

AED AND THE SKILLS GAP



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Assessing the skills gap, its causes, and possible solutions

There is a skills gap that has profound impacts on businesses. There are a variety of factors contributing to the existence of the skills gap. Combatting the skills gap involves improving visibility in high schools, developing partnerships amongst stakeholders, and improving workforce development programs.

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1 | EXECUTIVE SUMMARY

A skills gap refers to a mismatch between the skills that businesses are looking for in new employees and the skills present in the workforce. This in turn makes it difficult for businesses to hire and expand their businesses. This paper focuses on a skills gap in jobs that require vocational skills and specifically on a shortage of technically skilled workers in the heavy equipment distribution industry, which is represented by Associated Equipment Distribution (AED). The businesses in this industry require skilled technicians to repair and maintain equipment, which they in turn rent or sell to consumers.

Analysis of economic trends and of a survey of AED members conducted in the summer of 2015 indicate the anecdotal evidence of a technical skills gap is also borne out in the data. AED members report significant difficulty in recruiting technicians, with the primary cause of this difficulty being a lack of technical skills among job applicants. A similar trend appears in the broader economy; 84% manufacturing executives report that the technical skills gap exists and 67% report that employees lack training. Respondents to the AED survey also report a job opening rate (the percent of jobs going unfilled) more than three times the national average. These factors indicate a significant mismatch in skills that is hampering businesses' ability to hire.

The skills gap has significant negative effects on businesses' bottom lines and on their ability to grow. Studies of the manufacturing industry indicate that businesses may be losing 11% of earnings and 9% of revenue due to the skills gap and the inability to fire qualified workers. Among AED members, more than 50% report that the inability to find qualified technicians hinders business growth and increases costs and inefficiencies. More than 60% say that the skills gap makes it difficult to meet customer demand. The survey data also indicates a correlation between those who say that the skills gap is hindering growth and those that have a higher job opening rate (i.e. those being more affected by the inability to find workers).

A variety of causes are likely to blame for the technical skills gap. Chief among them are failures in the technical education system, retiring Baby Boomers, and poor visibility and perception of vocational careers among youth. While there is a great investment in both attention and resources at the federal and state level on promoting 4-year college education, relatively little is provided towards advancing vocational programs. Programs in workforce development at the federal level are often focused on re-skilling workers or targeting at-risk demographics but not on helping youth who want to pursue a technical career. The lack of new technical workers is exacerbated by retirement of Baby Boomers. Among manufacturing executives, 93% argue that Baby Boomers retiring are an issue contributing to the skills gap. Finally, data from both AED members and the broader economy indicate that there is a poor perception of technical careers. Respondents to the AED survey report that youth are being pushed away from vocations and towards 4-year degrees. More broadly, only 37% of parents would encourage their child to pursue a technical career.

Addressing the skills requires the input of all stakeholders to further coordinate and develop effective policy initiatives. Analysis of workforce policy in South Carolina highlights the potential benefits of cooperation between businesses and schools to create formalized apprenticeships programs. In Washington State, detailed tracking of workforce programs has provided lawmakers and stakeholders, which concrete insights into the effectiveness of a variety policies. Outside of government, cooperation between technical schools and businesses has proven effective to share curricula that best prepare students for vocational careers. Finally, addressing the skills gap requires proactive engagement of students, educators, and parents at the high school level to increase awareness of the viability technical careers and to give interested students the resources they need to pursue these professions.

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ASSESSING THE SKILLS GAP, ITS CAUSES, AND POSSIBLE SOLUTIONS

2 | THE SKILLS GAP

A skills gap refers to a mismatch between the skills that businesses are seeking in employees and the skills present in the available workforce. This makes it difficult for businesses to hire and expand. There is a skills gap in jobs that require technical skills, with a specific shortage of technically skilled workers in the heavy equipment distribution industry, which is represented by Associated Equipment Distribution (AED). The businesses in this industry require skilled technicians to repair and maintain equipment, which they in turn rent or sell to consumers. AED technicians are known as equipment service technicians, which entails maintaining and repairing equipment and engines used in a wide variety of applications, including construction, mining, agriculture, industrial, and energy.

2.1 | Identifying The Skills Gap

The AED member survey and broad economic studies provide an opportunity to identify the skills gap and its effects in concrete rather than anecdotal terms. An important consideration when looking at the existence of the skills gap for AED member businesses with regards to hiring technically skilled service technicians is that a very similar skills gap is experienced in the wider economy through manufacturing. The broad manufacturing sector represents around 12% of the United States' yearly Gross Domestic Product, with yearly revenues of upwards of \$2 trillion. This makes the manufacturing industry at large around 80 times larger than AED's membership.² The link between the issues faced by manufacturers and AED members, both in terms of the existence of the skills gap and in terms of the issues created by the skills gap, is critical when looking at the role of the skills gap in the economy today. An understanding that a shortage of technically skilled workers could be costing the US economy upwards of \$180 billion in revenue for businesses in sectors effected by the skills gap only serves to bluster the concerning impacts of the skills gap for AED members.³

² "Facts About Manufacturing." National Association of Manufacturers. Accessed December 4, 2015. <http://www.nam.org/Newsroom/Facts-About-Manufacturing/>.

³ Accenture "2014 Manufacturing Skills and Training Study Out of Inventory Skills Shortage Threatens Growth for US Manufacturing," 2014, *Manufacturing Institute*.

2.2 | Perceptions of the Skills Gap

FIGURE 1: RATINGS (0-5) OF FACTORS AED MEMBERS LISTED AS AFFECTING HIRING

FROM THE SURVEY OF AED MEMBERS



A survey of executives in the manufacturing industry found that 84% said that there was a skills gap.⁴ Manufacturing executives further said that they expect the skills gap to only get worse by 2020.⁵ When further asked what factors are issues with the skills gap, 67% of executives answered that employees lack the hard skills that they need in the industry.

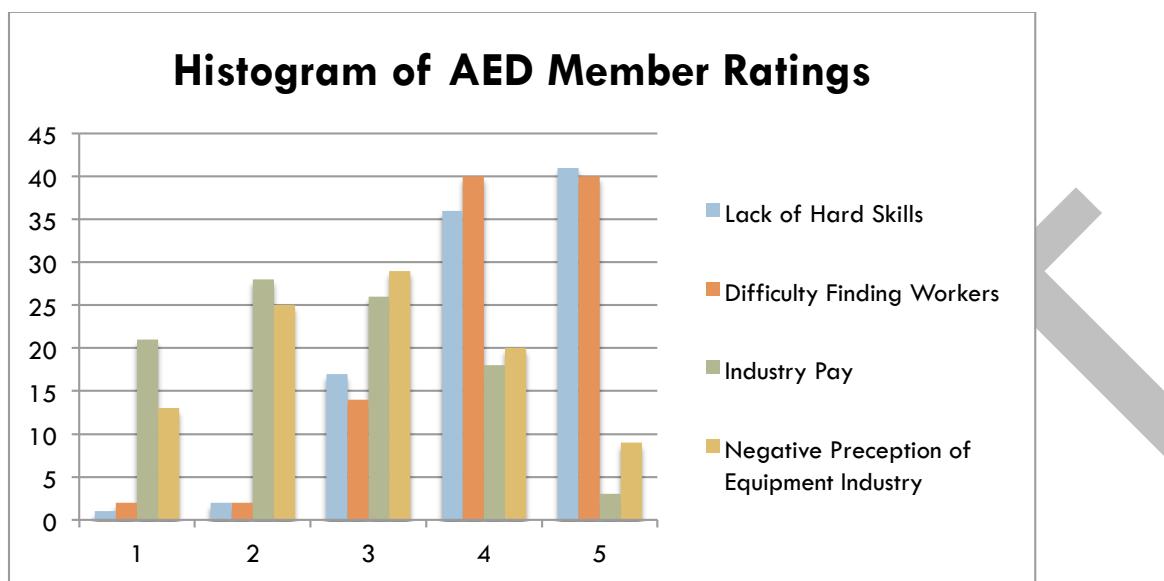
These results are both very much in line with the results of the survey of AED members. In the survey, respondent were asked to rate on a 1-5 scale how much difficulty they had in finding technicians. Then they were asked to rate on a 1-5 scale how a variety of factors (lacking hard skills, inability to pass drug test, etc.) contributed to that recruiting. Figure 1 shows the mean response to these questions. Immediately evident is that AED dealerships indicate a high level of difficulty in recruiting technicians, with the primary reason for this difficulty being a lack of hard (technical) skills among applicants. Also notable, is that factors that one might believe are driving the difficulty, namely low pay and a negative perception of the industry appear at the bottom of the list.

⁴ Deloitte "The skills gap in U.S. manufacturing 2015 and beyond," 2015, *Manufacturing Institute*

⁵ *Ibid*

FIGURE 2: HISTOGRAM OF AED MEMBER RATINGS OF VARIOUS ISSUES

FROM THE SURVEY OF AED MEMBERS

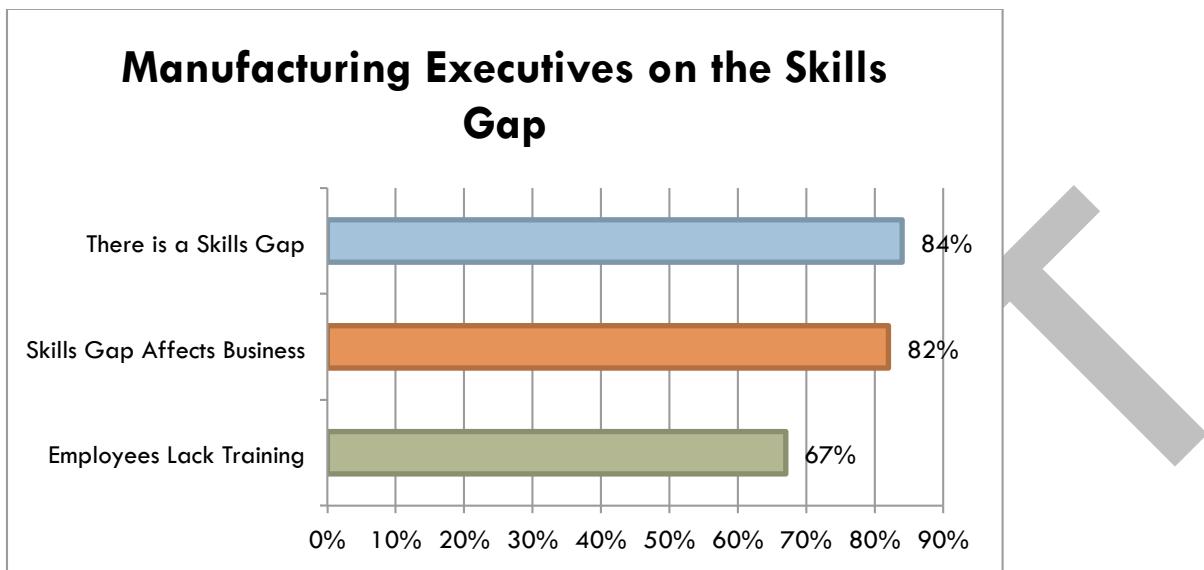


The histogram in *Figure 2* provides a further breakdown of how respondents rated a selection of factors. Again, the primary takeaway is that majority of respondents rated the Difficulty Finding Technicians as a 4 or 5. A similar trend appears in the histogram for Lack of Hard Skills, where only a handful rated it to be an insignificant factor in recruiting difficulty. Conversely, the distributions for the less important factors, Industry Pay and Negative Perception of Industry, are roughly bell shaped over the rating levels. This shows that the high average ratings for Difficulty Finding Technicians and Lack of Hard Skills are representative a real world difficult in recruiting, or at the very least, a perception thereof.

As seen in *Figure 3*, manufacturing executives concur with the results of the AED member survey that there is a skills gap in manufacturing, and that the lack of employees with hard skills is a significant factor.

FIGURE 3: THE SKILLS GAP FOR MANUFACTURERS⁶

FROM A SURVEY OF MANUFACTURERS CONDUCTED BY DELOITTE FOR THE MANUFACTURING INSTITUTE



While one may levy the criticism that this data only measures perception, the perceptions reported are backed by employment that also reported in the survey. A common metric for identifying a labor shortage like the technical skills gap is wage inflation. The reasoning is that when faced with a shortage, employers raise wages to attract new workers. Unfortunately, the survey only contains data from one year so one cannot identify wage inflation trends. Instead two other metrics can be used to look for a shortage of qualified technicians in the workforce. The first metric is job opening rate (JOR), which is calculated by taking the number of unfilled positions and dividing it by the total number of positions, filled and unfilled, in the job market. The second metric that can be used is the amount of time that an advertised position remains open before being filled.

⁶ Ibid

This shows the connection between the issues of the skills gap for the manufacturers and AED members in terms of the existence of a skills gap, the skills gap affecting businesses, and the lack of hard skills for employees.

FIGURE 4: JOB OPENING RATES FOR AED MEMBERS

FROM THE SURVEY OF AED MEMBERS

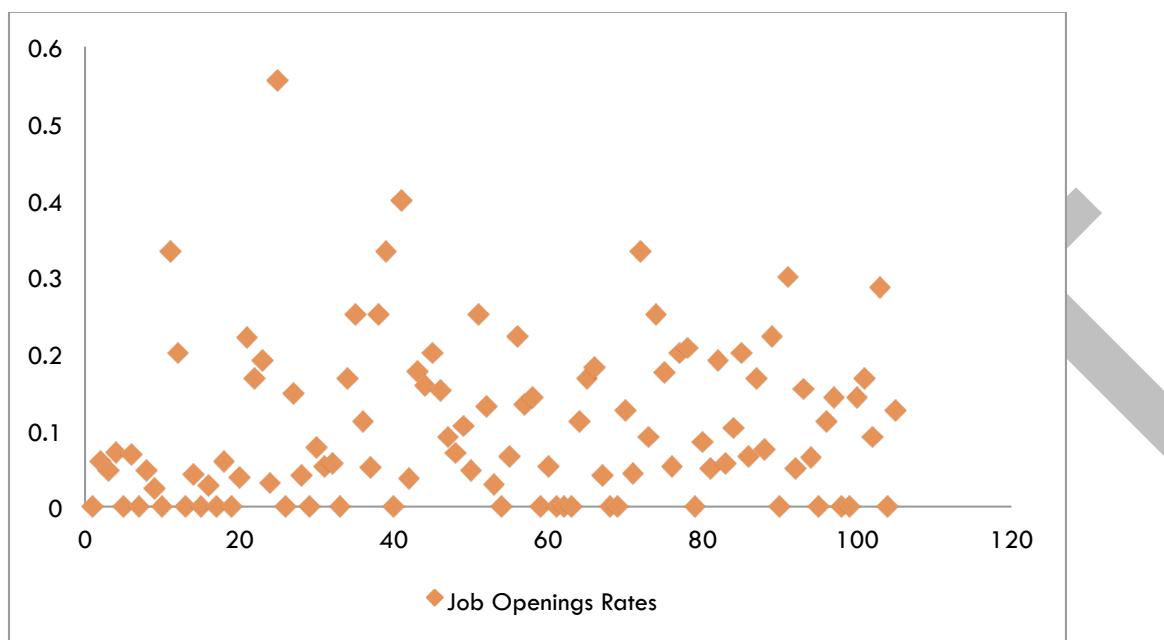
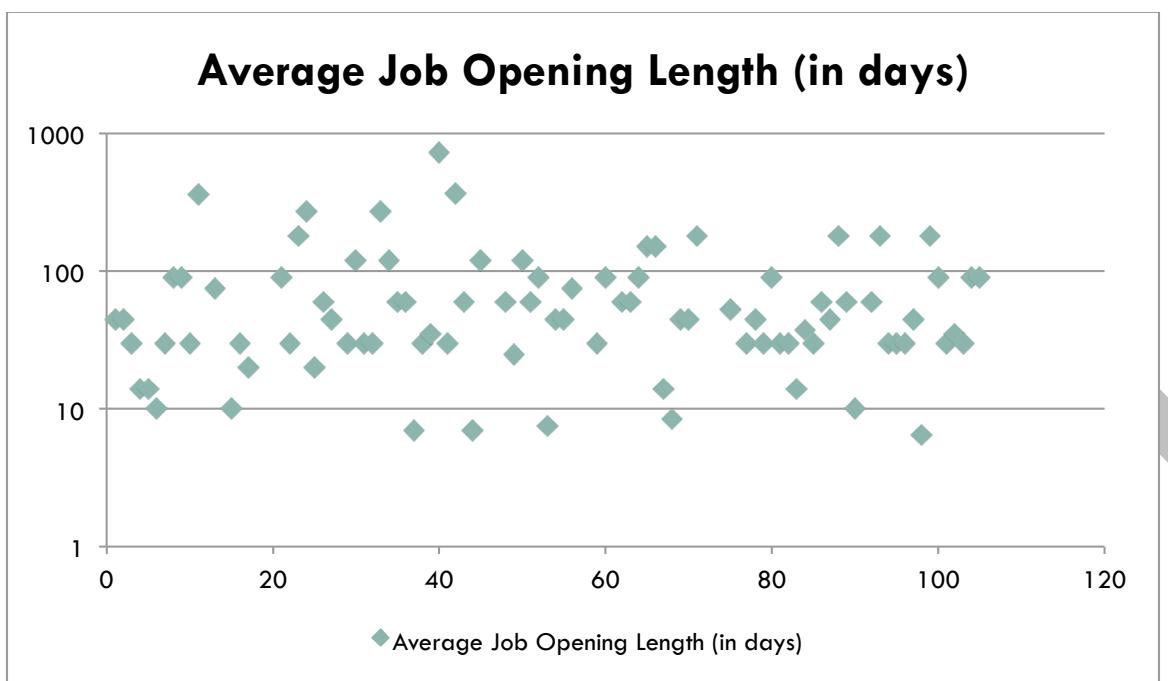


Figure 4 shows the job opening rate for survey respondents. The red line indicates the BLS determined nationwide job opening rate of 3.7%.⁷ As is clearly evident, a majority of AED dealerships have a JOR which exceeds the national average, often to a very significant degree. In fact the mean job opening rate for respondents was roughly 11.34%, more than three times the national average. Even the median value, which is not sensitive to outliers, is 8.43%, more than double what the rest of the nation faces. Given the reported difficulty in finding qualified technicians, this job opening rate is likely not a sign of an industry ready to boom but of a mature industry that cannot find the skilled workers that it needs. This talent shortage leads to low industry growth as businesses are unable to meet customer demand or take advantage of new opportunities.

⁷ Accessed December 4, 2015, "Job Openings and Labor Turnover Summary", Economic News Release, Bureau of Labor Statistics, <http://www.bls.gov/news.release/jolts.nr0.htm>

FIGURE 5: AVERAGE LENGTH OF JOB OPENINGS (PLOTTED ON A LOGARITHMIC SCALE)

FROM THE SURVEY OF AED MEMBERS



Further evidence of the skills gap in the equipment distribution industry is presented in *Figure 5*. The plot shows the average number of days that a job remains open. Again the red line indicates the national average for how long a position remains open, 28.1 days⁸. Similarly to JOR, a majority of AED members fall above this national average. It should be noted that the y-axis is on a log scale, those highest points represent respondents who indicated that a position may remain open for a year or more before being filled.

2.3 | Effects of the Skills Gap

Another connection between the experiences of AED members and the experiences of the wider manufacturing industry that can be seen in *Figure 3* is the effects of the skills gap on businesses. Similar to AED members, the skills gap hurts manufacturers businesses by hindering their ability to grow, increasing production costs through additional overtime and inefficiencies, and difficulty meeting customer demands. Some estimates put the impact of the skills gap on businesses at around 9% of foregone yearly earnings.⁹ In the manufacturing sector as a whole, that could translate to over \$180 billion in lost earnings each year.¹⁰ If the same estimate were to hold true, the skills gap could be costing the full AED membership in the United States anywhere from \$1.75 billion to \$3.1 billion each year. At the average estimate of total dealer revenues in the United States, the skills gap could be costing individual member businesses around \$6.1 million

⁸ <http://dhihiringindicators.com/>, “DHI-DFH Mean Vacancy Duration Measure”, DHI Hiring, Accessed December 4th, 2015

⁹ *Supra*, note 3

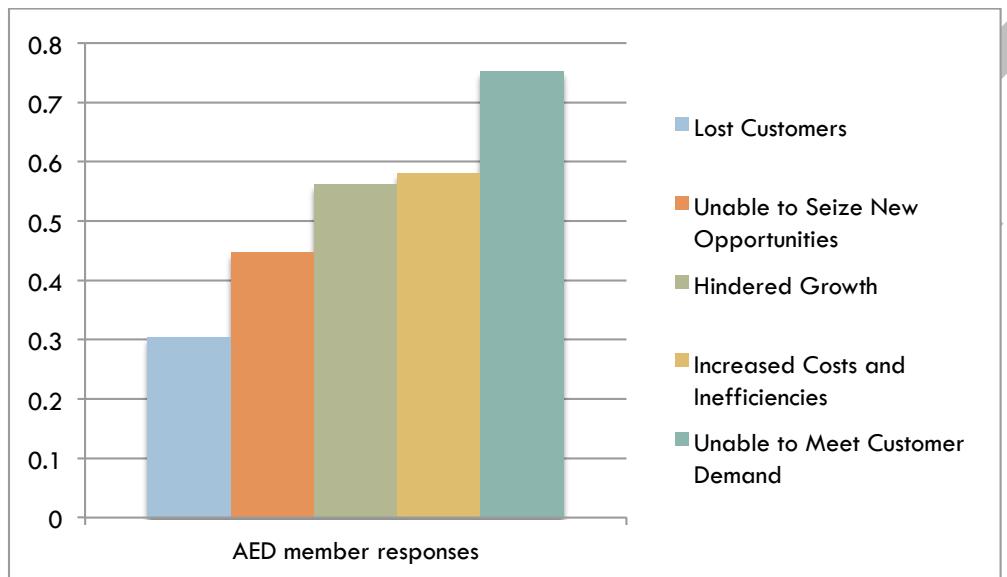
¹⁰ *Supra*, note 2

apiece.¹¹ If current trends about AED member employment held true and member businesses were able to simply address the current skills gap that could mean an additional approximately 4,000 jobs nationwide.¹²

In the equipment distribution industry, the skills gap is real and it adversely affects businesses. These affects appear in the form of decreased expansion potential, lost revenue and lost wages, among other detriments.

FIGURE 6: EFFECTS OF THE SKILLS GAP

FROM THE SURVEY OF AED MEMBERS



In the survey AED members were asked to indicate whether or not their ability to recruit new technicians has affected their business some specific ways. Included was whether or not it had caused them to lose customers, hindered their growth and made them unable to meet customer demand. Figure 6 illustrates the percentage of respondents who responded affirmatively to each of the affects. The red line is the 50% line, above which a majority of respondents are facing the indicated affect. While only a third reported losing customers due to recruitment issues, a majority said that the skills gap had hindered their businesses growth and made it difficult to meet customer demand.

We can estimate the dollar value of the affects by looking at lost wages and lost revenue. By calculating the unfilled technicians days per year and multiplying by either average wage or revenue per technician we get estimates for lost wages and lost revenue, respectively. For lost wages this amounts to roughly \$4.24 million annually across all 430 distributor members of AED. Additionally, almost \$170 million in revenue is lost every year due to jobs going unfilled for extended periods of time. Furthermore, these numbers only count turnover related openings. They assume a static number of total jobs and don't account for industry growth.

Due to not counting growth related job openings and to the possibility of raising retirement rates in the near future, the estimates of \$170 million in lost revenue and \$4.24 million in lost wages may be

¹¹ AED member information regarding the number of AED members in the United States (393), the upper bound estimate of total AED member revenues (\$34.530 billion), the lower estimate bound of total AED member revenues (\$19.375 billion), and the average estimate of total AED member revenues (\$27 billion).

¹² AED member survey about revenue per employee (\$600,000 per employee)

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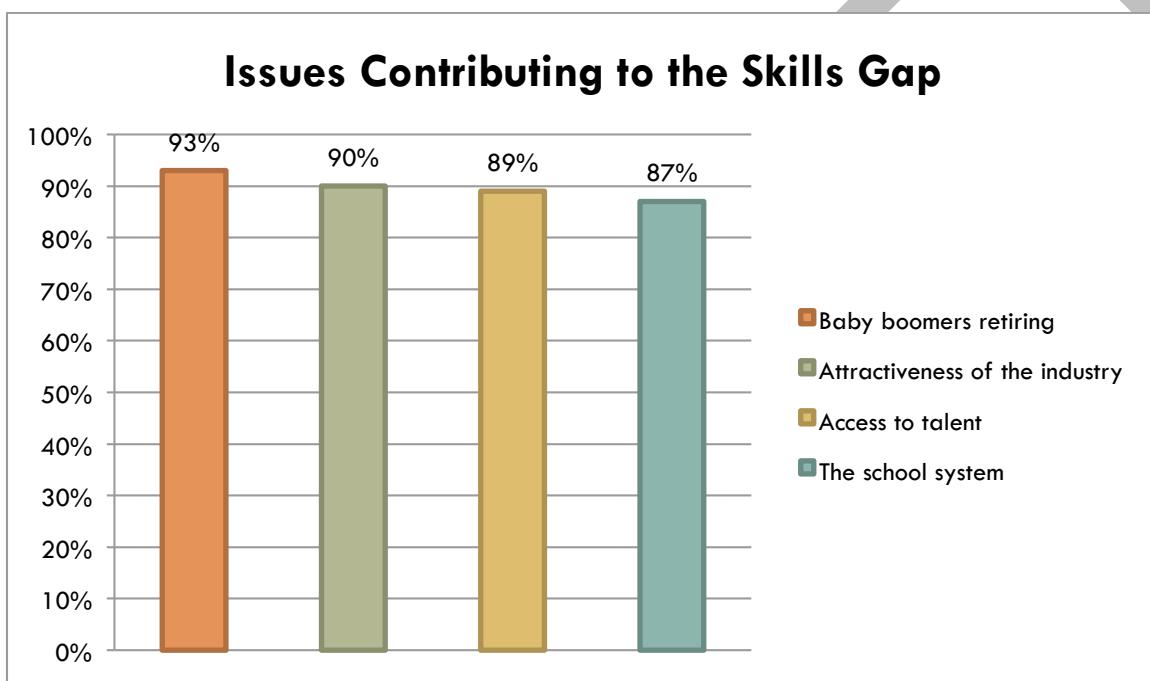
conservative estimates. Furthermore, these estimates do not count the potential affect of the skills gap on costs due to having to pay overtime. 58% of AED members do, however, report that the inability to hire higher technicians leads to increased costs and inefficiencies.

3 | EXPLAINING THE SKILLS GAP

The existence of the skills gap is supported both by the evidence from the manufacturing industry and from the AED membership, and it is abundantly clear that the skills gap is hurting businesses in need of technically skilled workers. To look further at the skills gap, it is important take a closer look at some of the factors that may be contributing to the existence of the skills gap. *Figure 7* demonstrates some of the major external reasons why manufacturing executives believe that the skills gap exists today.

FIGURE 7: MANUFACTURING EXECUTIVES ON ISSUES THAT CONTRIBUTE TO THE SKILLS GAP¹³

FROM A SURVEY OF MANUFACTURERS CONDUCTED BY DELOITTE FOR THE MANUFACTURING INSTITUTE



In *Figure 7*, it is evident that there are several strong explanations for the skills gap. Specifically, the retirement of baby boomers, the current educational landscape, and the perception of the industry are key factors in the existence of the skills gap. These seem to be compelling factors for why the skills gap exists today, but there are other possibilities. One issue that the Department of Labor has cited to refute the existence of the skills gap is wages in the technical work force. Analyzing the possible explanations for the skills gap will give some valuable insight about the potential root causes of this issue that has such profound impacts for American businesses.

¹³ *Supra*, 4

These results reflect the number of respondents that rated each category as having either a "significant" or "moderate" impact on the existence of the skills gap.

3.1 | Baby Boomers Retiring

With 93% of manufacturing executives stating that Baby Boomers retiring contributes to the skills gap, it is clear that this is a major issue. With 2.7 million baby boomers expected to retire from the manufacturing industry over the next ten years, and an additional 700,000 jobs likely to be created in manufacturing over that time, the skills gap is likely to only continue to grow. Today, six out of every ten job openings in manufacturing go unfilled. Of the 3.4 million manufacturing jobs expected to open over the next decade, 2 million are projected to go unfilled. That means that the skills gap in manufacturing is anticipated to have more than tripled between 2011 and 2025.¹⁴ Clearly an aging workforce and many experienced workers retiring in the foreseeable future have massive impacts on the skills gap in manufacturing. Given the analogues between the manufacturing skills gap and the skills gap for AED members, it is easy to see that the retirement of baby boomers also plays a large role in the skills gap for AED members. The present effects of this can even be seen in the survey of AED members who responded that they expect 10% of their current workforce to retire in the next five-years, with 21% of businesses reporting that they expect 20%, or more, of their workforce to retire over the next five years. Some businesses reported expected retirement rates of 40% over the next 5 years. This will likely put even greater strain on an already over stretched technical workforce.

For AED members, this level of retirement may have dire consequences. Currently, the main reason that technicians leave distributors is due to “poaching”. Of the 89 businesses that answered the question on what was the main reason for technicians leaving, 60 indicated that the employee was continuing work in a technical field, either for a customer, for a competitor or in another industry that requires technically skilled labor. Only 15 indicated that the main reason for a technician leaving was retirement. As Baby Boomers continue to reach retirement age, which they do at rate of 10,000 per day, AED members, and the economy as a whole, will have to contend with dearth of technical talent and an increasing number of open positions to fill.¹⁵

3.2 | Social Momentum Toward Four-Year Degrees

In the survey of manufacturing executives, 89% said that access to talent contributed to the skills gap and 87% said that the school system played a part in the lack of technical workers. These two issues combine when looking at the landscape of high school students entering college. Since 2000, college entry has risen by 25%, as around 5 million more students will start college in 2015 than did in 2000.¹⁶ This is while the college-age population has grown around 15% over that time.¹⁷ Over that time, four-year colleges have seen a noticeable jump in the number of students that enrolled as opposed to two-year schools. From 2000 to 2012, those enrolled four-year colleges have increased by 46.6% while two-year colleges, many of which offer technical degrees needed by AED and the manufacturing sector, have only seen an increase of 20.6%. Compare this with the trends from 1990 to 2000, when four-year colleges saw only 7.2% growth over that time while two-year degrees grew by 13.5%. This means that comparing pre-2000 and post-2000 trends indicates that four-year colleges have seen a staggering 547% change in the rate of enrollment growth

¹⁴ Supra, 4

¹⁵ D'Vera Cohn and Paul Taylor, “Baby Boomers Approach 65 – Glumly,” Pew Research Center. Accessed December 9, 2015. <http://www.pewsocialtrends.org/2010/12/20/baby-boomers-approach-65-glumly/>

¹⁶ “Table 105.20. Enrollment in elementary, secondary, and degree-granting postsecondary institutions, by level and control of institution, enrollment level, and attendance status and sex of student: Selected years, fall 1990 through fall 2024,” National Center for Education Statistics. Accessed December 4, 2015. http://nces.ed.gov/programs/digest/d14/tables/dt14_105.20.asp?current=yes

¹⁷ “Table 101.20. Estimates of resident population, by race/ethnicity and age group: Selected years, 1980 through 2013,” National Center for Education Statistics. Accessed December 4, 2015. http://nces.ed.gov/programs/digest/d14/tables/dt14_101.20.asp?current=yes

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between the period 1990-2000 versus 2000-2012. Meanwhile, two-year degrees have seen only a 50% increase in rate of enrollment between the two time periods.¹⁸

Despite higher entry rates, colleges have not seen an increase in retention rates, and the four-year college retention rate has remained relatively constant at around 71%.¹⁹ This simply demonstrates that four-year colleges have not become better option in terms of the students staying that enter college. Certainly some of this uptick in four-year college entry is due to a changing economy in the United States with different demands, but there will be almost 4.5 million students that begin four-year colleges in 2015 that will not return in 2016.²⁰ Considering that the skills gap for AED member could be caused by a total of 1,200 or so workers nationwide, it is easy to see that there could be some friction involved with students that would be well suited for a technical degree path out of high school instead going to a four-year college.²¹

Again, these trends and realities are backed by the perceptions of AED members. Dealerships indicate a belief that “Vocations have been abandoned in the US” and that students are pushed, by their parents, into college and “...steered away from blue collar jobs.” This in turn means that the number of young people looking to start technical jobs and who view them as a potentially fruitful career are dwindling.²²

3.3 | Low Social Perceptions and Visibility of Technical Jobs

Only one out of every three parents would encourage their child to pursue a degree in manufacturing. This result is a bit surprising given that 90% of Americans believe that manufacturing is important to the country's economic prosperity, and 82% say they would support further investment in the manufacturing industry. In fact, if given the option to create one thousand new jobs in their local community, Americans ranked manufacturing as the number one industry that they would choose for those jobs.²³ On a slightly larger scale, 37% of parents would encourage their child to work in a technically skilled job.²⁴ Given the seemingly broad support for manufacturing in the United States, one would expect more support for people entering the industry. One major factor causing this friction between perception of the industry and support of working in the industry is the visibility of technical work in society, and specifically, in school.

If a parent is familiar with the manufacturing industry, that parent is twice as likely to encourage a child to pursue a career in manufacturing. This reality also appears in the AED survey data in which respondents say that if they can get parents on their side, they have a good chance of recruiting young technicians. If this can't be done, students are pushed into 4-year schools, and likely won't view technical work as a viable option. This speaks to the importance of visibility, as well as the lack of visibility currently, given the low support for children entering manufacturing.

¹⁸ “Table 105.20. Enrollment in elementary, secondary, and degree-granting postsecondary institutions, by level and control of institution, enrollment level, and attendance status and sex of student: Selected years, fall 1990 through fall 2014,” National Center for Education Statistics. Accessed December 4, 2015.

http://nces.ed.gov/programs/digest/d14/tables/dt14_105.20.asp?current=yes

¹⁹ “Table 326.30. Retention of first-time degree-seeking undergraduates at degree-granting postsecondary institutions, by attendance status, level and control of institution, and percentage of applications accepted: 2006 to 2013,” National Center for Education Statistics. Accessed December 4, 2015. https://nces.ed.gov/programs/digest/d14/tables/dt14_326.30.asp

²⁰ *Supra*, note 16

²¹ Based on calculation of estimated total lost earnings for AED members of \$2.4 billion a year and survey data from AED members indicating that technicians per member business are normally found at the rate of one technician per \$2 million in revenue.

²² From AED survey data

²³ Deloitte “Overwhelming Support U.S. public opinions on the manufacturing industry,” 2014, *Manufacturing Institute*

²⁴ *Supra*, note 4

There are a number of potential explanations to why this lack of visibility exists. One possible reason is the lack of exposure in the school system. 87% of manufacturing executives said that the school system contributes to the skills gap, and only 30% of American parents believe that school systems encourage children to pursue manufacturing careers. 78% of Americans went so far as to say that the education system needs to be reformed, and 72% said that some form of internship or apprenticeship programs would help increase interest in manufacturing work.²⁵ This is against the backdrop of a 40% decline in apprenticeships in the United States since 2000.²⁶

3.4 | Misalignment of Labor Market Needs and School System

At the root of the technical workforce crisis is an education system which provides limited opportunities to explore technical careers and which produces graduates without the requisite skills to fill labor openings. Across all geographic regions and company sizes, AED members report a general dissatisfaction with local education institutions. When asked the question, “*Do you believe that local educational institutions in your area (high schools, community colleges, other technical schools) understand your company’s workforce needs and align their curricula and train students to meet those needs?*” only 15% of respondents said yes.

This problem is not unique to AED. 87% of manufacturing executives rated issues with the school system as contributing to the skills gap, and only 30% of American parents believe that schools encourage pursuing manufacturing careers.

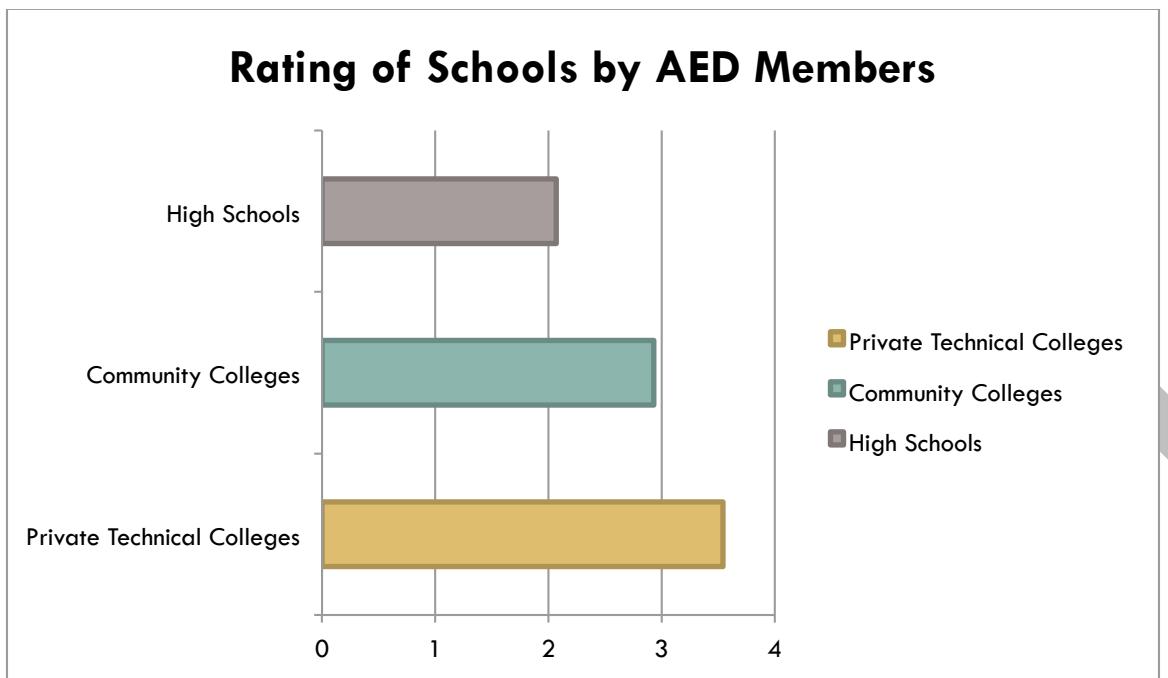
Figure 8 further illustrates this point. The graph presents average ratings of local high schools, community colleges and private technical schools by AED members, on a 1-5 scale. While the ratings for the technical schools are slightly above average, high schools and community colleges are significantly behind. The poor ratings, especially for high schools, are indicative of a technical education system that has largely neglected secondary school students and other young adults. This lack of focus pushes students away from technical careers at an early age.

²⁵ *Supra*, note 20

²⁶ *Supra*, note 4

FIGURE 8: RATINGS (0-5) FOR AED MEMBER SATISFACTION WITH LOCAL SCHOOLS

FROM THE SURVEY OF AED MEMBERS



3.5 | Lack of Wage Growth

When looking at an industry with a lack of labor supply, traditional economic models would suggest that wages would increase to attract more workers in order to keep up with labor demand. Anecdotally, this is the logic that the Department of Labor employees when looking to see if there is a skills gap for AED member. However, there are some frictions presents in the labor market that may make it difficult for businesses to actually be able to increase wages in order to attract new workers. Anecdotally, the issue may be as simple as a cyclical problem with businesses not being able to grow without more employees, but not being able to hire more workers without growing the business. *Figure 4* demonstrates a potential explanation for the lack of wage growth.

FIGURE 9: A POTENTIAL CYCLE AFFECTING THE ABILITY OF BUSINESSES TO PAY HIGHER WAGES AND GROW

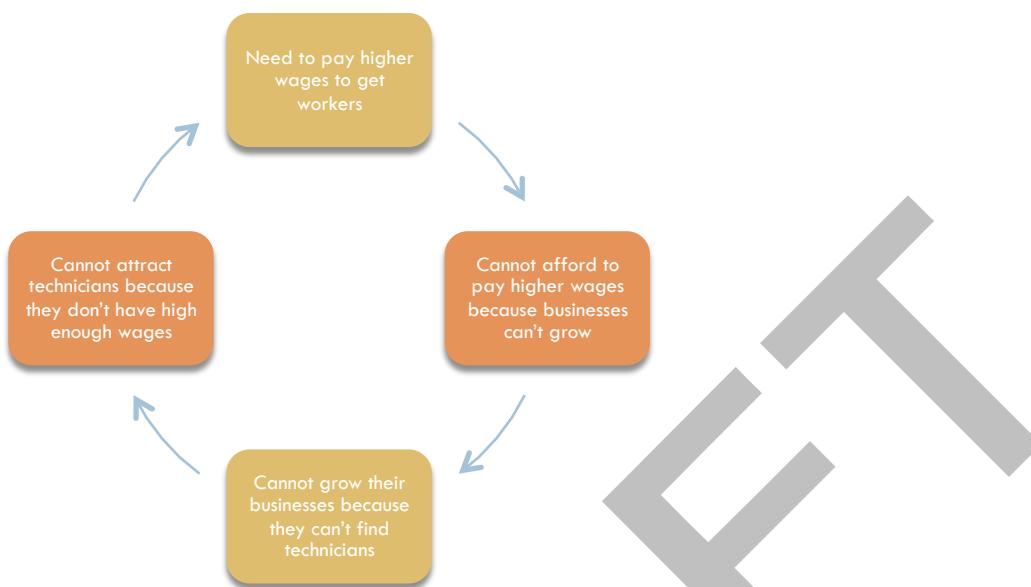


Figure 9 demonstrates the potential for the businesses to have trouble offering higher wages because of difficulty growing due to a lack of workers that are able to fill technical positions. In practice, it may be that wages are kept low because businesses are unable to find enough workers to grow their businesses enough to offer those higher wages.

This diagram is not without evidence. Responses in the AED survey indicate that the inability to pay higher wages affects dealership's ability to both hire and retain technicians. In the data we also see correlation between those who say that the skills gap is hampering business growth and businesses that report a high rate of unfilled jobs.

4 | POLICY ANALYSIS

4.1 | AED Foundation Recruitment Strategy

Any consideration of the extent to which public policies can help AED address the skills gap in its technical workforce must be done in the context of the AED Foundation's community-based recruitment strategy²⁷. Developed in response to the shortage of skilled technicians entering the heavy equipment industry, the community-based recruitment strategy is intended to facilitate dialogue and partnerships between individual AED members and key stakeholders in their local area including other AED members, high schools, and technical colleges. This approach is designed to increase the visibility of the technician profession and its benefits among high school students, while providing guidance on the pathways to pursuing these careers and opportunities to financially support their transition to a technical college. The AED Foundation has worked with its members to establish educational and professional development standards for technical colleges to incorporate within the curriculum of their technician-oriented degree programs, and awards an

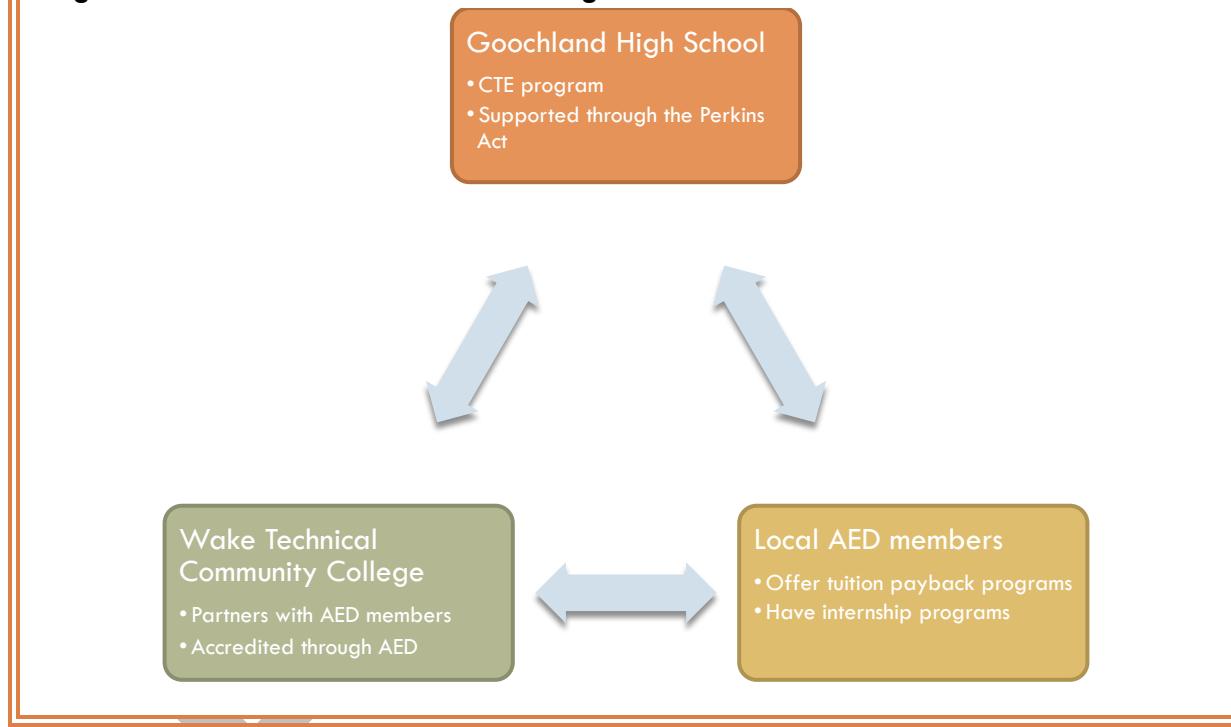
²⁷ Steven A. Johnson, "Recruitment Guidebook for AED Member Dealers: Recruiting Young People for Careers in the Construction Equipment Industry" (2nd Ed., May 2012), The AED Foundation.

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industry-recognized accreditation to schools that adopt these standards. The success of this strategy relies on stakeholders' recognition of the mutually beneficial incentives it provides.

A demonstration of how this works in practice in southern Virginia is the collaboration between the career & technical education (CTE) program at Goochland High School, Richmond-area AED members, and the regional college that holds AED accreditation, Wake Tech. Goochland High School hosts AED members for on-campus marketing and career events, and AED members donate equipment to the school's CTE program as well as provide access to their facilities for site visits. Goochland students interested in pursuing a technical degree at Wake Tech are provided with internship and post-graduation employment opportunities with AED members as well as participation in a tuition reimbursement program upon starting their technician career. The AED Foundation works with Wake Tech to ensure that its curriculum for AED technician-oriented degree programs aligns with the skills and competencies students need to transition into careers as AED technicians.

Figure 10: AED Foundation model in Virginia



The AED Foundation's community-based recruitment strategy shares many similarities with the approach of organizations representing industries with comparable workforces experiencing challenges with skills gaps. For example, the Center for Energy Workforce Development (CEWD)²⁸, an association of electric, natural gas, and nuclear utilities in the United States, was founded in response to an anticipated shortage in that industry's skilled workforce. Over the last 10 years CEWD has established multilayered consortia of key stakeholders across the nation, soliciting the participation of employers, educators, worker groups, to develop targeted strategies that build sustainable pipelines developing skilled workers to meet the industry's future

²⁸ Center for Energy Workforce Development, <http://www.cewd.org/about/>, accessed December 4, 2015.

needs. These consortia represent networks at the national, regional, and state levels that regularly meet to collaborate on initiatives to raise awareness about the utility technician profession, provide technical training and education opportunities for secondary and post-secondary students, develop technical curricula tailored to local employer needs, and coordinate marketing and recruitment efforts.

The strength of CEWD's consortia strategy is that it reflects an inclusive approach by opening participation to all education stakeholders, regardless of whether or not their school offers academic programs or coursework specifically geared toward utility technician career preparation. Expanding the range of participants from the education sector allows CEWD to maintain a robust network to develop innovative solutions to local utility workforce needs as well as disseminate information, share resources, and exchange best practices. The fundamental idea behind this approach is that while some high school or community colleges in CEWD's consortia may not currently offer utility technician-oriented curricula, their inclusion in these networks makes them stakeholders in the technical skills gap issue and ensures they know about the resources and opportunities available to students interested in these career fields and can send them in the right direction through their active engagement with other consortia participants.

The AED Foundation's community-based recruitment strategy empowers AED members to become proactive participants in the effort to close the skills gap by engaging with local stakeholders to strengthen the pipeline that supplies the next generation of the technician workforce. While there certainly are differences between the heavy equipment and utility industries the similarities between the nature of the skills gap affecting their workforce and their strategic responses to it demonstrate that each provides examples for ways in which the other might consider opportunities to support its approach. For example, CEWD's online presence uses a minimalist yet professional style in its website design that displays content in a quickly digestible summary format, provides links within a layout that's simple to navigate, and embeds its products and resources in parts of its web domain that are easy to identify and access. The AED Foundation's website has an engaging and creative design as well as innovative features that set it apart from other workforce development organizations in a way that effectively communicates and distinguishes its brand. However, opportunities exist to fine tune the site layout to facilitate new visitor navigation so that users who are not already familiar with the arrangement of specific resources can efficiently locate important content.

The AED Foundation's current emphasis on its accreditation program for technical colleges that develop and deliver curricula aligning with the essential competencies of AED's technician workforce has many advantages, and with colleges across the country in the process of becoming accredited students increasingly have greater access to post-secondary educational opportunities that can prepare them for technician careers. While this emphasis is critical to the success of the community-based recruitment strategy's goals, it's also important to focus on efforts to strengthen the workforce pipeline at the secondary and pre-secondary levels to enhance opportunities for students to engage with the industry and develop an awareness of the technician profession as a viable career path at earlier stages in their education experience. For example, CEWD's Get Into Energy program is a comprehensive initiative aimed at teen and preteen students that uses targeted marketing strategies that include videos, games, an interactive website, contests, live demonstrations, local training sessions, and events to increase exposure to the utility industry and its technician workforce as early as possible so these careers resonate with students when they consider their options after high school graduation. Get Into Energy also targets information and resources to parents, educators, and guidance counselors that connect utility technician skills to STEM education with lesson plans and career exploration tools, recognizing the influential role these stakeholders play in advising students on their career choices. The AED Foundation resources available to the public through its website are effective at helping young adults already motivated to pursue a technician career locate accredited programs and connect with local dealers,

AED and the Skills Gap

but opportunities exist to increase its outreach and engagement efforts among the secondary, and potentially the pre-secondary, student population.

Aside from the best practices that can be learned from peer workforce development organizations, AED stands to benefit from government action directed at addressing the skills gap. The extent to which public policies can support AED specifically is explored in the following case studies that identify relevant federal and state initiatives that both provide a context for further advocacy and examples of the types of public-sector opportunities with the greatest potential use for AED. The nature of the cases and their discussion are oriented toward workforce development policies best situated for strengthening the AED Foundation's community-based recruitment strategy.

4.2 | U.S. Federal Case Study²⁹

In 2014, President Obama signed the bipartisan Workforce Innovation and Opportunity Act, which reforms and reorients state and federal labor market programs to facilitate job seeker access to education, training, employment, and support services, and connect employers with skilled and qualified workers. WIOA establishes a strategic partnership between the Department of Labor's Employment & Training Administration (DOL/ETA) and state workforce agencies to provide federal resources and guidance in supporting states with the administration and delivery of program services through a network of local American Job Centers. To foster coordination and cooperation among all stakeholders, states are placed into regional sectors to align economic development strategies, and state-level workforce development boards consisting of public and private sector representatives are created to implement targeted interventions adapted to local market conditions. Core programs encompassed within WIOA are held accountable to data-driven common performance indicators that must be regularly reported to DOL/ETA and made available to the public. Fundamentally, WIOA reflects the national model for workforce development policy in the United States, and represents the macro-level context within which AED's technical workforce shortage issue is situated.

Implementation of the WIOA reforms among the states began in the summer of 2015, and the process is still ongoing with the DOL/ETA working closely with state workforce agencies to establish a framework of federal expectations to guide their efforts. As DOL/ETA continues to issue directives to state workforce agencies, industry groups like AED should regularly monitor the issuance of federal policy documents published on DOL/ETA's website to remain informed about the guidance states receive, which can reveal the implications for industry stakeholders and uncover potential opportunities for private sector employer groups to become involved in the emerging processes and programs. For example, as regional and state-level workforce development boards assemble, AED should encourage notify its members of opportunities to participate as it will ensure that their interests as individual employers and as representatives of the heavy equipment distributor industry are given voice when decisions are made about the allocation of public resources for workforce initiatives. Additionally, AED can advise its members on opportunities to become involved with the American Job Center network of local offices that supply career coaching, training, and funding resources to job seekers as well as maintain a virtual presence on a centralized website that enables employers to post job openings and provide job seekers with information regarding the required skills and credential to pursue a particular career path.

AED involvement with the emerging WIOA programs can help raise the visibility of technician careers, connect interested job seekers with the resources they need to become eligible and apply for job openings,

²⁹ "The Workforce Innovation and Opportunity Act," United States Department of Labor, Employment and Training Administration (ETA), <http://www.dol.gov/wioa/>, accessed December 4, 2015.

and give voice to the unique concerns of the heavy equipment distribution industry in local decision-making through the participation of AED members in state workforce development boards.

4.3 | South Carolina Case Study³⁰

Apprenticeship Carolina is a South Carolina initiative launched in 2006 that established a statewide apprenticeship program in collaboration with the state technical college system and the South Carolina Chamber of Commerce. This program represents a successful public-private partnership that proactively solicits the expertise of local employers on the competencies required of their technical workforce so that state colleges can more effectively design their programs to ensure that students demonstrate mastery of essential skills upon graduation. Businesses and technical colleges are encouraged to work together to find opportunities to incorporate on-the-job training for students through apprenticeships that facilitate their transition from high school to post-graduation work. This combination of class-based and work-based learning is uniquely balanced for each professional program as a result of the informed diagnosis of businesses in the affiliated industries of their human resource needs as well as the curricular expertise of technical college administrators. Synthesizing this information into content standards, Apprenticeship Carolina then formally establishes specific technical apprenticeships as registered programs with the Department of Labor that qualify for federal funding.

Apprenticeship Carolina represents a model state-level workforce policy that can support the AED Foundation's community-based recruitment strategy. By facilitating dialogue and collaboration between employers and educators, local governments can play an important role in sustaining mutually beneficial partnerships that ultimately promote job creation and improve local economic development. AED already encourages its members to connect with local high schools and technical colleges to raise awareness about technician careers and the pathways available to students interested in pursuing this profession, but including the public sector as stakeholders in these initiatives can strengthen their effectiveness, particularly with regard to efforts supporting students' transition from high school graduation to post-secondary technical education and employment opportunities. South Carolina leveraged its expertise of the public resources and funding available through existing workforce programs, in this case on-the-job training apprenticeships, to help educators and employers take advantage of federal and state grants by working together to develop curricula that met requirements to qualify these programs for funding. More importantly, the state was able to assume this role without incurring much additional financial commitment on its part.

State policymakers have an economic incentive to engage with educators and employers and provide access to existing public resources if doing so ultimately promotes local job creation, and South Carolina can be an example AED references in advocating for similar state-level policies that support its existing community-based recruitment strategy.

4.4 | Washington Case Study³¹

Washington State is often highlighted as a leader in state-level workforce policy program administration. The state's exemplary status is recognized as primarily the consequence of the Washington

³⁰ Jennifer Gonzalez, "Apprenticeship Programs Expand With Help of Community Colleges," *The Chronicle of Higher Education*, September 19, 2010, www.newcarolina.org/userfiles/ncar/documents/chronicle.pdf, accessed December 4, 2015.

³¹ Kevin Hollenbeck and Wei-Jang Huang, "Net Impact and Benefit-Cost Estimates of the Workforce Development System in Washington State." Upjohn Institute Technical Report No. 13-029. Kalamazoo, MI: W.E. Upjohn Institute for Employment Research. <http://dx.doi.org/10.17848/tr13-029>

AED and the Skills Gap

State Workforce Training and Education Coordinating Board (WTECB), which promulgates, tracks, and reports accountability, performance monitoring, and management standards to evaluate the programs constituting the state workforce development system on specific outcomes. One of the outcomes is return on investment, and in 2006 researchers from the Upjohn Institute conducted an analysis of the return on investment of 11 state programs comparing their net benefits to costs. Of particular note, this analysis demonstrates the positive short- and long-term net impacts associated with community & technical college job preparation, secondary career technical education, and apprenticeship programs. On average, participants in these workforce programs increased their initial employment earnings 6.7 – 9.2 percentage points within 9 months of completion, and 4.6 – 6.8 percentage 2 years after the initial period.

The Washington case demonstrates both the importance of data collection to evaluate policy performance outcomes and the relative effectiveness of workforce development programs targeting job-oriented technical education and training when measured against other public labor market policy interventions. The strategic alignment of education and workforce initiatives among stakeholders in the public and private sectors relies on access to data so that the resources invested in these programs produce positive returns. The National Skills Coalition cites Washington as a model for other states to follow, and much of WTECB's work anticipates the program performance monitoring, evaluation, and reporting requirements of the federal WIOA reforms.

AED has a stake in the development and implementation of state-level data collection initiatives that will ultimately supply the information supporting the efficacy of public programs targeting the technical skills gap in its industry as well as aid its efforts to advocate for the adoption of such policies with proven success.

5 | RECOMMENDATIONS

5.1 | Strengthening the Community-Based Recruitment Strategy

- Consider a consortia model to expand the scope of engagement with secondary and post-secondary educators outside the existing network of AED accredited technical colleges, and solicit their participation in the development and implementation of future strategic initiatives.
- Increase targeted outreach efforts to secondary and pre-secondary students to raise awareness and understanding of the heavy equipment industry and the career opportunities associated with the technician profession.
- Identify opportunities to incorporate technician-oriented skill sets into secondary-level curricula (Ex. career and technical education & STEM programs), enabling students to develop and master key competencies early.
- Redesign the layout of the AED Foundation's website to streamline navigation and ensure that critical content and resources are easily identifiable and accessible.

5.2 | Addressing the Skills Gap through Public Policy

- Encourage AED member participation in WIOA workforce development and engagement with their location American Job Center locations.
- To the extent possible, work with DOL/ETA to have information and resources about AED technician careers included on the American Job Center website.
- Monitor the publication of newly promulgated guidelines from DOL/ETA directing state implementation of WIOA reforms to identify potential implications for AED.

- Promote state-level workforce development initiatives that facilitate coordination among educators and employers to develop partnerships that take advantage of public funding resources for specific programs, like apprenticeships.
- Continue to incentivize career technical education programs at the high school and secondary school levels aimed at addressing labor market and local employment needs, especially in terms of easing the process for accessing workforce development funds for technically focused programs.
- Advocate for the adjustment of national workforce policies to incorporate an emphasis on individuals entering the labor market broadly and those seeking technical careers specifically to support their pursuit of education and training programs designed to prepare them to enter these industries, particularly those experiencing workforce shortages.

5.3 | Further Study and Next Steps

- Develop and administer a new survey targeting AED members with questions that solicit more detailed responses regarding the nature of the skills gap and its affect on their businesses as well as their experience and perception of the resources and practices promoted by the AED Foundation through its community-based recruitment strategy.
- Consider incentivizing survey participation among AED members to ensure that a more representative sample is captured that accurately reflects the distribution of members based on revenue characteristics.
- Conduct a more comprehensive analysis of the causes of the skills gap focusing on perceptions of the technician profession among students, educators, parents, and current AED technicians, and understanding the factors motivating student career and post-secondary education decisions.
- Evaluate the performance of AED accredited technical programs to assess the relative rates of participation among and attempt to determine career opportunities pursued by graduates upon degree completion.

THE SKILLS GAP

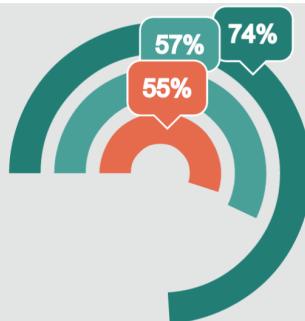
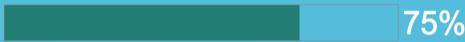
Highly technically skilled workers are in short supply in the wider manufacturing sector. This same lack of skilled technical workers is also present with the members of the Associated Equipment Distributors.

AED Members and the Skills Gap

In a survey of AED members, company executives responded that the Skills Gap had a number of impacts on their businesses.

Effects of the Skills Gap on finding workers

Difficult to find workers



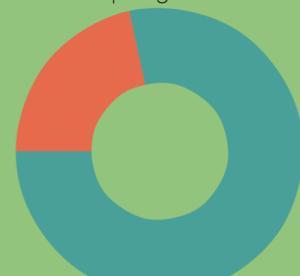
Effects of the Skills Gap on AED member businesses

■ Difficult to meet demand ■ Increase costs & inefficiency
■ Hinder company growth

Factors Contributing to the Skills Gap

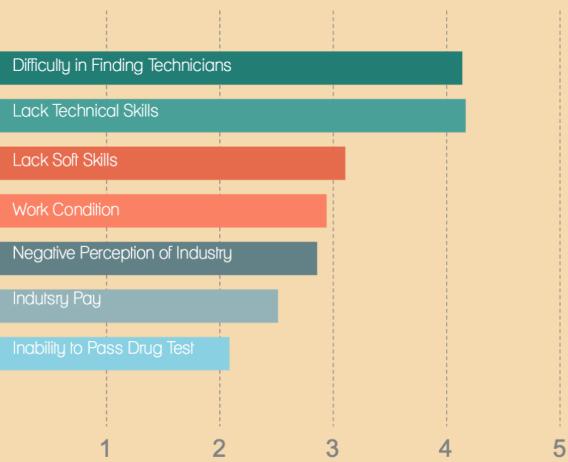
Local Schools

Do schools in your area understand and meet your company's needs?



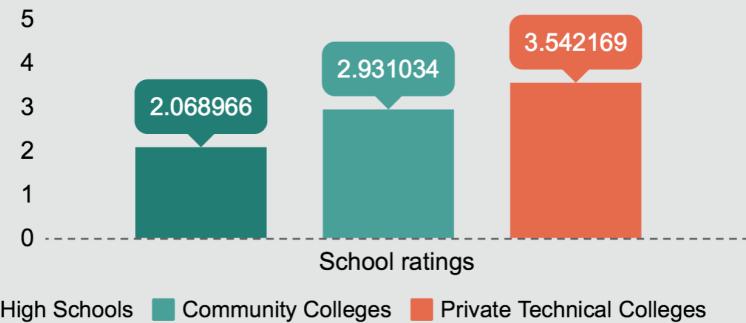
Lack of Technical Skills

Equipment distributors across the nation report a high difficulty in finding qualified candidates to fill open technicians positions. The #1 reason? Lack of technical skills.



Technical Education

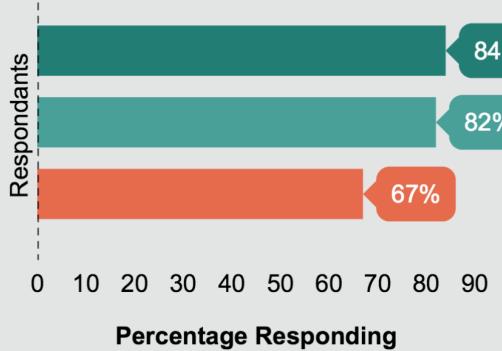
Rate the quality of the technical education programs at the following institutions



■ High Schools ■ Community Colleges ■ Private Technical Colleges

Broader Manufacturing Trends

Executives on the Skills Gap



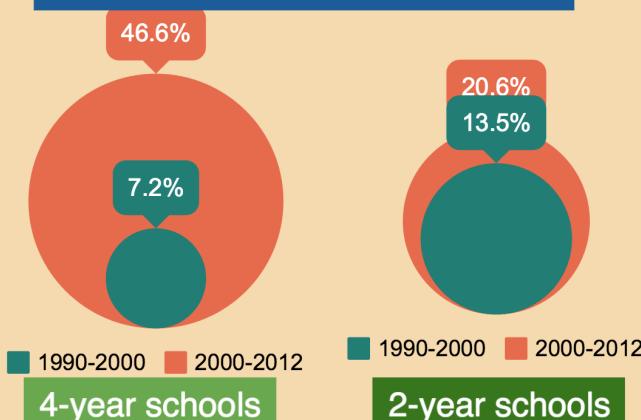
Jobs over the Next Decade



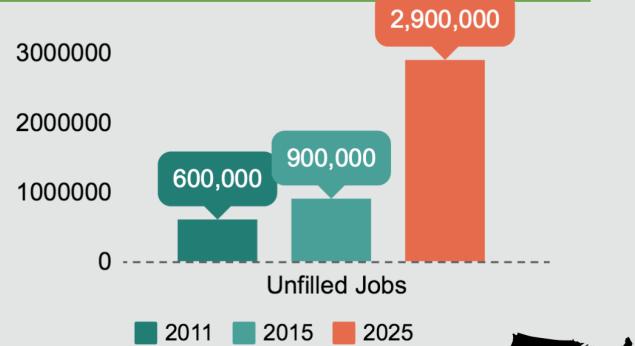
about 10,000 Baby Boomers will reach retirement age every day for the next 14 years

■ Projected available jobs
■ Open jobs that will be filled

College Enrollment Growth



Estimated Unfilled Jobs



Potential Impacts of the Skills Gap

Estimates indicated that the skills gap may be costing businesses effected by it as much as 9% in forgone yearly revenue. If this calculation holds true across both the broader manufacturing sector and for AED member, this represents a profound impact on both member businesses and the wider economy.



9% in forgone revenue

For AED members, this could lead to an organization-wide loss of around: \$2.4 billion each year

possibly \$180 billion for manufacturing

Recommendation for Addressing the Skills Gap

- Promote state-level initiatives that facilitate coordination among educators and employers to utilize public funding resources for specific programs, like apprenticeships.
- Continue to incentivize career technical education programs at the high school and secondary school and ease the process for accessing workforce development funds for technically focused programs.
- Advocate for the adjustment of national workforce policies to incorporate an emphasis on individuals entering the labor market broadly and those seeking technical careers specifically.



SOURCES:

Deloitte, Accenture, The Manufacturing Institute, National Association of Manufacturers, Survey of AED member, AED and the Skills Gap, National Center for Education Statistics, Pew Social Trends