

Gaps in the Energy Workforce

2021 Pipeline Survey Results

Overview

In 2021, the Center for Energy Workforce Development (CEWD) conducted the ninth Gaps in the Energy Workforce Pipeline survey. This survey has been conducted bi-annually for the past 15 years to help analyze the changes occurring in the workforce within the energy sector.

Initially, the first survey results showed an aging workforce and the potential for significant retirements in the 10 years following that research. Coupled with a lack of talent supply, these forecasts compelled the CEWD strategic mission to build talent supply pathways for critical jobs in partnership with energy companies, educators, and other community entities. In the most recent surveys, results show that the size of the workforce has stabilized, and the focus is now on the composition of the workforce in terms of skills and diversity, as well as improving retention of the existing energy workers.

As in previous surveys, CEWD focused the 2021 analysis on four key job categories: Lineworkers, Technicians, Plant/Field Operators, and Engineers. In addition, following the expected growth of the renewable sector, a Renewable Technician role was added in the category of key jobs. This is the first survey where a renewable category with occupation breakdown is included, therefore, no comparisons can be made to past results. However, the baseline data will support future comparative insights.

It is important to mention some differences from this survey cycle to the previous one. First, there was a drop in participation due to member and work processes. There were approximately 32% fewer participating companies overall when compared to the previous cycle, with some members abstaining from participating given staffing shortages and the loss of some employees who had previously overseen completing the survey. This drop in participation also has an impact on the results, especially when comparing them to previous cycles.

In addition, the global pandemic affected the employment levels nationally and the ability to forecast, especially when looking at attrition and retirement. It should be noted, other industry sectors have experienced similar situational anomalies in the inability to forecast anticipated hiring demand. We expect the difficulty to forecast will be temporary and that in future cycles, more accurate predictions can be provided.

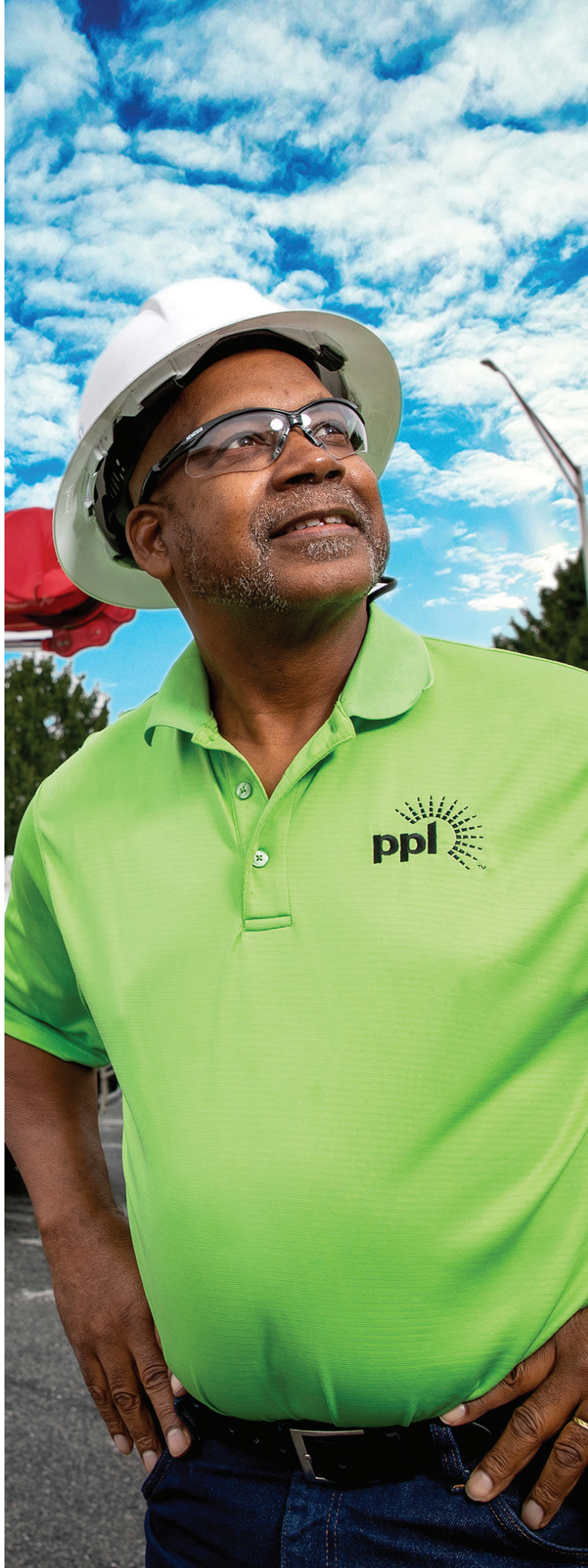
Despite these variables that have created some differing values than previous survey cycles, the results of the 2021 Gaps in the Energy Workforce Pipeline Survey still provide a valuable glimpse on the state of the workforce, especially its composition and the overall trends the industry is following.

The five key job categories included in the data analysis, now comprise 32% of the total utility workforce and are critical for the generation, transmission and distribution of electricity and natural gas across the country. The remaining 68% is comprised of corporate service departments including Human Resources, Customer Service, Finance, Information Technology, as well as other occupations essential for the sector.

The survey findings are based on the responses from electric and natural gas energy companies across the United States that are members of CEWD. The data provided by participating companies included information on age, years of service, hires and attrition, along with information on the diversity and veteran composition of the workforce. Looking to get a better understanding of the industry's diversity, we also added a "persons with disabilities" section in this survey but received little data.

THE FIVE KEY FINDINGS FROM THE SURVEY ARE:

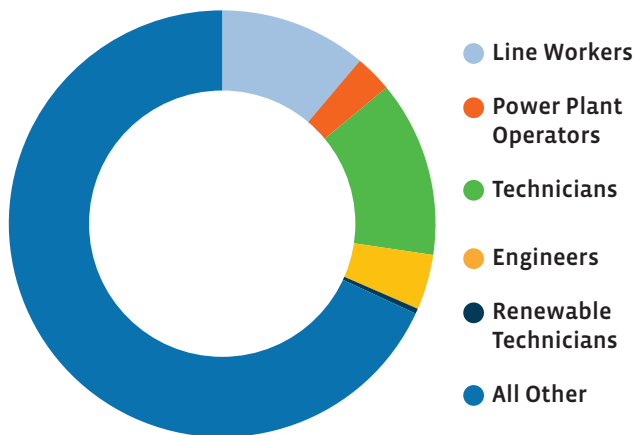
- The size of the energy workforce remains stable since the previous survey.
- The energy workforce continues to get younger.
- Retirement attrition has reached its lowest level since 2014.
- Non-retirement attrition increased specifically amongst younger workers.
- There was a slight increase in women and minority hiring, while there was a decrease in veteran hiring, which follows the national trend.



THE SIZE OF THE WORKFORCE IS UNCHANGED

Although the size of the energy workforce has fluctuated upwards and downwards over time, the 2021 survey shows almost no change from the previous survey, having seen only a 0.2% decrease, which indicates a relative stabilization of the size of the utility sector. The industry is composed of approximately 613,623 employees spread across all three types of utilities: Investor-Owned Utilities, Public Power and Rural Electric Cooperatives. Based on these survey responses, these energy businesses represent 72.6%, 1.4% and 26% of the workforce, respectively. It should be noted, utilities comprise about 10% of the energy industry workforce, estimated to include approximately six million total employees.

While we can say the size of the workforce remains unchanged over the past few years, its composition has varied a little. The number of key jobs decreased slightly in comparison to the last survey cycle. While in the 2019 survey, key jobs represented 45% of the workforce, for this survey they represent 32%. It is important to keep in mind that not all companies that participated in the last cycle participated in this one, thus, this difference might be smaller if we consider all previous participants as well.



The number of Lineworkers, Power Plant Operators and Engineers all saw a decrease of approximately 4% each in the number of workers in comparison to the last survey. Technicians were the key job that experienced the smallest change, having seen only a 2% decrease when compared to the last cycle. On the other hand, there was a considerable change in the corporate services employment, representing 65% of the workforce in 2019 to 81% in 2021.

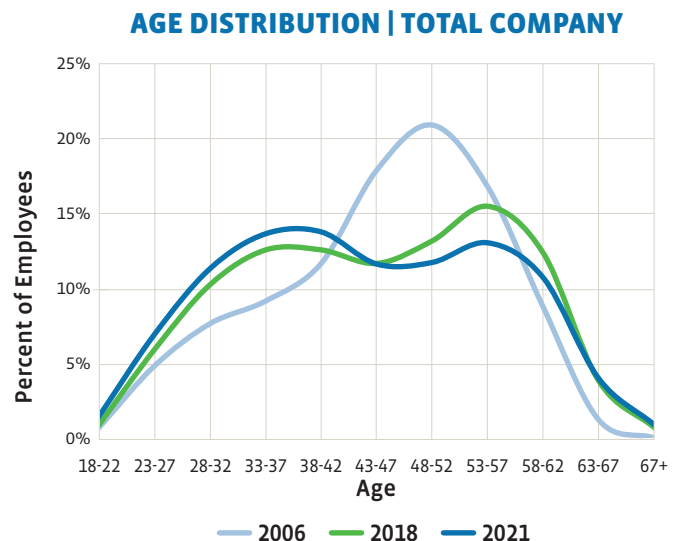
As mentioned previously, Renewable Technicians were included for the first time as a key job within the sector. Representing just 1% of the workforce, they are a small percentage of employment; however, we can expect an increase in the upcoming years, with the renewable energy sector projected to experience the greatest increase in jobs of all sectors (which include Transmission and Distribution, Non-Nuclear Generation, Natural Gas and Nuclear Energy). This is, in part, due to efforts in promoting sustainable and clean energy.

THE WORKFORCE CONTINUES TO GROW YOUNGER

Since 2006, when CEWD first began to measure workforce age, the industry has seen a consistent progression towards a younger workforce. With a focus on the creation of energy education pathways in high schools, community colleges and universities, companies have seen an improvement in size and capability in the talent pool for recruiting and hiring into these high-skill positions.

Jobs such as Lineworkers, Skilled Technicians, and Plant Operators generally require some level of postsecondary education prior to hire, and companies have made considerable progress in partnering with education providers and workforce systems to develop education that leads to the competencies needed for these high-skilled, high-paying careers.

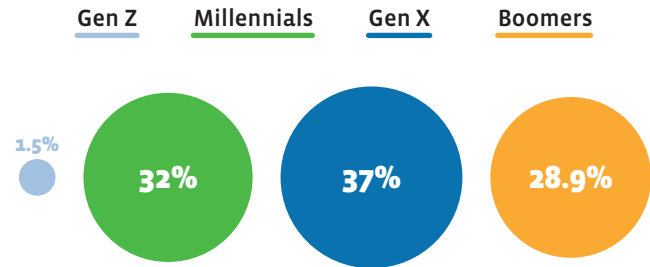
We can see a change in the distribution of the age curve from the 2021 survey when compared to previous years. While in the first survey in 2006, we saw an older population, the 2018 survey continued to show a younger population within the sector, but still with a considerable population in the age ranges 53 and higher.





In the 2021 survey, we can see a considerable increase in the younger populations within the energy workforce. For this survey, Electric Cooperatives show the youngest workforce, with 16% of their employees under the age of 32. On the other side of the age ranges, Investor-Owned Utilities have the largest population of workers older than 53, representing 29.8% of their workforce.

WORKFORCE AGE



When looking at the key jobs, the youngest workforce belongs to the Renewable Technicians, where 43% of the workers are under 32. This demographic is attributed to the fact that the renewable sector is a newer sector and occupations typically associated with these jobs have a more current educational pipeline, thus attracting younger workers. Engineers follow them, where 25% of the population is younger than 32.

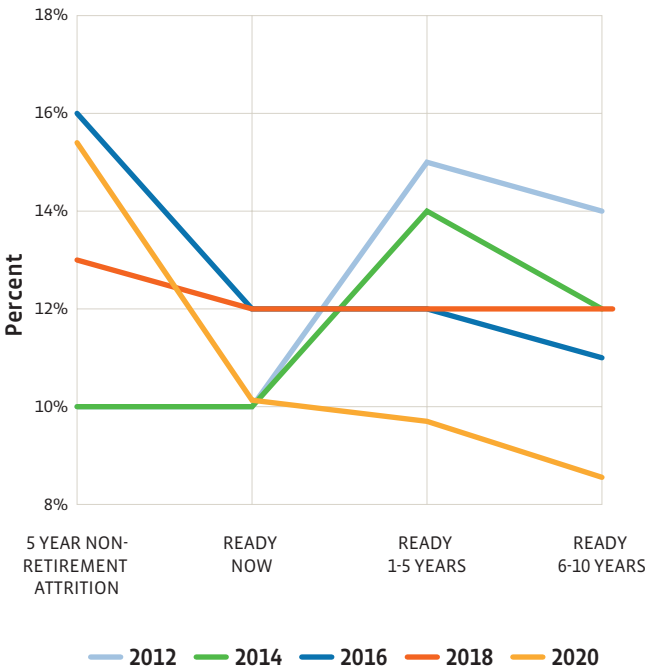
On the other hand, Power Plant Operators have one of the oldest workforces, with only 15% of their employees younger than 32. Of the workforce in these positions, 12% of is older than 53. They are followed by Lineworkers, where 11% of their employees are older than 53.

Survey respondents reported an increase in hiring during 2019, followed by a decrease in hiring in the year of 2020, which aligns with most industries in the country that year, considering the global health crisis and the instabilities it created across the economy. Considering this, companies were reluctant to provide projections for hiring until there is a more stable situation. The same can be said for attrition and retirement projections.

RETIREMENTS ARE DECREASING FOR THE INDUSTRY AS A WHOLE

Retirement forecasts (a combination of age and years of service) and the low non-retirement attrition of prior years had contributed to a retirement bubble in the past. Although retirements have been considerable in the past, overall retirements have been on a decreasing trend as of the last survey cycles. Currently, workers that can retire now represent 11% of the workforce, the lowest percentage since 2012.

ELECTRIC & NATURAL GAS COMPANIES ATTRITION OVER TIME | KEY JOBS



The same goes for workers able to retire in 1-5 years and 6-10 years, which represent 9.7% and 10.4% respectively. If compared to the last survey's results, workers able to retire in 1-5 and 6-10 years represented 12% in each of the populations. It is expected that, the younger the workforce gets, this trend will continue to be seen.



The same trend seen for the companies can be found in the composition of key jobs as well. Workers that can retire right now represent 10.2% of the workforce, the lowest percentage since 2012. As for those workers who could potentially retire in 1-5 years and 6-10 years, those are projected to be the lowest values since 2012 as well, representing 9.1% and 8.5% respectively. When compared to the 2019 values, where 12% for each of the populations was expected to retire within that time, we can see there was a considerable change.

Overall, Renewable Technicians have the lowest percentage of potential retirements over the next 10 years (2.8%) and the lowest percentage of employees ready to retire at any time (2.4%). This makes sense since their workforce is the youngest of all the key jobs.

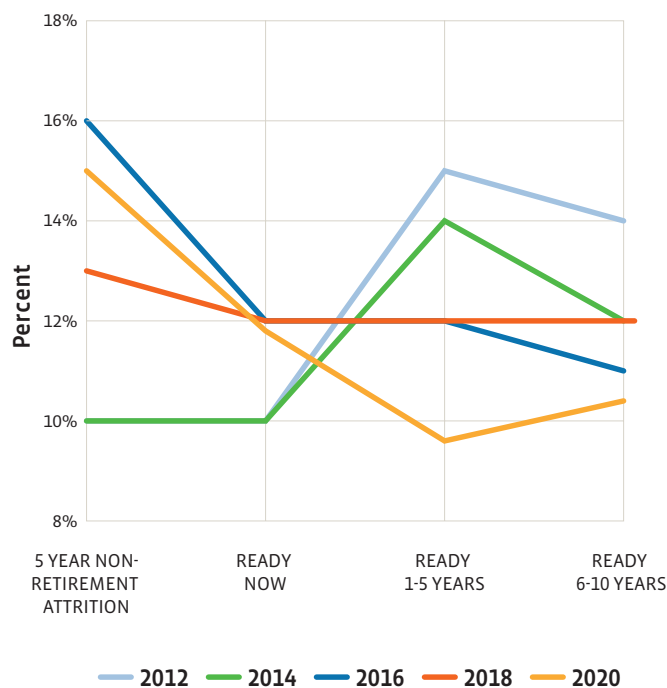
Plant/Field Operators and Engineers however will see potential retirements over the next 10 years of 33.6% and 26.6% respectively. We found Technicians have the highest potential to “retire now” at 12.2% with 28.6% retirement potential over the next 10 years.

For the key jobs in the nuclear sector, the five-year projection of retirement and non-retirement attrition is higher than for the key jobs, with 5-year non-retirement attrition ranging between 14% and 18% and the retirement ranging between 20% to 31%.

NON-RETIREMENT ATTRITION FORECASTS HAVE INCREASED

Although energy companies have historically had lower attrition rates than other industries, non-retirement attrition has been rising within the key jobs since 2012. The five-year non-retirement attrition averages within the key jobs is around 15.4%. Although there was a slight increase in comparison to the last survey, this was to be expected considering the pandemic that affected the nation. Despite this, industry companies should look at the overall trend and focus on retention strategies based on demographics, age, and race.

ELECTRIC & NATURAL GAS COMPANIES ATTRITION OVER TIME | TOTAL COMPANY



Survey respondents have indicated that 64% of the total company non-retirement attrition occurs within the first 5 years of employment. The percentage varies amongst job categories, but it is significant enough to focus on retention efforts and strategies for the new hires. The highest turnover occurs amongst the youngest age groups, with 60% of the non-retirement attrition coming in the 23-37 age range.

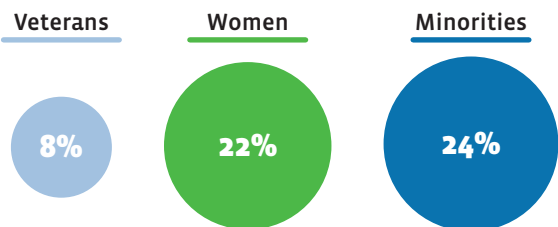
Considering the high costs of hiring and training for the new workers as well as the time invested in said training, this high turnover can represent a significant high expense for companies and a reduction in the return on investment on building a talent pipeline. Creating strategies to promote retention becomes essential considering this information.



COMPOSITION

When building the talent pipeline, energy companies are focusing not only on the numbers in talent supply, but on the diversity of that pipeline as well. The age of new employees continues to decrease, and companies are implementing strategies to change the diversity of the employee population as well. This diversity, whether through the hiring of minorities, veterans, women, or those with differing abilities, strengthens businesses and promotes economic prosperity in the regions companies serve.

ELECTRIC & NATURAL GAS COMPANIES WORKFORCE COMPOSITION



Energy companies have made a conscious effort to attract, hire and retain military veterans, supported by initiatives such as Troops to Energy Jobs and Veterans in Energy (VIE). Nine years ago, the industry launched the Troops to Energy Jobs initiative to match existing military service professionals and veterans from all branches to our job demands for the future.

The percentage of veterans in the employee population can vary greatly from company to company, but overall, they represent approximately 8% of the population, according to the 2021 survey.

While this value is lower than the last cycle, where veterans represented 9.6% of the population, it should be noted the percentage of veterans in the national workforce is decreasing and now stands at 5.3%. Continuing to attract the veteran population should be a focused effort by companies.

The diversity composition of the workforce continues to evolve as well. Women now comprise 22% of the workforce, slightly lower than the last cycle. This may be because women were heavily affected during the world health crisis, with many having left their jobs to stay at home and care for their families¹.

¹ <https://www.census.gov/library/stories/2021/03/moms-work-and-the-pandemic.html>

Minorities represent 24% of the workforce, which is an increase from the last survey. This can point to the fact that the focus on increasing the diversity of the workforce through broadened recruitment priorities and inclusion initiatives have been helpful in supporting workforce diversify. The strategies taken by energy companies, whether with elementary schools to attract more girls into engineering or specialized bootcamps for underrepresented communities for entry into a variety of apprenticeships has helped increase the diversity of education pathways, hiring and retention of a diverse population is ensuring employee populations more closely reflect the communities they serve. CEWD will continue to support the industry’s efforts in this area, through the formation of partnerships with minority serving organizations and the development of an industry-wide DE&I Roadmap for Change that is being developed in collaboration with the organization’s partner associations.

INDUSTRY WORKFORCE DEMAND

In 2021, the number of potential replacements for retirements and non-retirement attrition for the key jobs were forecasted to be 44,000 employees over the next five years. This includes Lineworkers, Technicians, Plant/Field Operators, Renewable Technicians, and Engineers. Over the same period, the number of critical nuclear jobs that may need to be replaced has been identified as approximately 15,000.

Key jobs are not the only area where utilities will be replacing employees, however. The forecast for workers in corporate and other field positions is estimated at approximately 94,000. This includes related positions in each of these sectors; Human Resources, Information Technology, Customer Service, Management, Physical and Cyber Security and other positions in operations outside of the five key jobs. CEWD continues to expand the focus on these positions with particular consideration to the impact of technology and new sources of generation.

This demand for employees will be filled from a variety of resources. Many of the positions will be filled by students graduating from schools in the National Energy Education System (NEEN). NEEN is a consortium of high schools, community colleges, technical centers, and universities, which have partnered with CEWD members to build education pathways that lead to

POTENTIAL REPLACEMENTS BY 2026	
Lineworkers	16,750
Technicians	17,000
Plant/Field Operators	3,500
Engineers	6,500
Renewable Technicians	250
Nuclear	15,000
Other Corporate and Field Positions	94,000

skills and competencies needed for the future. Other positions will be filled by military veterans, transitioning workers from other industries or the internal pipeline of employees as they transition into jobs with evolving technologies and new sources of generation.

The energy industry continues to undergo a significant transition with the game-changing impacts of technology, social trends, infrastructure modernization, changing customer demands and the move towards clean energy. These changes also drive the need for innovation, adaptability, and new skills in the workforce, and the energy industry is working together through CEWD to meet the workforce needs of today and of the future.

RECOMMENDATIONS

Specific recommendations for building sustainable energy workforce pipelines include:

- Expand Career Awareness initiatives to build awareness of energy careers among youth, low-income students, women, military and transitioning workers. Most every sector is challenged to attract the talent they need. The energy industry is no exception. Our messaging must connect with current and future career explorers to attract the best and brightest to the field. Companies will be well-served to examine how they are presenting themselves to those unfamiliar with energy career opportunities, especially tomorrow's workforce that has key priorities in their career considerations. Further, the energy sector must work in a unified fashion to create stronger visibility about industry opportunities.
- Build diversity, equity, and inclusion into workforce pathways at every step. The energy industry has prioritized DE&I initiatives for many years and must continue to drive change in this space to ensure our workforce reflects the communities and customers served. From recruitment strategies to prioritizing retention initiatives, leaders will continue to build business plans that seek change. This is not a "nice to have" objective; it is essential for business success. Again, the industry must work in collaboration to become a more diverse, equitable, and inclusive workforce.
- Implement company-specific workforce development strategies, with a commitment to strategic workforce planning. With increasingly technical jobs in the industry, preparing for tomorrow's workforce cannot be left to chance or last-minute adjustments. Workforce planning must be a business imperative, prioritized at the highest levels. Industry companies that are not focused on workforce development or strategic workforce planning will be well served to look to leadership from industry peers and other business sectors for guidance.
- Companies must set clear career pathways for growth within the company, to reduce turnover within the first 5 years. They should also understand the full spectrum of factors that cause attrition to ensure appropriate response plans. For instance, company culture, practices of inclusion, modernized training, work practices consistent

with other industries, technology considerations must all be evaluated.

- Support State Energy Workforce Consortia to build partnerships between energy employers and local education, labor, and government entities to develop secondary and postsecondary programs specific to skilled energy positions. It will be important for industry leaders to understand the Knowledge, Skills, and Abilities of the future workforce and communicate those to community-based partners responsible for educating, training, and upskilling the workforce. The industry will be well served to have easily accessible curriculum available to share with educators, so it is easy for them to prioritize energy education.
- Considering the Renewable Energy sector is projected to grow considerably in the upcoming years, focusing training programs for occupations tied related to the sector will be essential to meet the demand.

SURVEY METHODOLOGY

The Gaps in the Energy Workforce Pipeline Survey was sent to members of the Center for Energy Workforce Development asking them to provide data on actual and forecasted hires and attrition (both retirement and other attrition), age and years of service of the current workforce, number of employees in specific positions (Lineworkers, Technicians, Plant Operators, Renewable Technicians and Engineers), and total number of employees. Nuclear companies outside of CEWD were also invited to complete the survey, thanks to support from the Nuclear Energy Institute. The survey was administered by CEWD, and all company data is confidential.

For the first time, contractor data was collected and analyzed, as a way of understanding the state of the workforce of a sector that plays an essential role to the industry. Their results are not included within this summary, but separate reports and statistics were provided to those companies.

Electric and natural gas utilities from across the country responded to the survey. Information on electric cooperatives was provided by the National Rural Electric Cooperative Association (NRECA). The companies who responded to the survey collectively represent approximately half of the total electric and natural gas utility workforce and 81% of the industry's nuclear utilities.