing the Clean Energy Careers for All Program. Please do not hesitate to reach out with any questions to GovAffairs@ASHRAE.org.