White Paper

Elevating the HVACR industry: Promoting exciting careers to diverse prospects can help address staffing shortages

Renee Joseph

Vice President, Channel Sales and Marketing Operations

Johnson Controls, Inc.

Johnson Controls

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Employers in the HVACR sector are struggling to fill positions in a wide range of roles and skill levels. Recruitment of more women and minorities can be part of the solution. So can teaching young people and second-career professionals about the exciting opportunities and financial rewards the industry has to offer.

The heating, ventilation, air conditioning and refrigeration industry offers abundant careers with excellent growth potential, satisfying intellectual challenges, meaningful benefits to society, and solid financial rewards.

And yet, businesses in the HVACR sector face shortages of qualified employees for a multitude of roles and at a wide range of skill levels. A 2015 report from the HVACR Workforce Development Foundation cited 220,734 HVACR job postings in 2014 – twice as many as in the oil and gas industry (109,323).[1] These include large numbers of middle-skilled jobs that cannot be off-shored or replaced by technology.

Why should these worker shortages exist? One reason is that the HVACR industry is growing fast. The U.S. Bureau of Labor Statistics projects a 21 percent increase in HVACR mechanic and installer jobs through 2022, nearly twice the projected growth of overall employment.[2] Another is that many HVACR workers will soon leave the workforce: The U.S. Social Security Administration estimates that 22 percent of the nation's overall workforce will retire by 2022.[3]

Closer to home, a survey by The Friday Group an international firm providing facilities management consulting services to commercial business and government, projected that up to 60 percent of facility management staff – electricians, plumbers, HVAC mechanics, operations and maintenance workers and others – will retire in the next five to seven years.[4]

Interviews with industry leaders, including heads of major industry associations, suggest two other important reasons for the HVACR worker shortage:

- Many prospective employees barely know the industry exists or greatly underestimate the quality of careers it can provide.
- Despite change for the better in recent years, workforce diversity is limited – the industry remains heavily dominated by Caucasian men.

Both these issues present challenges but also great opportunities for the industry. Both can be addressed effectively through concerted education and recruitment, targeted to reach a diverse range of prospects across lines of age, gender, ethnic background and career aspiration.

An industry underappreciated

HVACR is an industry with far greater importance and opportunity than its reputation suggests. Industry leaders say many career-seekers perceive the industry as a profession of running or repairing mechanical equipment. "Part of it is the stigma of blue-collar labor," observes **Patti Ellingson**, immediate past president of **Women in HVACR**, a professional growth organization focused on networking, mentoring and education. "At some point, in our educational system, the conventional advice became, 'If you don't go to college, you won't amount to anything.'"

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The reality is that the industry has many attributes that should make it attractive, starting at the level of technical careers, such as equipment installation and service, where multiple well paid positions are available to holders of two-year associate degrees from technical colleges.

Another factor is lack of outreach to students and other potential employees, noted **Talbot Gee**, CEO of **Heating, Air-conditioning and Refrigeration Distributors International (HARDI)**. "Most companies in our industry do not excel as recruiters," he says. "Few distributors, for example, have formalized and aggressive prospecting and recruiting strategies."

Even more fundamental, "HVACR is one of those hidden industries," says **Bryan Albrecht**, president of **Gateway Technical College** based in Kenosha, Wis. "It's not highly visible. It's behind the walls and above the ceiling tiles. And because we don't have a good feeder pipeline in our secondary schools, a lot of students are never exposed to the industry."

The reality is that the industry has many attributes that should make it attractive, starting at the level of technical careers, such as equipment installation and service, where multiple well-paid positions are available to holders of two-year associate degrees from technical colleges. Ellingson observes, "Many people don't realize that we are a very financially sound industry – that by getting the education and training for these technical careers, they can by far out-earn someone who has gone to college for four years and has a general studies degree."

Furthermore, those careers can and do lead to the American dream of business ownership, notes **Kari Arfstrom**, executive director of the **HVACR Workforce Development Foundation**: "I've heard of many success stories of students who had career and technical education teachers who made a difference in their lives, became technicians, and went on to launch profitable contracting or distribution companies."

That's to say nothing about the full spectrum of rewarding careers available in the industry, many of which are or can lead to positions of major responsibility in large organizations. The broad HVACR umbrella includes, in addition to installation and service careers:

- Architects who design the heating and cooling systems for homes, office buildings and factories.
- Engineers and scientists in manufacturing companies who develop new building comfort and energy-conserving technologies, products and services.
- Sales and marketing representatives within manufacturing companies who call on and sell to owners, consulting engineers, distributors/representatives and contractors.
- Distributors and representatives who help building owners, consulting engineers and contractors select, configure, install, and support HVACR equipment and controls throughout the building lifecycle.
- Facility managers who regulate indoor air conditions, control comfort, and manage energy consumption in buildings, across campuses, and even across global enterprises.

"Most people don't appreciate the complexity and sophistication involved in running the HVAC side of facilities," says **Donald Albinger**, Vice President of Product Management with the Building Efficiency business of **Johnson Controls**. "The facility manager, for example, in some cases sits very close to the CEO. In a large enterprise of buildings with an annual energy spend of several million dollars, that person is as important to the company's strategic goals as anybody else. He or she affects the comfort and productivity of the people who work in the building environments, and those environments affect the company's appeal to potential new hires."

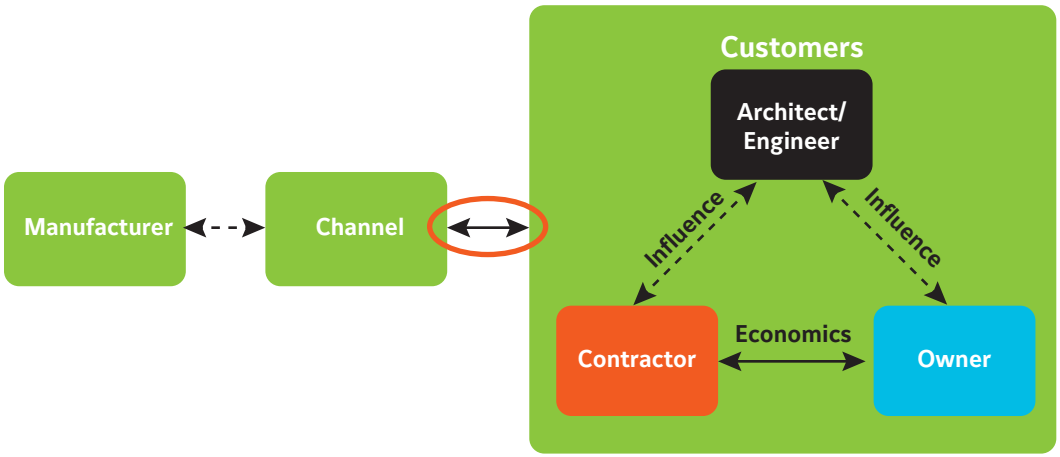
Top HVACR Occupation Families (2014 Job Postings)

Occupation Family	Total 2014 Postings
Installation, maintenance and repair	104,233
Architecture and engineering	24,701
Construction	14,753
Sales and related	12,506
Information technology	9,534
Production	9,002
Office administration and support	8,303
Transportation and material moving	6,237
Business and financial operations	5,655
Building and grounds cleaning and maintenance	5,338

SOURCE – *Heating up: The Sweltering Demand for Heating, Ventilation, Air Conditioning and Refrigeration Workers,* ©2015 Burning Glass Technologies, prepared with the HVACR Workforce Development Foundation, July 2015.

Jeff Littleton, executive vice president of **ASHRAE**,[5] goes a step farther: "Roughly 40 percent of the primary energy consumption in a developed economy comes from buildings. Our profession has an opportunity to have an impact on the environment and our planet by reducing greenhouse gas emissions and creating a more sustainable built environment. We affect the health and welfare of people on both sides of the building envelope."

HVAC Market Players and Relationships



Enhancing diversity

Seen in a broad perspective, careers in the industry should appeal strongly to both men and women and to people of all ethnic and cultural backgrounds. At present, however, Ellingson observes, "Of all the career paths one could take here in the United States, this is the oldest, most male-dominated industry. We are seeing a slight shift in demographics, but it is extremely slow. From my experience attending HVACR trade shows or education sessions, there is no other industry quite as narrow in demographics."

Industry leaders interviewed for this paper noted an increase in women in the industry. "We haven't done a good job of quantifying it, but anecdotally I do believe the percentage of women has grown," Gee says. "I would say that every year it inches up." Meanwhile, Littleton notes that ASHRAE counts about 3,000 women among its 54,000 members worldwide, and five women sit on its 31-member board of directors.

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– Patti Ellingson
Women in HVACR

Still, leaders agree that much more needs to be done. HARDI's Gee observes, "In any sales organization, your number one job is to serve your customers. Your sales force needs to reflect and relate to the demographics of your customer base, whether that be more women owners of contracting businesses or more Spanish-speaking people in regions of the country."

"For example, in the Southwest and Southwest United States, it's almost a given that you need counter people, salespeople and technical service people who are fluent in Spanish. That's also true for serving ethnic neighborhoods. I was born in Chinatown in San Francisco, and if you're going to serve that market, you'd better have someone who can speak Chinese. The continued growth of these kinds of markets will only increase employment opportunities for those who can relate to them."

Ellingson sees sheer numbers as one reason more women need to join the industry: "We are 50 percent of the population. With the aging demographics of our industry today, we need to recruit more women and encourage young women that these are viable careers. If we don't, then given the importance of HVACR in our daily lives, we as a society will be in trouble."

The strongest argument for diversity is the power of multiple experiences and perspectives when dealing with the marketplace, operating a business, and solving problems. "Diversity of thought and new approaches to problem-solving are more important than ever," notes Albinger. "The reality is that as a business you need a good sense for how to manage strategic relationships with vendors and suppliers in your community.

"When you have ethnic diversity among your supplier partners, you need a good understanding of how they operate – their strategic purposes and how they can weave into the fabric of your own strategy. If you consider only the viewpoint of a Caucasian male like myself, you will miss opportunities to run your buildings or your business more effectively."

Littleton adds, "There is no doubt in my mind that solutions are much better when you involve people with diverse backgrounds – gender differences, racial differences, geographic differences. Speaking from our own experience within ASHRAE, if we have a committee of people of the same age, background, upbringing and education, we tend to arrive at a homogenous, one-dimensional solution. Diversify that out, and wow! The impact on the caliber of creative thinking and the caliber of the solution is really significant."

On the educational front, Gateway's Albrecht sees a need to respond to the makeup of the community. To that end, the college looks to recruit a diverse faculty, which helps attract more diverse students and ultimately diverse graduates for local employers to hire. "It's about engaging our employers in leveraging diversity as a strength for continued business growth," Albrecht says.

Barrier-free access

Industry leaders agree that there are no "material barriers" to increasing diversity in the HVACR sector, and that in fact certain aspects of the industry should help it attract diverse professionals and especially more women.

"This is a results-driven industry, and employers want producers," Gee observes. "For women who can produce, the sky is the limit, just as it is for men. On the sales side, women salespeople can be a great differentiator. No employer today can afford to forego talent simply due to a person's sex, race, or anything else. There is plenty of room for engineering and science in our field – that's another huge opportunity for women."

Even in the male-dominated installer and technician ranks, Ellingson sees growing roles for women. While some may feel uncomfortable with certain roles, such as residential service that requires entering strangers' homes alone, or intimidated by the physical demands of certain technical jobs, women have innate qualities that can help them excel.

"In my opinion, women are better multi-taskers," says Ellingson. "Men are more compartmentalized. I believe women have a different approach to problem solving. We're more methodical. Women tend to outshine men in troubleshooting and correcting a system the first time around. In interviews with companies that have female technicians, they rave that as long as they can keep them, women truly do work better, smarter and faster."

"When it comes to lifting things, sometimes women have to get creative. They may have to rely on their employer to provide them with a lighter ladder, or things of that nature. But among most of the mechanical contracting companies I speak to on a regular basis, if they have a female tech, she is their top tech."

Albrecht agrees that technical and manual skills are no barrier to women and that, in addition, women can bring new perspectives on renewable and sustainable energy systems. "They also bring a knowledge base that could help deliver innovation in room design and indoor comfort and help establish new areas of growth for the HVACR industry," he says.

Making strides

While opportunities abound, attracting more women and minorities to the HVACR sector will take effort, industry leaders agree. There are signs of progress. Women in HVACR, for example, is a thriving organization that helps women grow in their careers. The group is 14 years old and in 2015 held its twelfth annual conference. It has more than 500 paid members, plus some 1,500 followers through its website (www.womeninhvacr.org) and social media. Members, many at executive levels, represent manufacturers, wholesalers, contractors, distributors, and other industry sectors. Here are a few other notable initiatives:

- Over the past three years, Gateway Technical College has averaged 392 students in its HVACR programs, of whom 149 represent minority groups. "This year we had 13 women in those programs," says Albrecht. "That's the highest we've had in six years, though it's not to the level where we need to be. About 27 percent of our total student body represents diverse populations. Our fastest-growing ethnic group is Hispanic. We've built three multicultural centers, one on each of our campuses, to provide support systems for diverse students."
- ASHRAE in 2015 held its first Women in ASHRAE breakfast at its annual conference. "It absolutely sold out – it was standing room only," says Littleton "That opened our eyes. Even though we thought of ourselves as welcoming of women, minorities and everyone, there were cases where a woman would walk into one of our technical committee meetings, be the only woman in the room, and feel intimidated. That's an issue. So we have formed a Women in ASHRAE Presidential Ad Hoc Committee whose sole purpose is to make certain that our society welcomes and encourages women's participation and makes them feel comfortable."
- HARDI three years ago launched an Emerging Leaders program. "That's a very diverse group, possibly the most diverse in our association and also, hands down, the fastest- growing trade association program I have ever been connected with," says Gee. "Our biggest problem is managing its growth. It's not just about networking with other people your age. It is rigorous and case-study driven and is evolving into a credentialing program to groom people as strategic leaders and thinkers within their organizations. Our highest priority is growing the best generation of leaders possible, which means attracting, welcoming, and cultivating potential leaders of any background."

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HVACR Workforce Development Foundation

Winning with recruiting

Aside from initiatives aimed directly at diversity, better recruitment is the key to attract more, better qualified and more diverse people to HVACR professions. Aggressive efforts are essential, says Arfstrom, of the HVACR Workforce Development Foundation, because competition from other industries is intense. That's especially true for middle-skill occupations that require no more than a two-year post-secondary degree.

"I attended the American School Counselors Association's annual conference last June," says Arfstrom. "Half the exhibit floor consisted of people like me, making sure school counselors knew about careers in our fields. I'd say 98 percent of the workforce booths were for jobs requiring sub-baccalaureate degrees. We're all competing for the same workers. Diesel mechanics, aviation mechanics, you name it. Everyone is having the same issues in recruitment."

Part of the answer, she says, is to shatter the assumption that college is the only path for young people who want to succeed. "In the past couple of decades, there has been a heavy focus on preparing students for college," she says. "We talk about college- and career-ready, but we forget about the career-ready part of it.

"However, in the last 18 months, things have begun to swing back around. More and more people are talking about career-ready because we see huge increases in college tuition, and students coming out laden with debt and being baristas at Starbucks. We haven't yet hit the apex of an attitudinal change to career-ready, but if that happens I think it will be helpful for the HVACR industry."

More broadly speaking, Arfstrom cites three keys to bolstering interest and diversity in HVACR careers: "Recruitment, recruitment, recruitment. It is only through the promotion of this growth industry by enthusiastic employers, career counselors, parents, and instructors that we will raise awareness of HVACR jobs and meet the critical need for a skilled, educated workforce."

Her foundation's website (www.careersinhvacr.org) offers a recruitment toolkit including a PowerPoint presentation, videos and other materials designed to help current HVACR employers and program instructors encourage students, veterans and second-career adults to consider professions in the HVACR industry.

Arfstrom and Ellingson agree that recruitment needs to start early – not in technical college or high school but in middle school and even elementary school. "Employers and technical colleges tend to rely heavily on high school job fairs," Ellingson says. "They're not starting early enough. A lot of those kids already know where they're going. As an industry, we need to find ways to reach younger students. In elementary schools, when they hold career days, you see police officers, firefighter and nurses. Nobody talks about the HVACR industry."

Industry leaders cited a variety of best practices for recruiting that likely would have substantial impacts if broadly replicated.

Raise the profile. Gateway Technical College has modernized its programs to include residential and commercial HVAC, building automation, and commercial refrigeration. It has also made the programs highly visible. "We've put together learning laboratories," says Albrecht. "We expose the HVAC ductwork in our buildings so our students can see it. Students are part of the college buildings and grounds program. They have a chance to be a part of the design and remodeling of classrooms. That living laboratory approach, bringing that technology to the forefront of discussion has helped encourage young people to look at HVAC as an innovative way to develop a career path."

Support employers. Gee of HARDI, notes that distributors and other organizations run lean shops and hesitate to dedicate staff to activities like recruiting that do not directly generate revenue. "They need to find ways to allocate resources to sell their companies to local talent," he says. "That means activities like getting out to the job fairs and career days. We're trying to motivate more of our members to do that. We have a webinar series for human resources professionals aimed at what we call human capital optimization. Our goal is to expand those into a series of live workshops. Human capital optimization is one of our highest priorities." HARDI also works to facilitate relationships between employers and their local technical colleges.

Support STEM education. Littleton notes that from ASHRAE's perspective, everything begins with science, technology, engineering and math (STEM) education. "We have a number of programs that encourage STEM development," Littleton says. "But we've got to catch kids early. If by the time they get into high school they don't understand the value of STEM, it's hard to make up that ground as they start making career and college decisions. To follow a career path in engineering and science requires a lot of STEM education." Among its initiatives, ASHRAE offers a scholarship program that has awarded some $1.5 million over the past 27 years.

Ellingson observes, "STEM is a crucial key to success within our industry. Women in HVACR encourages STEM development through two small scholarships each year to help advance new and existing students to industry success."

Get students engaged. Hands-on activities can be powerful. The Johnson Controls Building Efficiency business has offered an Igniting Creative Energy (ICE) Challenge, providing rewards to K-12 students for submitting projects that highlight what people can do at home, at school or in the community to be more energy efficient and become better stewards of the environment. Since 2002, more than 13,000 students have taken part; at least two former ICE award winners now work for the company as engineers. The program is evolving to a new format with an emphasis on STEM education.

Making the case

Amid discussion of how best to recruit a new, larger and more diverse generation of HVACR professionals, the industry's core message is simple and clear. HVACR is an industry where:

- People at all skill levels can earn family-supporting salaries and benefits in rewarding jobs that can't be offshored or automated out of existence.
- A wide range of careers offer intellectual challenges and opportunities to reach executive levels or fulfill dreams of business ownership.
- Careers involve a wide range of skills, from equipment troubleshooting and repairs; to computing, process automation and networking; to data and financial analysis; to oversight of entire campuses and building portfolios.
- Job duties are critical to ensuring human comfort and productivity, preserving food supplies, and protecting medical and research processes.
- Daily decisions have meaningful impacts on the efficient use of energy, environmental sustainability, and the mitigation of global climate change.
- A coming wave of retirements means abundant opportunities for bright, ambitious people.

Successful delivery of these messages can help the HVACR professions achieve the status and competitive standing they deserve, attract a qualified workforce at all levels, and secure the future of a highly essential industry.

According to ASHRAE Executive Vice President Jeff Littleton, everything begins with science, technology, engineering and math (STEM) education.

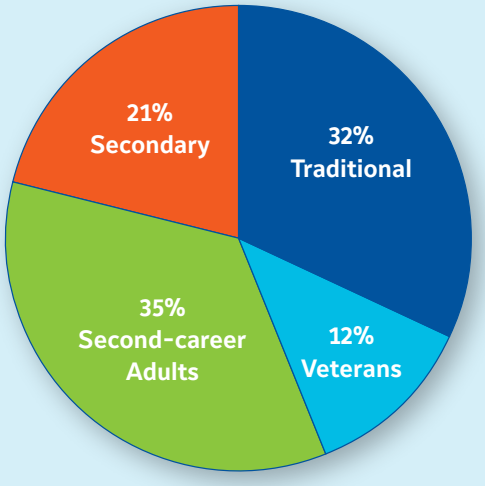
Just one-third of those enrolled in post-secondary HVACR programs were "traditional" students who had graduated with a diploma or GED from a secondary school in the recent past.

The Educators' Viewpoint

As part of its effort to address the shortage of installers and technicians in the industry, the HVACR Workforce Development Foundation commissioned a survey of instructors to assess the training and education of students entering HVACR jobs. The online survey was completed by 544 secondary and post-secondary instructors in the United States and Canada. Here are some highlights of the survey findings:

Student characteristics. Just one-third of those enrolled in post-secondary HVACR programs were "traditional" students who had graduated with a diploma or GED from a secondary school in the recent past. The rest were veterans or members of the National Guard (12 percent) and second-career adults seeking new skills (35 percent).

Makeup of Students



Available chairs. Fifty-six percent of respondents said their programs were under-enrolled with room for more students, while 28 percent were on target with enrollment and 10 percent were over-enrolled. **Kari Arfstrom**, Executive Director of the **HVACR Workforce Development Foundation**, observes, "The programs are there, the instructors are there. If we can recruit and retain students in these programs, we will not have a workforce gap. The seats are there."

Student challenges. Instructors listed various difficulties among students, including lower skills than in previous years; poor study habits; poor reading, math, and comprehension skills; lack of motivation and work ethic; spotty attendance; and obsession with cellphones. Some noted difficulty finding students with clean driving records and the ability to pass drug tests. About 22 percent of students enrolled in programs dropped out.

Lack of diversity. Some instructors "specifically bemoaned the lack of women and minorities in their programs – an issue that needs to be addressed in recruiting efforts."

Deficient recruiting. More than 63 percent of respondents indicated that recruitment strategies were only somewhat effective. Just 13 percent said they succeeded in attracting highly qualified students, while almost 24 percent said they were struggling to attract highly qualified students.

Instructors retiring. Almost half of U.S. respondents and 70 percent in Canada indicated that they will retire within the next 10 years, a rate much higher than for the workforce as a whole. This points to an urgent need for in-depth, sustained professional development for the remaining instructors and those who replace the retirees.

About the author

Renee Joseph has deep knowledge of the HVAC industry and associated products built on a career spanning more than 20 years in positions of increasing responsibility with Trane Company and Johnson Controls. In her current role as Vice President, Channel Sales and Marketing Operations with Johnson Controls, she leads the channel, marketing, ease of doing business and portfolio management efforts of the North American Building Efficiency business. She holds a bachelor's degree in marketing from Viterbo University in La Crosse, Wisconsin, and has completed the executive MBA Leadership Program with the American Management Association.

Resources

[1] *Heating up: The Sweltering Demand for Heating, Ventilation, Air Conditioning and Refrigeration Workers,* ©2015 Burning Glass Technologies, prepared with the HVACR Workforce Development Foundation, July 2015.

[2] "Heating, Air Conditioning, and Refrigeration Mechanics and Installers." U.S. Bureau of Labor Statistics, 8 Jan. 2014. http://www.bls.gov/ooh/installation-maintenance-and-repair/heating-air-conditioning-and-refrigeration-mechanics-and-installers.htm.

[3] *The HVACR Workforce: Demand Heats Up as Supply Melts Away. A Projection of the Coming Shortfall of HVACR Workers and How to Fix It.* A Summary of Reports Presented by the HVAC Workforce Development Foundation, September 2015.

[4] "Facility Departments Must Cope with Baby Boomer Retirements," Facilities Net/*Building Operating Management,* September 2015.

[5] ASHRAE was formerly known as the American Society of Heating, Refrigerating and Air-Conditioning Engineers.

[6] *The Next Generation of HVACR Installers and Technicians: What Instructors Are Saying and What Needs to Be Done About It,* September 2015, HVACR Workforce Development Foundation.

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