CEWD

CENTER FOR ENERGY WORKFORCE DEVELOPMENT

State of the Energy Workforce 2018

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Introduction

The Center for Energy Workforce Development (CEWD) is a nonprofit national organization that brings together the best from the energy industry, education, government, and communities to deliver a single mission: ***build the alliances, processes, and tools to develop tomorrow's energy workforce***.

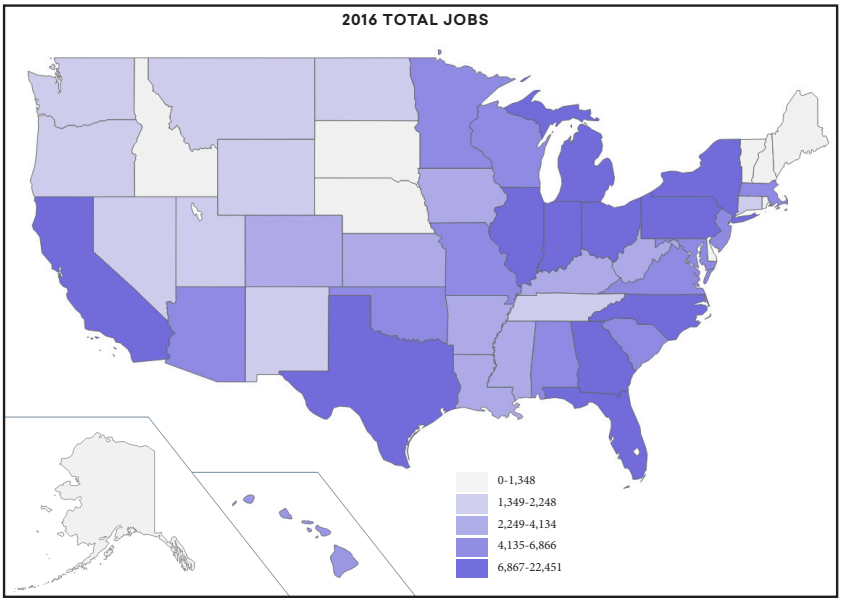
Originally formed by a few large members of the electric utility industry in 2006 to address concerns about an aging skilled workforce, CEWD members today include more than 100 electric and natural gas utilities, six trade associations (Edison Electric Institute, American Gas Association, Nuclear Energy Institute, National Rural Electric Cooperative Association, American Public Power Association, and Distribution Contractors Association), large supplemental contractors, and unions (IBEW and UWUA).

As the only national organization focused solely on attracting and developing a diverse, qualified workforce for the industry, CEWD has grown in its capability to deliver proven workforce development solutions, curriculum, tools, and data that improve the rate and quality of hiring into industry jobs. Its network and system for documenting and sharing across states and regions results in significant savings of time and money for its members and reinforces its foundational approach: **Industry Solutions / Regional Implementation**.

In early 2018, the CEWD Board of Directors took a fresh look at the national factors impacting the industry's ability to attract and retain a diverse, qualified workforce. The review of these industry **Game Changers** was both enlightening and sobering, in part because of the amount and degree of change noted since the last review in 2016.

The Board noted that transformational change in the industry will continue to pose significant risks for the viability of tomorrow's energy workforce.

The good news is that CEWD and its members are better positioned than ever before to identify and address the challenges and turn them into opportunities for the benefit of the industry and its workforce.



Harvard Business School Case Study – Lessons Learned

CEWD's impact on workforce development in the energy industry was acknowledged in 2018 when the Harvard Business School approached CEWD Executive Director Ann Randazzo about developing a case study. In partnership with Harvard, and citing it as "the highlight of my career," Randazzo brought to life for future business students the mission, approach, and results of CEWD, gleaned from leading the Center since its beginning. Asked by Harvard to summarize all of that learning in one page, Randazzo offered the following:

First, make a plan…and *then* find partners and resources to implement the plan. It's tempting to jump in for some "quick wins" but real change comes from deliberate strategic workforce planning, whether it's at a national, state, or company level. The process starts with a look at what the future may hold, and then identifying critical groups of jobs that will be impacted. And the plan has to include numbers—where are you now and what is the forecast. From that point, you can develop targeted workforce strategies with accountability for implementation and measurement.

Collaborate in the classroom – compete on the grid. CEWD started with the question, "What can we do better together?" Collaborating in the classroom is at the top of the list. Competition isn't an effective workforce development strategy, especially when considering how early you have to start in education. Students aren't deciding who they are going to work for in elementary school, but girls are deciding whether they like Math and Science and all students are making academic and behavior choices that will include or exclude them from certain career pathways. When competing companies collaborate to build a larger talent pool, everyone benefits.

Industry Solutions – Regional Implementation. Anyone familiar with CEWD knows this is at the heart of our approach. While every company is different, and every state's energy workforce challenges are different, experience has shown that there are shared challenges and issues regardless of size, geography, or business model. Providing proven solutions at a national level that can be adapted to regional differences ensures that a company or a consortium will not have to spend the time and money to start from scratch.

The pathway doesn't end at hiring. True career pathways don't end once an individual is hired, but continue with training, employee development, and retention strategies throughout a career. The feedback loop between industry and education must continue with data and information on the success of hires and changes in skill requirements. In that way, education initiatives will be constantly improving and sustainable over time. Education, community, and government partnerships are critical to success, but industry must be involved all along the way.

In the following pages, we address each of these areas in greater detail through the CEWD Strategic Planning Framework of Workforce Planning, Career Awareness, Education, and Structure and Support.

Chapter 1:
The Energy Industry

The Energy Industry Today

Implications for Workforce Development

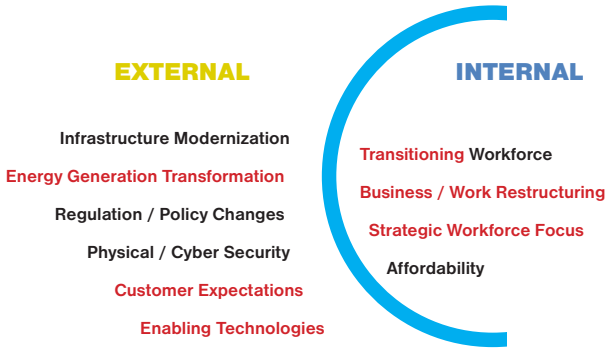
Addressing the Challenges

The Energy Industry Today

Today's energy workforce is in the midst of significant transformation, driven in large part by the industry's Game Changers, which this report explores in depth in Chapter 2. The skills requirements of the workforce are being impacted in ways not seen in CEWD's history.

Industry Game Changers have been part of CEWD's lexicon for many years and represent the potential for significant shifts in size, skills, and knowledge requirements of the current and future energy workforce. All of these changes can impact a company's ability to create and maintain a talent pipeline of qualified and diverse workers and to deliver on the company's business plan. Companies that are in the midst of infrastructure changes, building or closing plants, or implementing new technologies may have pressing current workforce needs. Others may be planning changes that will not be fully implemented for 5 to 10 years but will have tremendous impact on skill requirements. At a company level, addressing the workforce impact of these Game Changers in many cases means changing the work before changing the workforce.

Energy Industry Game Changers
with Implications for Workforce



Pace and Timing

CEWD's Board of Directors reviewed the industry Game Changers and their workforce impacts in 2018. The 2018 review shows significant differences (in red) from the last edition in 2016. Both the External and Internal Game Changers indicate a shift to an industry that is more rapidly transforming, with technology playing an increasingly important role. The energy workforce is also changing with a younger and more diverse workforce that is increasingly digitally literate. This transitioning workforce, along with advances in education technology, can position the industry to meet the challenges of the future.

The continued move to a more digitized electric and natural gas infrastructure is at the heart of this change. With more smart technology installed, system and customer data are being produced at a rate never before seen. Coupled with Enabling Technologies such as artificial intelligence, machine learning, and robotics, companies are developing the capability and capacity to anticipate and meet energy customers' growing expectations and needs. This interconnectivity also means energy companies must be more vigilant than ever to cyber threats and attacks.

Implications for Workforce Development

The updated National Strategic Workforce Plan takes a notably broader view of impacted energy jobs, beyond the critical job categories of lineworkers, plant and field operators, technicians, and engineers explored in past Workforce Plans. A key difference in the 2018 analysis from past Game Changer reviews is the underlying impact of the *nature* of today's workforce—younger, transitory, more tech savvy, less likely to build a career with one company. These impacts are seen affecting all categories of jobs analyzed by CEWD and its members.

What are the potential implications for CEWD and its members?

First, the way CEWD has traditionally defined the workforce is changing and will no doubt continue to change. Workforce development efforts are growing beyond lineworkers, technicians, plant/field operators, and engineers. The more accurately CEWD can define the demand for the jobs that drive and support the industry and its traditional critical jobs, the better able we are to build an adequate supply of qualified, diverse talent for our industry.

Second, competencies are key. Workforce agility, mobility, and promotion are dependent on first mastering foundational competencies, whether they focus on employability, workplace requirements, or technical requirements. The work CEWD has done and continues to champion on building and measuring the effectiveness of workforce competencies has never been more important in today's energy workplace. Equally important is our members' recognition of those competencies in the hiring process.

Third, the interconnections between skill requirements across the key jobs, support services, and contractors shouldn't be ignored. Education, on-the-job training, and knowledge transfer are all creating a more fluid workforce, which offers greater flexibility to companies and potentially higher rewards to those who can adapt or change quickly to meet their company's needs.

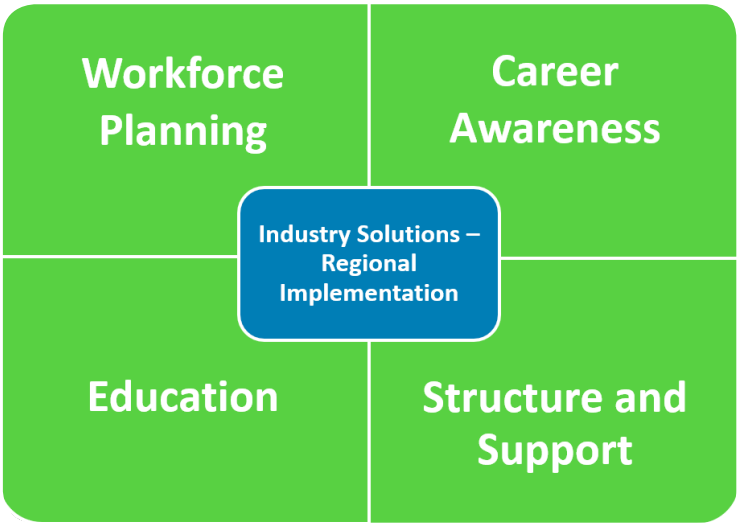
Fourth, companies must either build, or ensure they have capacity to retrain, their workers and transfer knowledge. Equally important, employees who have a thirst for learning and are willing to be proactive in their learning and growth will be the winners in the race. In today's workforce, there is no room for complacency.

Finally, technology is king. The use of technology—and the changes to technology—have progressed beyond evolutionary and border on revolutionary. Even as the technology needed to do these critical jobs is changing at light speed, the industry must think about on-the-job training, just-in-time training, and knowledge transfer as necessities that can be delivered with technology.

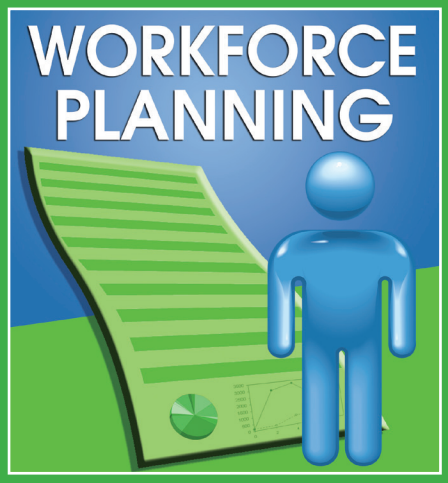
Addressing the Challenges

The more the workforce development picture changes, and the more quickly the industry transforms, the clearer it becomes that **planning** is the key. After more than a decade of pressure-testing, CEWD's Strategic Plan Framework continues to encompass all of the areas a solid workforce development strategy must address.

Companies and State Energy Workforce Consortia that put focused resources in the four pillars of the framework—Workforce Planning, Career Awareness, Education, and Structure and Support—are significantly more able to not only meet their workforce challenges but turn challenge into opportunity.



The next chapter explores Workforce Planning, taking a deep dive into the Game Changers and National Strategic Workforce Plan and the results of CEWD's most recent Gaps in the Workforce Pipeline Survey, two critical inputs to CEWD's national strategy.



Objective: Balance the supply and demand for a qualified and diverse energy workforce.

Chapter 2:
Workforce Planning

Workforce Planning

- The CEWD Strategic Planning Model
- 2018 Industry Game Changers and Workforce Implications

Workforce Analytics

- CEWD 2017 Gaps in the Energy Workforce Pipeline Survey Results

Workforce Development

- Get Into Energy Pathways Assessment Tool for Employers

Knowledge Transfer & Retention

Execution & Metrics

- Defining Workforce Development Value

Plan Development in State Consortia

- Strategic Plan Framework for State Consortia

Promising Practices in Workforce Planning

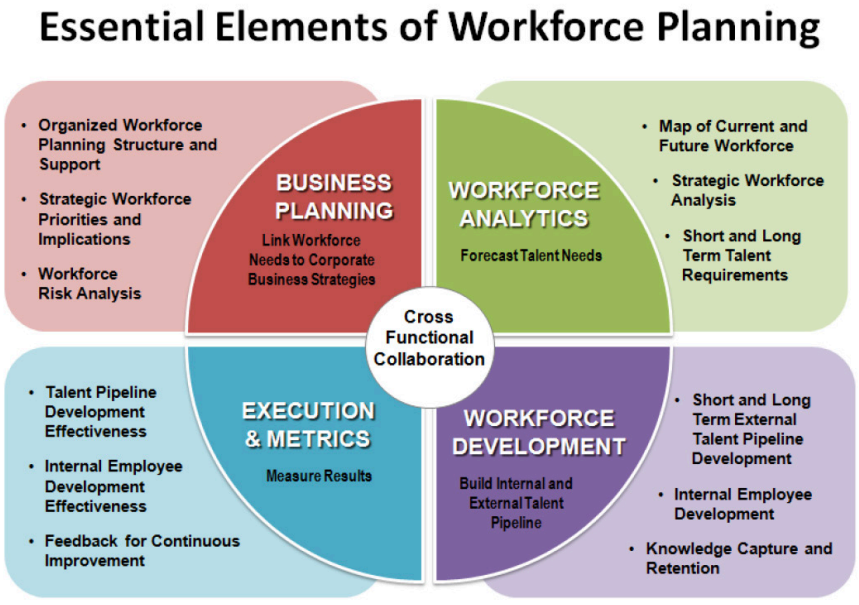
Workforce Planning

One of the most important things CEWD and its members have learned over the past decade is the importance of strategic workforce planning—and more importantly, **beginning** with a plan.

The Essential Elements of Workforce Planning Model addresses four important quadrants: **Business Planning**, **Workforce Analytics**, **Workforce Development**, and **Execution & Metrics**. One of the first steps is to gain an accurate understanding of strategic workforce priorities and implications and then perform an assessment of the risk associated with them. Secondly, it's critically important to be able to forecast your talent needs in light of the risks.

CEWD maintains the National Strategic Workforce Plan and also provides a Strategic Workforce Planning Template for CEWD member companies (https://cewd.org/wizard/workforce-planning/) and a Strategic Planning Workshop Template for State Energy Workforce Consortia (http://cewd.org/documents/wizard/documents/StrategicPlanningWorkshop-NationalTemplate.pdf) to help the consortia develop a plan for their state.

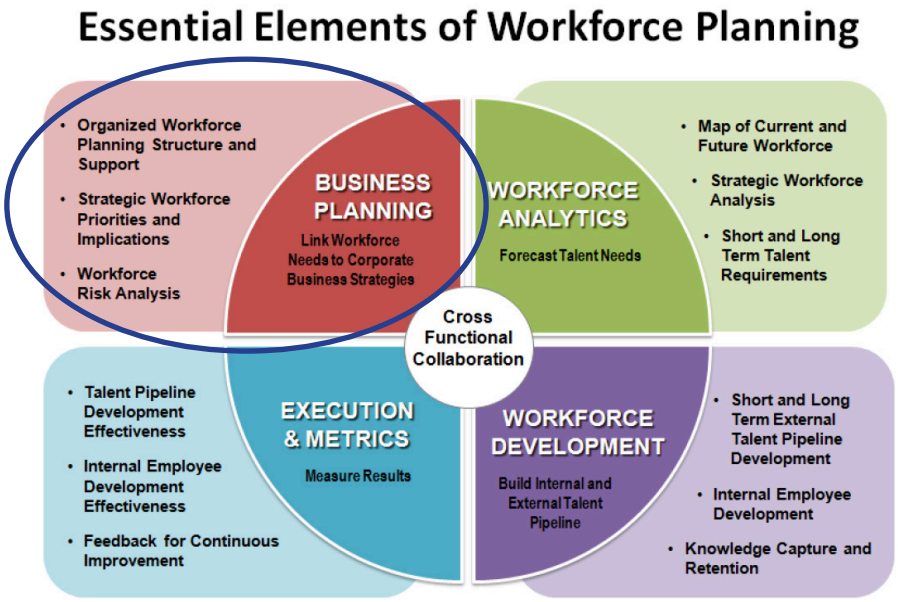
More about plan development and the availability of tools to help assess priorities and develop metrics is detailed later in this chapter. But first it's important to understand the quadrants of the model and, within the quadrants, two long-standing areas of documentation that inform CEWD's National Strategic Workforce Plan: the **Industry Game Changers** and the **Gaps in the Energy Workforce Pipeline Survey**.



Within the Strategic Workforce Planning Template, each phase of the Essential Elements model is designed to capture critical information.

The **Business Planning** phase is intended to answer the following:

- What are the internal and external Game Changers affecting our business?
- Does your company have the people, processes, and support in place to implement Strategic Workforce Planning?
- What are the workforce requirements to address current and future business strategies?
- What new skills will be required?
- What are the critical jobs that need to be analyzed?
- What are the risks?



CEWD systematically practices workforce planning at the national level. In March 2018, repeating the practice of two years past, the CEWD Board of Directors and Executive Council conducted an extensive review of industry Game Changers and the potential impacts for the energy workforce. As had occurred in 2016, the review led to some significant changes in both the Game Changers themselves and the risk analysis. Following is a detailed review of the 2018 Game Changers.

The 2018 National Strategic Workforce Plan and Industry Game Changers

Workforce Impact Summary

Just as energy companies are balancing the mix of generation and delivery of energy between centralized and distributed resources, today's energy workforce is beginning to mirror that same trend. The centralized workforce is decreasing, but the decentralized workforce appears to be growing. In the last decade, the overall number of employees in Electric and Natural Gas Utilities has declined, with the largest contributor to the overall job decline in support and corporate jobs. Key Jobs that include Lineworkers, Technicians, Plant/Field Operators, and Engineers have remained steady. However, the overall size of the energy industry is growing as contractors and suppliers that provide supplemental labor, specialized expertise, renewable and distributed generation, energy efficiency, and new technology grow to support the energy industry's emerging needs.

"Competencies like problem solving, critical thinking, teamwork, collaboration, and the ability to learn are equally as important as technical skills in addressing the workforce needs."

Because the pace and timing of change varies with companies, geography, and regulation, the industry must continue to develop a workforce with skills for traditional energy production and delivery as well as developing capabilities for the future. While the focus in the past has been more on the size of the workforce, this analysis points to a growing concern with skill gaps for both the incoming and the incumbent industry workforce.

Both new and incumbent employees must have strong foundational skills that range from academic skills like Science, Technology, Engineering, and Math (STEM) to employability and technical skills, so the impacts on internal technical training organizations must also be factored in. Competencies like problem solving, critical thinking, teamwork, collaboration, and the ability to learn are equally as important as technical skills in addressing the workforce needs.

With the growth and speed of changes in technology, the energy industry workforce must be able to adapt and learn new skills by building on a strong foundational knowledge. Incumbent workers in jobs that are changing have an increased need for up-skilling as their work changes. Education must adapt at the same pace, with both external and internal training that maps to critical competencies and the use of technology to speed up knowledge transfer and new learning.

The 2018 CEWD Strategic Workforce Plan takes a notably broader view of impacted jobs, beyond the critical job categories of Lineworkers, Plant/Field Operators, Technicians, and Engineers explored in past Workforce Plans. In calling attention to the segments of the workforce that support and/or transition into Key Jobs and the growing reliance on the utility's contingent workforce, we note in this summary the impact the Game Changers have on those jobs as well.

While the impact analysis suggests significant impacts to both size and skills for engineers, support workers, and contractors, the underlying impact of the *nature* of today's workforce—younger, transitory, more tech savvy, less likely to build a career with one company—is significant for all job categories.

What are the potential implications for CEWD and its members?

First, the way we have traditionally defined the workforce in the center of CEWD's bullseye is changing and will no doubt continue to change. Our target for workforce development efforts is growing beyond Lineworkers, Technicians, Plant/Field Operators, and Engineers. When we look at the need for Lineworkers nationally, we can no longer ignore that a significant percentage of the crew stringing line isn't employed by the utilities. When we think about who is actually digging the trench to lay a mile of pipe, we realize there are support workers who must be accounted for. The more accurately we can define the demand for the jobs that drive our industry, the better able we are to build an adequate supply of qualified, diverse talent for our industry.

Second, competencies are key. Workforce agility, mobility, and promotion are dependent on first mastering foundational competencies, whether they focus on employability, workplace requirements, or technical requirements. The work CEWD has done and continues to champion on building and measuring the effectiveness of workforce competencies has never been more important in today's energy workplace. Equally important is our members' recognition of those competencies in the hiring process.

Third, the interconnections between skill requirements across the Key Jobs, support services, and contractors shouldn't be ignored. Education, on-the-job training, and knowledge transfer are all creating a more fluid workforce, which offers greater flexibility to companies and potentially higher rewards to those who can adapt or change quickly to meet their company's needs.

Fourth, companies must either build—or ensure they have—capacity to retrain their workers and transfer knowledge. Equally important, employees who have a thirst for learning and are willing to be proactive in their learning and growth will be the winners in the race. In today's workforce, there is no room for complacency.

Finally, technology is king. The use of technology—and the changes to technology—have progressed beyond evolutionary and border on revolutionary. Even as the technology needed to do these critical jobs is changing at light speed, the industry must think about on-the-job training, just-in-time training, and knowledge transfer as necessities that can be delivered with technology.

Workforce Impact Analysis Methodology

It's helpful to view the workforce risks and implications of Game Changers through an "impact" lens of size and skills:

- Is the ***size*** of the workforce likely to increase, decrease, or stay the same?
- Are the current ***skills*** required for the job adequate or will new skills be needed? And, if new skills are needed, will they be provided by the company or by an education provider?

CEWD has attempted to gauge which job categories are potentially most at risk for impact at a national level. While CEWD has historically defined Key Jobs narrowly, this assessment focuses attention on a broader definition of jobs, including support services that may be impacted, and the impact to the industry contractor workforce. Examples of support services jobs include Human Resources, Customer Service, Information Technology, Operations Support, and Supply Chain. Industry contractors include those involved in construction and maintenance of electric and natural gas infrastructure and generation.

It's important to note that some Game Changers (Regulation / Policy Changes, Business / Work Restructuring, Strategic Workforce Focus, and Affordability) can't be assessed at a national level because the impact is driven by individual company strategy, so risk assessments for those areas are not included.

For those areas where national implications can be inferred, the following paragraphs summarize the combination of size and skills impacts and provide a guide for focusing on job categories at the national level. The color coding is not intended to imply direction of impact (e.g. greater, lesser, more, fewer) but the potential for impact, which should be subject to greater analysis. Green indicates that, based on what we know today, the impact appears to be low. Red indicates that there appears to be potential for high impact compared to the current state and that greater analysis needs to be done to define the type and degree of impact for these particular jobs in relationship to this Game Changer.

External Game Changers

Infrastructure Modernization

The modernization of the electric and natural gas infrastructure is paving the way for two-way energy flow, interconnected devices and technologies, and access to data that is transforming the industry. The structure and operation of distribution systems is changing as smarter infrastructure is built and new distributed generation technologies, including microgrids, are deployed and integrated into the electric grid. Investing in a safe and reliable power grid is critical to the deployment of new technologies and maximizing the use of renewable energy.

With these new technologies comes the growth in customer expectations, and the need for individualized customer solutions to meet the needs of this new generation of customers. The smart meter is at the center of technologies that will provide access to data to enable decisions on what assets to build and when, anticipate customer needs, and manage the supply of energy from traditional and new sources.

The growing demand for natural gas driven by low gas prices is outpacing the interstate transportation and distribution systems across the country. Safety and reliability are paramount for the natural gas industry, and an aging infrastructure is drawing attention to the need to modernize the existing infrastructure and build new infrastructure to deliver natural gas.

Workforce Impact

Infrastructure modernization impacts both the size and skills of the workforce. New digital technology in particular is impacting workforce size as a smarter grid requires a greater number to research, design, build, and protect the new technologies. Entirely new organizations are being created to handle this work. Both new and incumbent employees will need new skills and competencies to support interconnected devices and the two-way flow of electricity including telecommunications, networking, and distributed energy integration. These changes may drive the need to upskill segments of the incumbent transmission and distribution workforce, which could potentially impact existing technical training organizations. New technologies in training, like simulations and augmented and virtual reality, will support the need for continuous learning.

Infrastructure Modernization also has significant impact on workforce skills, not only for industry members but for their contractor partners. In particular, for natural gas transmission and distribution, building and repairing gas pipelines has caused a significant increase in the need for natural gas distribution contractor resources. Contractors struggle to attract enough welders, fusers, heavy equipment operators, and other workers to meet the needs of the utilities. Using contractors also impacts internal hiring needs of the utilities because utility employees manage the contracted projects.

Engineers have a significant role to play in modernizing our energy infrastructure. The need for degreed engineers to design new infrastructure is only expected to grow, and the skill requirements are changing. The need also precedes other jobs as engineers are needed to design the work before it can be built. In addition, the results of the CEWD Gaps in the Energy Workforce Pipeline Survey show a significant decrease in the number of mid-career engineers, which may reflect a knowledge loss risk as older engineers retire, and new engineers enter the workforce.

Job Category	Lineworker	T&D Technician	Generation Technician	Plant/Field Operator	Engineer	Support Services	Contractor
Size Impact							
Skills Impact							

Energy Generation Transformation

Over the past decade, the shift to cleaner sources of energy generation has dramatically changed the energy industry landscape. Advancements in renewable energy, energy efficiency, and energy storage, coupled with the implementation of smart technologies, are driving this transformation of energy generation. Customer expectations for cleaner energy sources and the ability to connect customer sited generation from remote renewable sources, both large and small, have changed the game for energy companies.

Utilities are making significant investments to transition to a cleaner energy mix by expanding the use of gas, hydro, and renewable generation sources, and by improving energy efficiency. This move to reduce the use of carbon-based fuels is driving new construction, coal plant retirements and retrofits, and reinforces the industry's commitment to provide safe, reliable, clean, and affordable energy.

While regional differences still exist, this national shift to a more distributed and decentralized energy generation model has had similar impacts on the workforce. Positions that were once exclusively inside traditional utilities may now be part of a customer workforce or part of the utilities' new supply chain (no longer only materials or labor but generation and services as well).

Workforce Impact

Engineers, Generation Technicians, and Plant/Field Operators are most impacted by the Energy Generation Transformation. As older plants close, and new generation facilities are built, skill requirements, workforce size, and geography must all be considered for degree of impact. Construction of new generation will have impacts for Engineers and Contractors, as well as for Generation Technicians and Plant/Field Operators to operate and maintain the new plants. Distributed generation will also have some impact on transmission and distribution for new distribution assets to aggregate the energy.

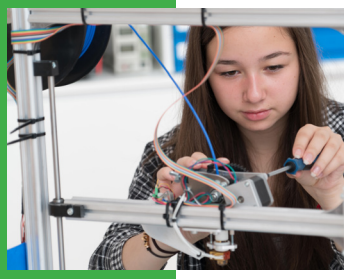
The industry has seen a significant number of plant closings to date, and more closings of both coal and nuclear plants are planned. CEWD's survey data has shown that generation employees in particular have not retired at the same rate as other job categories. Companies are now reporting an uptick in retirements as plants close, meaning fewer employees that are displaced. Incumbent employees are being retrained and redeployed, although there may not be a direct deployment of workers to other types of generation.

The closure of nuclear power plants and the uncertainty of future closures is having an impact on the size of both the utility and contractor workforces. As skilled nuclear workers from plants that have closed move to positions at other plants, there is a cascading effect on talent pipeline initiatives.

Job Category	Lineworker	T&D Technician	Generation Technician	Plant/Field Operator	Engineer	Support Services	Contractor
Size Impact							
Skills Impact							

Regulation / Policy Changes

Federal and state regulatory mandates continue to influence energy companies' priorities and the workforce plans that support them. In this century alone, federal energy policy has seen significant shifts with presidential administrations. Mandates to reduce fossil fuel emissions and increase renewable energy sources have driven workforce reductions and development of extensive retraining and severance programs as fossil plants have been shuttered. Similarly, decommissioning of nuclear plants presents workforce challenges for engineering and technician specialties. But the impacts are localized as individual companies develop their own strategies to address these shifts in policy.



At the national level, administrative action to drive change in workforce policy appears to be gaining momentum. In 2018, the administration issued a report on national apprenticeship expansion and created the National Council for the American Worker, which is intended to ensure that American students and workers have access to affordable, relevant, and innovative education and job training. Additionally, in 2018 the administration reauthorized the Carl D. Perkins Career and Technical Education Act of 2006 through fiscal year 2023 under a new title, Strengthening Career and Technical Education for the 21st Century Act (Perkins V).

The Perkins Act is particularly important in aiding states' abilities to support low-income students from 8th grade through postsecondary education, in part through better alignment with other state programs, including the Workforce Innovation and Opportunity Act (WIOA) and Every Student Succeeds Act (ESSA).

While the implications for energy companies of these federally driven efforts aren't fully known at this point, other workforce policy issues are becoming part of the state-level workforce conversation for electric and natural gas utilities and their contractors.

Career Pathways: Although energy is not a national career cluster, some states have moved to create their own 17th career cluster in energy. In some states without a 17th career cluster, companies and their education partners are working with state leaders to implement energy career pathways. In those states, students in K–12 and postsecondary education, as well as individuals re-entering the workforce, are finding greater job-specific training opportunities with more direct entry options into electric and gas jobs.

Sector Partnerships: Sector partnerships, which convene multiple employers with education, training, labor, and community-based organizations to address the local skill needs of a particular industry, are a proven strategy for helping workers prepare for jobs and helping employers find skilled workers. The number of states with sector partnership policies has increased as states implement WIOA, which requires sector partnerships as a local workforce activity, and requires states to support those local efforts.

Employment of individuals with criminal records: According to a recent report by the Council of State Governments, an estimated 70 million people in America have a criminal record. Understanding and addressing these challenges requires the collaboration of employers, workforce development officials, and policy makers at every level of government. While a focus has emerged in many states to protect individuals with criminal records from discriminatory hiring practices, it's unclear whether the industry will take a proactive stance toward hiring individuals with criminal records, given federal security requirements and other regulatory issues.

Employment of veterans: According to a 2018 report by the Bureau of Labor Statistics, the unemployment rate for veterans who served on active duty in the U.S. Armed Forces at any time since September 2001 had edged down to 4.5 percent in 2017. Veterans remain a much sought-after demographic for the energy industry because military skills often align well to the requirements of our critical jobs. Increasing competition for qualified veterans across multiple industries is driving better state-level workforce planning and heightened outreach to veteran organizations, bases, and individual veterans.

Employment of individuals with disabilities: CEWD is seeing examples at the company level of successful recruiting and hiring of individuals with disabilities. One of the most important steps is to address the barriers to employment and recognize, first, the capabilities and qualifications the person brings to the organization, rather than the disability. Much work is underway at the state level to develop new ways to attract and engage this important population.

The impacts and timing of these more local policy issues will vary by state and sector, but each bear watching for workforce implications. Strategic workforce planning can significantly mitigate the financial, knowledge, safety, and timing risks of this and other less predictable Game Changers.

Physical / Cyber Security

Securing the nation's energy infrastructure has grown increasingly more complex and critical as physical attacks and cyberattacks have increased globally. The increasing use of intelligent systems and infrastructure has subjected the industry to complex cybersecurity risks. Interconnected devices increase responsiveness, efficiency, performance, and energy management but also increase cyberattack risk.

While it's unlikely that a large number of physical security and cybersecurity jobs are going to be created by the industry, the issue is less about numbers and more about the need for a unique blend of security knowledge and industry-specific expertise. The numbers are small but critical, and include jobs such as Cyber Security Engineers, Analysts, Architects, and Threat Analysts.

Cybersecurity competencies are becoming embedded in jobs from the bottom to the top of the organization. All employees should have some form of IT cybersecurity training, and the level of training on cyber system capabilities increases in positions associated with the generation, transmission, and distribution of energy. This layering of knowledge in every job is much like the layering of cyber defenses in electric and natural gas energy systems and structures.

Workforce Impact

Companies may upgrade the skills of some jobs to protect infrastructure or engage external resources. However, the external resources are more likely to be skilled consultants who are focused primarily on security than core utility contractors. Companies are segmenting Information Technology (IT) and Operational Technology (OT) since OT requires different skill sets. Industrial Control Systems, including supervisory control and data acquisition (SCADA) systems, are at the heart of infrastructure modernization and will require increasingly energy-specific skills to keep both the electric and gas infrastructure safe.

Energy companies are also making organization changes that reflect this heightened focus on cybersecurity and physical security by combining organizations.

The impact of physical security and cybersecurity needs is expected to be highest for Engineers and positions in System Operations and Information Technology.

Job Category	Lineworker	T&D Technician	Generation Technician	Plant/Field Operator	Engineer	Support Services	Contractor
Size Impact							
Skills Impact							

Customer Expectations

The expectations of energy consumers are changing at the speed of technology. As two-way communication between homes, businesses, and energy systems become the norm, customers and their needs are playing a greater role in the design and implementation of everything, from new ways to generate and distribute energy to the way we interact, communicate, and manage the business. The modernization of the electric grid and natural gas infrastructure and implementation of smart metering have led the way to new possibilities for energy companies to bring energy solutions that meet the growing demands of customers who expect access to new services, energy choices, and the ability to manage energy use.

A better definition for customers might be "prosumers," a term used to describe a prospective consumer who is involved in the design, manufacture, or development of a product or service. The customer experience must play a key role as the customer is inserted earlier and earlier into energy processes and decisions. Putting customer needs at the center before, during, and after decisions, or becoming customer-centric, has become a business imperative for energy companies to stay viable in today's changing world.

Not all customers are the same and their needs reflect that, so the need for a diverse workforce is felt here as well. It takes a diversity of experience, background, and demographics to anticipate and understand the diverse needs of today's customers.

Workforce Impact

The workforce impact is expected to be felt most in engineering and the management of distributed energy resources, system planning, information technology, marketing, and customer support organizations. For all who engage with customers, there will be a need to increase their understanding of industry energy system fundamentals and the use of advanced technologies.

As an example, the role of the traditional customer service organization moves from transactions and response to customer inquiries, to energy advice and education as customers take on more responsibility for managing their own energy use and have access to the data and apps that help them do it. Artificial intelligence, robotics process automation, and the use of chatbots will help to change the work flow for customer service representatives (CSRs) and will increase the need for analytical skills that can't be programmed. This will, in turn, increase the need for foundational skills like problem solving, critical thinking, and interpersonal communications as routine tasks become automated and more crucial, customer-focused tasks remain.

The workforce impact on Engineers and information technology would appear to mirror the changes reflected with Infrastructure Modernization and Enabling Technologies. The impact on external resources is more likely to be for companies providing skilled consultants (data analysis, data mining, predictive analytics) than for core utility contractors. With customer-facing technology evolving at such a rapid pace, the workforce impact is predicted to be high but specific implications are yet to be seen.

Job Category	Lineworker	T&D Technician	Generation Technician	Plant/Field Operator	Engineer	Support Services	Contractor
Size Impact							
Skills Impact							

Enabling Technologies

For workforce planning purposes, CEWD defines Enabling Technologies as those that significantly change work flow or processes. Technology is changing at an exponential rate but for some technologies, like upgrades in computer systems and communication devices, the impact is felt as productivity improvements or efficiencies and not as a significant impact on our work and jobs. The speed of technology adoption is driven by leadership and some companies are moving much more aggressively than others.

Enabling technologies can include hardware and equipment, like robots and drones, or software, like artificial intelligence and machine learning, chatbots, robotic process automation (RPA), and blockchain. The challenge is connecting the information gleaned from sources like smart meters, smart sensors, drones, and the connection of distributed energy resources to intelligence that can be used by both equipment and humans in meeting business and customer needs, multiplying the overall impact.

Efficiency and safety are two of the greatest advantages from using drones, and both electric and gas transmission and distribution are seeing benefits. On the electric side, drones are already being used to inspect power lines and substations, shortening outage times and limiting hazardous exposure for Lineworkers, Technicians, and Engineers. On the gas side, drones can be equipped with sophisticated methane sensors to detect gas leaks. Aerial photography by drones can also aid in technical training by providing views of plants, substations, and other equipment not previously available. Drones will become another "tool in the toolbox," reminiscent of adding tablets for planners, technicians, and lineworkers.

Artificial intelligence (AI) and machine learning are the two technologies being used to leverage information coming out of microgrids and distributed generation. Many see AI as an essential component of grid modernization and management moving forward and will significantly enhance the ability to predict outages and to safeguard the grid, ultimately making all the work like this more efficient and workers more effective.

Chatbots and RPA are being used in support services like Human Resources and Customer Service to automate repetitive transactions. Automating the simpler, repetitive tasks frees employees to solve more difficult tasks, which may require additional training.

Workforce Impact

For software and devices, the impact is less about workforce reductions and more about workforce reskilling and upskilling. Additionally, the lifespan of new technology is getting shorter and shorter and will require continuous learning capabilities and strong knowledge capture and transfer processes. The workforce impact is primarily on support services including Finance, Information Technology, and Operations Technology, particularly in Demand Management, Infrastructure Management, and Renewable Management. And, again, the external resources are more likely to come from specialized IT consulting firms and supplemental contractors than from core utility contractors.

Higher level technical skill requirements will change based on the technology employed, but foundational competencies like critical thinking, problem solving, and the ability to learn become more important as the implementation increases. Overall, the jobs that appear to be most affected by enabling technologies like robots, chatbots, and drones are in customer service, corporate support services, system operations, and technicians (lineworker, other T&D). These advances in technology will favor workers who are tech-savvy, willing and able to learn new systems, and comfortable with the demands of data management. The younger generation is at a distinct advantage as they have never really known a world without technology.

Job Category	Lineworker	T&D Technician	Generation Technician	Plant/Field Operator	Engineer	Support Services	Contractor
Size Impact							
Skills Impact							

Internal Game Changers

Transitioning Workforce

The Electric and Natural Gas Utility industry workforce has changed significantly over the last decade but is benefiting from more than a decade of workforce initiatives to develop and hire workers into critical jobs. As industry hiring has increased and retirements have begun to stabilize, a younger and more diverse workforce is facing the need for a higher level of skills than ever before. This transformation will drive strategic change in everything from education to recruiting, hiring, and retention.

Although retirements have been a major Game Changer for the energy workforce in the past, CEWD's 2017 Gaps in the Energy Workforce Survey shows about 12% of the workforce is ready to retire at any point and overall retirements are forecast at a little over 2% a year for the next 10 years. That is below the percentage of employees who will leave for other reasons and validates the trend toward "normal" retirement rates for the industry.

"Millennials make up almost 30% of the overall utility workforce and 40% of the engineering and lineworker positions."

Millennials make up almost 30% of the overall utility workforce and 40% of the engineering and lineworker positions. A key change believed to be driven by this younger workforce is the increase in non-retirement attrition, particularly among those with fewer than five years of service. Studies of millennials in the workplace indicate they are less hesitant to change jobs than their older counterparts. In an industry where it takes years to become fully competent in highly skilled jobs, and in a country where the current unemployment rate is below 4%, companies must rethink their employment value propositions in order to attract and retain new employees and effectively transfer the knowledge of those who leave. Coupled with employee retention efforts, companies will need to use both policy and technology solutions to capture and provide access to critical knowledge when needed.

The energy workforce is also becoming increasingly diverse. Veterans make up about 11% of survey respondents' current workforce, which is an increase from 8% in 2014, the first year CEWD surveyed participants on veterans. Similarly, minorities have increased from 22 to 26% of the workforce, reflecting an increased focus on diversity and inclusion efforts. However, the percentage of women in the utility workforce has shown only a slight increase from previous surveys and, at 24%, reflects half of the national percentage of women in the U.S. workforce.

Workforce Impact

CEWD's 2017 Gaps in the Energy Workforce Survey shows the overall size of the utilities workforce has decreased since the last survey, with the number of Key Jobs remaining fairly stable. The decreases can be accounted for in corporate support and other types of jobs. When viewing the energy workforce as a whole, however, there are indications that the utility contractor workforce is growing. The contractors who supply supplemental labor for the industry are an integral part of the energy workforce, particularly for Key Jobs. More work must be done to fully quantify the impact of the contractor workforce on the demand for Key Jobs.

The potential loss of knowledge through attrition, as well as the need for retraining, upskilling, and continuous learning, impacts all jobs categories. Internal training and technical training organizations will need to expand the use of technology to train employees on subjects from cybersecurity to automation and developing customer solutions.

Job Category	Lineworker	T&D Technician	Generation Technician	Plant/Field Operator	Engineer	Support Services	Contractor
Size Impact							
Skills Impact							

Business / Work Restructuring

Mergers among energy companies and acquisitions of businesses that complement or broaden an energy company's portfolio continue to drive significant changes internally. If the merger or acquisition includes expansion of geographic service territory, workforce impacts may be larger for corporate functions than for Key Jobs.

As technology is implemented, work process, organization design, and work policies and practices must be analyzed as well. These changes will have an impact not only on Key Jobs but on support workers as well.

Strategic Workforce Focus

Strategic business decisions may have profound changes on a company's workforce size, demographic makeup, skill sets, and knowledge requirements. Those decisions can encompass a focus on increased diversity, veteran hiring, insourcing previously outsourced talent, centralizing, de-centralizing, combining organization functions, or improving efficiency.

At the national level, the industry's commitment to train, hire, and retain military veterans (Troops to Energy Jobs) is having a real impact on company practices. In addition, the national industry focus on improving diversity and inclusion is driving education and workforce decisions.

Some Strategic Workforce decisions, like outsourcing or insourcing a particular job category, may have an impact on the size and the source of the workforce. But more than likely, they will impact the demographics or distribution of the workforce (for example, awarding work previously done internally to a supplemental labor contractor or hiring military veterans rather than community college graduates).

Affordability

Balancing workforce needs with reductions in labor budgets is a critical issue for companies as both internal and external cost pressures continue in the industry. External drivers, like those already mentioned, drive company priorities and, subsequently, budgets. Each company must determine what it can afford in the way of workforce strategy. The issue of affordability is apparent when companies make "build, buy, or borrow" decisions and, more recently, technology solution decisions in addressing workforce needs.

Affordability goes hand-in-hand with Strategic Workforce Focus as energy companies find ways to perform work more efficiently. As an example, individual municipal utilities may not have the resources to hire full-time talent in some areas, so groups of public power utilities have formed Joint Action Agencies to share workers between companies, or to provide specialized services. The agencies function less like contractors and more like centralized corporate services departments in larger energy companies.

Energy Industry Workforce Impact

Job Category	Lineworker	T&D Technician	Generation Technician	Plant/Field Operator	Engineer	Support Services	Contractor
Infrastructure Modernization							
Size Impact							
Skills Impact							
Energy Generation Transformation							
Size Impact							
Skills Impact							
Physical / Cyber Security							
Size Impact							
Skills Impact							
Customer Expectations							
Size Impact							
Skills Impact							
Enabling Technology							
Size Impact							
Skills Impact							
Transitioning Workforce							
Size Impact							
Skills Impact							

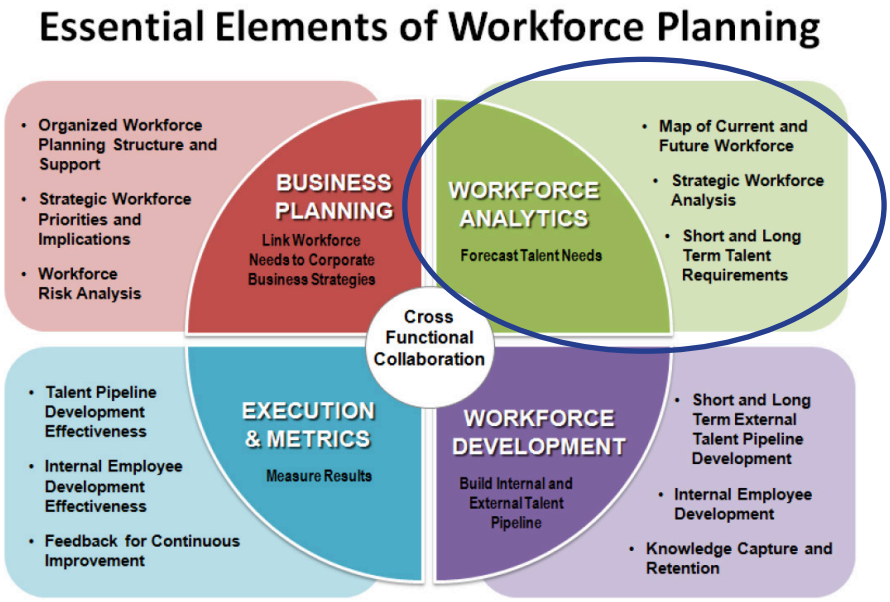
The collective impact on the energy workforce at a national level paints a compelling picture for heightened analysis in the engineering and new support services job categories. The supplemental contractor category also suggests the need for more rigorous analysis on the true numbers needed in the industry; this analysis got underway with CEWD's contractor members in 2018.

Of equal importance is the potential foundational impact of a transitioning workforce in a transforming industry. The impact of the transitioning workforce is more evident than ever before in the results of the 2017 Gaps in the Workforce Pipeline Survey.

Workforce Analytics

The **Workforce Analytics** phase is designed to answer the following questions:

- What are the critical workforce trends?
- What is the turnover in each critical job family and why?
- Where will new employees and new skills come from?
- Is the organization prepared to fill workforce requirements?



WFP Council Analytics Team

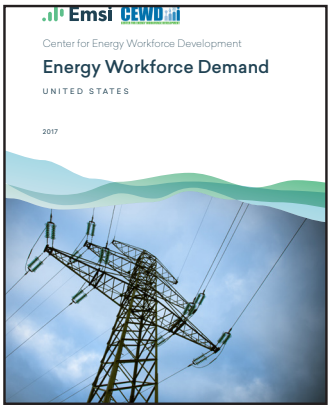
To help members learn more about workforce analytics and share best practices more easily, CEWD organized the Workforce Planning (WFP) Council Analytics Team in late 2015. Participation in this community of practice is open to all interested CEWD members and focused on documenting and sharing best practices, conducting benchmarking, and developing and vetting practices for use on the CEWD Essentials of Workforce Planning Wizard.

Since 2017, the team has pursued a goal of collaborating to improve retirement attrition forecasting and internal workforce planning processes.

See the end of this chapter for best practices from members of the WFP Council Analytics Team.

2017 Gaps in the Workforce Pipeline Survey Results

CEWD has collected and analyzed national workforce data on Key Jobs every other year since 2008. The findings from the 2017 Gaps in the Energy Workforce Pipeline Survey are based on responses from Electric and Natural Gas Utilities across the United States. The survey results continue to show progress in building a talent pipeline to fill critical jobs in the industry.



As in previous surveys, CEWD focused the analysis on four key job categories: Lineworkers, Technicians, Plant/Field Operators, and Engineers. These four job categories make up 44% of the total utility workforce and are considered mission critical for the generation, transmission, and distribution of electricity and natural gas across the country. The data provided by the companies responding included information on age, years of service, hires, and attrition, along with information on the diversity and veteran composition of the workforce.

For the first time, CEWD was able to analyze the full impact of public power employees in key jobs through the support of the American Public Power Association. As a result, CEWD is now able to include public power in the analysis of key job forecasts for hiring and attrition and has established a baseline to be able to make historical comparisons in the future.

Although the workforce size has fluctuated over time, the 2017 survey shows the most significant change since CEWD began surveying in 2006. The overall size of the workforce has decreased by 2.7%. The number of key jobs remained fairly stable, with the decreases showing up in corporate support and other types of jobs. The industry continues to support full-time positions with third-party contractors working directly for the industry.

The composition of the workforce is changing as well. For investor owned utilities (IOUs), veterans make up about 11% of respondents' current workforce, which is an increase from 8% in 2014, the first year CEWD surveyed participants on veterans. Similarly, female minorities have increased from 7.3% to 9% of the population for respondents, and the number of male minorities has increased from 15% to 17%.

Workforce Composition

- ⟷ 44% Key Jobs
- ↑ 11% Veterans
- ↑ 22.5% Veterans in Nuclear
- ↑ 9% Female Minorities
- ↑ 17% Male Minorities

The workforce continues to grow younger, with 19% of the workforce now under the age of 32. Although retirements have been a major game changer for the energy workforce in the past, the current survey shows about 12% of the workforce is ready to retire at any point and overall retirements are forecast at a little over 2% a year for the next 10 years. That is below the percentage of employees who will leave for other reasons and shows the trend toward "normal" retirement for the industry.

Overall, the industry is seeing the impact of more than a decade of workforce initiatives.

2017 Survey Findings

The Workforce Continues to Grow Younger

Since 2006, when CEWD first began to measure workforce age, the industry has seen a consistent progression toward a younger workforce. With a focus on the creation of energy education pathways in high schools, community colleges, and universities, companies have seen an increase in the talent pool for recruiting and hiring into high skill positions. Jobs such as Lineworkers, Skilled Technicians, and Plant Operators require some level of postsecondary education prior to hire, and companies have made significant progress in partnering to develop education that leads to the competencies needed for these high skill, high pay careers.

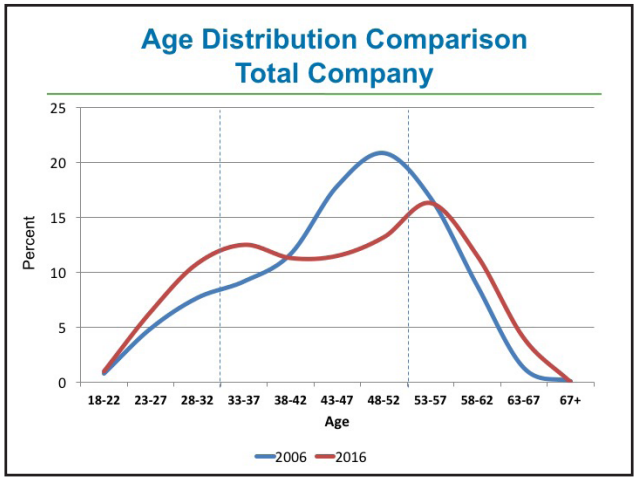
Workforce Age

19% under age 32
49% under age 52
33% over age 53

As a whole, the age curve for the industry has flattened, as older workers have retired and younger workers have been hired. Electric cooperatives have the youngest workforce, with only 25% of their workforce over the age of 53. IOUs have the oldest, with 35% over age 53. Public power, on the other hand, reports only 12% of their workforce under the age of 32.

When looking at just the key job categories, the percentage of Engineers and Lineworkers under age 32 continues to increase at 29% and 30% respectively, reflecting the focus on hiring in these categories.

Plant Operators and Skilled Technicians in both electric and gas transmission, distribution, and generation remain the oldest of the key jobs and will continue to need focus from a talent pipeline perspective.



Survey respondents report that hiring for the industry has increased significantly since the last survey. The overall percentage of hires into key jobs increased from 5% in 2014 to 9% in 2015 and then to 7% in 2016. In both years, the percentage of hires was greater than attrition and survey respondents forecast hiring at or above attrition, indicating growth for the first time since 2008.

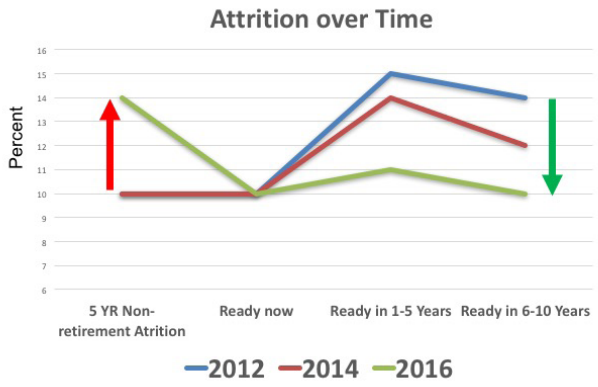
As a percentage of the total hires, other company jobs increased from half of hires in the last survey to almost two-thirds, indicating increased hiring in corporate and other jobs.

Retirements Are Decreasing for the Industry as a Whole and for Key Jobs

Forecasted retirement rates are down for all jobs from the previous survey, with rates averaging between 2% and 2.3% depending on job category. The most significant decrease is in the key job retirement forecast for years 2017–2022, where overall retirement forecasts dropped from 14% to 11%. That forecast for key jobs is almost even with the future years percentage, indicating a flattening of the retirement curve over time. The forecast for those in key jobs who can retire at any time has remained steady at 10% but increased from 9% to 12% for total industry jobs.

Although utilities historically have among the lowest attrition rates in comparison to other industries, non-retirement attrition is rising in key jobs based on survey responses. Non-retirement attrition varies from a 5-year average of 13% to 15% among the key jobs with an overall average of 14%, but is significant in that the percentage has increased by 4% overall since the last survey. CEWD member companies are paying particular attention to this trend and are focusing on retention strategies based on demographics, age, and phase of career.

Retirement forecasts for Key Jobs have decreased, while forecasts for other attrition have increased



Overall, Lineworkers show the lowest percentage of potential retirements for 2017 to 2026 and the lowest percentage of employees who are ready to retire at any time (7%). Ten-year retirement forecasts have decreased by 5% overall since the last survey.

Engineers show the largest decrease in overall forecasted retirements (6%).

Skilled Technicians in generation, transmission, and distribution show an overall decline of 5% in forecasted retirements as well, but have the highest percentage of employees who can retire at any time (13%).

Plant and Field Operators have the highest potential retirement forecast and show a quarter of employees in this category with the ability to retire in the next 5 years. On the whole, retirement forecasts have still decreased by 4% since the last survey.

In Nuclear, the 5-year projection for both retirement and non-retirement attrition is significantly higher than in other key jobs, with rates averaging between 36% and 41% overall. The retirement rates have actually increased since the previous survey.

It is important to note that hiring has increased for the industry, and actual hires for 2015 and 2016 are greater than attrition. Companies are replacing more employees than are leaving for the first time since the recession in 2008. Forecasts for hires show this continued level of replacement and growth.

Industry Demand

As in the previous survey, the actual number of potential replacements for retirement and non-retirement attrition has decreased for key jobs for non-nuclear generation, transmission, and distribution. About 59,000 employees may need to be replaced over the next 10 years for retirements, with an additional 30,000 potential replacements over the next 5 years for non-retirement attrition. Over the next 5 years, the number of critical nuclear jobs that may need to be replaced has actually increased, with an additional 11,800 that may need to be replaced.

Potential Replacements by 2026 for Key Jobs (Includes Public Power and Excludes Nuclear)

Job Category	Potential Non-Retirement Attrition 2017- 2021		Potential Retirements includes Ready Now 2017- 2021		Potential Retirements 2022 - 2026	
Lineworkers	15%	11,000	17%	12,000	9%	7,000
Technicians	14%	10,000	25%	18,000	11%	9,000
Plant Operators	13%	5,000	24%	9,000	10%	4,000
Engineers	14%	4,000	21%	6,000	10%	3,000
Total Key Jobs	**14%**	**30,000**	**21%**	**34,000**	**10%**	**25,000**

This demand for skilled talent will be filled from a variety of sources, including students graduating from schools in the National Energy Education Network (NEEN). NEEN is a consortium of high schools, community colleges, and universities that partner with CEWD members to build relevant and needed education pathways. Learn more about NEEN in Chapter 5 of this report.

Other positions will be filled by military veterans. Five years ago, the industry launched the Troops to Energy Jobs initiative to match exiting military and veterans from all branches to our demand for the future. Veterans now make up 11% of our workforce, and in Nuclear Operations that number is 22.5%. Companies from across the industry are reaching out to veterans for their training, leadership, and service mentality to fill these critical positions.

Potential Replacements by 2021 for Key Jobs in Nuclear Business Areas

	Potential Replacements 2017- 2021	
Job Category	Potential Attrition & Retirement	Estimated Number of Replacements
Operations	36%	3,700
Maintenance	43%	4,800
Engineering	41%	3,300
Total Nuclear Jobs	40%	23,000

The industry has also launched a strategic initiative to increase the diversity of education pathways, hiring, and retention of diverse populations to ensure that our employee populations more closely reflect the communities we serve.

The potential replacements shown are a reflection of retirement and attrition projections only and do not reflect the impact of other industry game changers. The business environment for nuclear, in particular, has changed substantially since the end of 2016 and the projected data may be impacted by recent plant decisions.

Our industry is undergoing a significant transition with the game changing impact of technology, infrastructure modernization, changing customer demands, and the move toward a cleaner energy mix. These changes drive the need for innovation, adaptability, and new skills in the workforce, as well as stronger collaboration with the industry's contractor partners, to fully understand the complete workforce demand in the industry. The energy industry is working together through CEWD to meet the workforce needs of today and of the future.

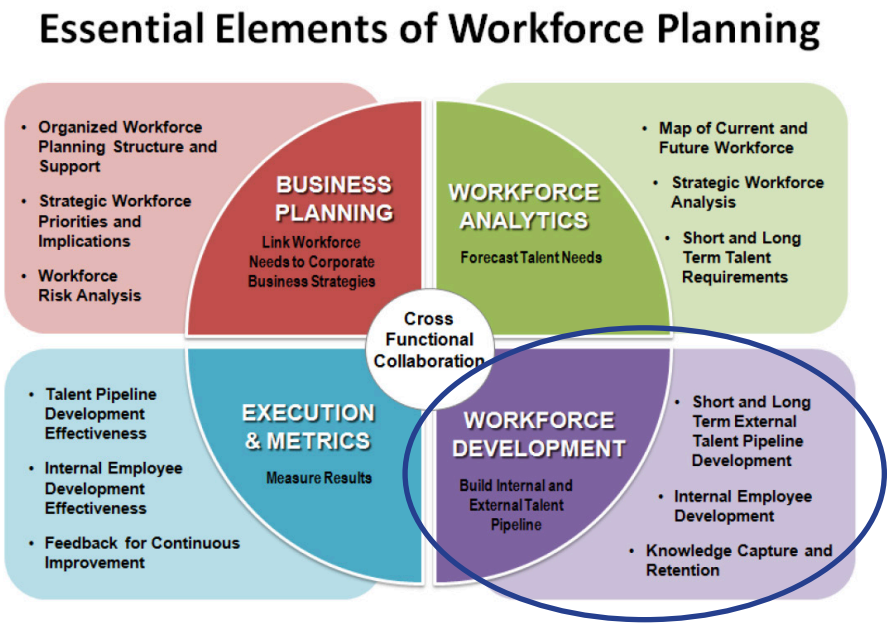
To review more in-depth results from the 2017 survey, visit https://cewd.org/survey-report/.

CEWD continues to revise and improve it survey process. The 2019 Gaps in the Energy Workforce Pipeline Survey will increase the data collected for retention analysis to include race, gender, and age. Additionally, pipeline metrics will be tracked with education members in the National Energy Education Network database.

Workforce Development

The **Workforce Development** phase is designed to answer the following questions:

- How can the recruitment strategy support the company's workforce strategies, such as increasing diversity within the company and hiring military veterans?
- What is the current supply of potential candidates within the state or region that can be tapped?
- What are some of the sources of candidates that are available?
- Are new programs required at local schools to address demand and potential new skills?
- What actions will the company take to create the desired talent pipeline?



The data and analysis from Workforce Analytics drive the development of action plans for Workforce Development. Workforce Development is the phase in which an organization determines its sources for candidates to meet the strategic direction of the company and to implement its workforce plan.

Get Into Energy Pathways Assessment Tool for Employers

In order for companies to successfully implement a Workforce Development strategy, it's helpful for companies to assess their readiness.

The **Get Into Energy Pathways Assessment Tool for Employers** was developed in 2018 and is based on the five actions companies can take to support a job applicant's pathway to an energy career. Originally described in the 2014 booklet, ***Five Things You Need to Know about Energy Workforce Development***, the assessment helps companies gauge where their gaps are in each of five areas: Visibility, Communication of Requirements, Partnerships, Internal Reinforcement, and Measurement and Feedback.

The results of the assessment are helpful in diagnosing weaker areas that companies should consider strengthening as part of their workforce development efforts. The Assessment is located in the Strategic Planning Template on www.cewd.org: https://www.cewd.org/documents/GetIntoEnergy-CareerPathwaysAssessmentTool.pdf.

The Assessment is one step in readying the organization to embark on workforce development. Additionally, the **CEWD Get Into Energy Career Pathways Model** provides a framework for developing a talent supply pipeline for skilled utility technicians. There are multiple resources available through the CEWD website on developing education pipeline programs for specific job categories, for bringing women or diverse candidates into industry positions, or for building a military veteran talent pipeline. See Chapter 4 of this report for more information about the GIE Career Pathways Model.

Knowledge Transfer and Retention

While overall retirements in the energy industry have ebbed in the past few years, many CEWD members are still experiencing high retirement attrition in their skilled workforce. Additionally, non-retirement attrition has risen well beyond what has been seen historically. The combination has fueled a heightened interest in retaining and transferring the knowledge and unique skills their employees gain before they leave.

In 2017, CEWD took several actions to help their members address the issues of knowledge transfer and retention. They include development of a new knowledge transfer and retention template, collection of best practices companies can draw from, and development of a KT&R Community of Practice where members discuss challenges they are running into and how they are solving them. The new template walks members through the steps they need to take to identify the kind of knowledge they need to capture. It also helps them develop a knowledge transfer plan and a continuous improvement scorecard for the company. This growing collection of tools to support knowledge transfer and retention can all be found in the CEWD Strategic Workforce Planning Implementation Wizard in the Workforce Development section.

A Summary of Promising Practices from KT&R Community Members

NorthWestern Energy – South Dakota

NorthWestern Energy has developed a process to guard against loss of knowledge that includes three elements: a Retirement Planning Discussion; a Knowledge Capture Interview Form; and a Knowledge Transfer Plan for supervisors—a spreadsheet listing methodologies to implement that address the impending loss of knowledge and skills.

The spreadsheet includes drop-down lists and visual elements to help supervisors easily record and prioritize data, as well as action steps that need to be taken as the employee nears separation. The interview form asks questions about job responsibilities, knowledge, skills, and resources critical to the employee's job, such as support they provide to other sites or locations; unique roles they play during crises; approval authorities they carry; meetings they regularly attend; certifications they possess; equipment they operate; and how they learned the things they need to know to do their jobs.

The documents—including an overview form that walks managers through the process—are now kept on the company's website. Managers and supervisors are encouraged to access them and to stay on top of employees who might be nearing retirement eligibility.

JEA – Florida

To prevent knowledge loss brought about by retirements, JEA—the municipal utility in Jacksonville, FL—launched an overlap hiring process several years ago. First, the company performs an assessment of retirement risk based on years of service, age for retirement eligibility, and criticality of the role. A second assessment is used to determine the degree of overlap needed in terms of time for a new hire to learn how to do the job from the retiring employee. In their model, because two people are doing the same job for a period of time, funding for salary and benefits for two people had to be addressed with JEA's board. The board initially approved $2 million for the overlap hiring process and most recently has increased the funding. Based on JEA's latest numbers, the company believes it has mitigated for about 92 percent of high-risk positions prior to the person leaving.

In addition to overlap hiring, JEA conducted a talent review to determine where the organization had internal talent that could be developed to fill openings as they arose. Incumbent employees provided resumes and information on jobs they were interested in. Now JEA is able to make interested employees aware of potential openings so that they can work on any competencies they might need to strengthen before applying.

JEA also developed knowledge transfer questionnaires for retiring employees (as well as those leaving for other reasons) that asked about any special tools, devices, vendors, processes, or other information the person used in the job that would be critical for their replacement to know.

Premier Power Maintenance – Indiana

At Premier Power Maintenance, an electrical testing and maintenance contractor based in Indianapolis, IN, the knowledge of how to perform skilled work was traditionally passed from seasoned team members to those coming on board as they worked side by side. But the process wasn't standardized or measurable.

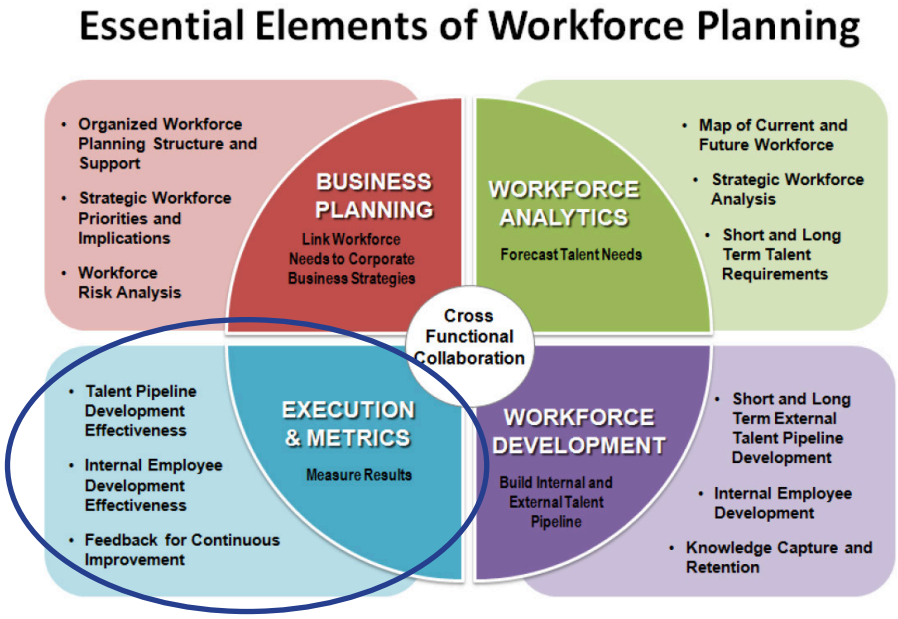
So the company focused on developing a structured, in-house training program for team members—both new and experienced. The result is Premier University, which provides ongoing training for current team members, as well as training for newly hired team members. All new hires are given pre-employment tests to determine their current level of skills and this data is fed into a "skills matrix" showing the company where it has skills gaps to fill.

Through its in-house university concept, the company also provides voluntary training programs for team members who want to upgrade or refresh their skills and knowledge in a wide range of areas. These are provided in a "Lunch and Learn" series that includes topics such as algebra, trigonometry, electricity, transformer oil analysis, relays, and other subjects. Most classes are four weeks long and include a Skype meeting, PowerPoint presentation, and problems to work on before and during the lecture. Special one-week classes are also available, such as relay theory and testing.

Execution & Metrics

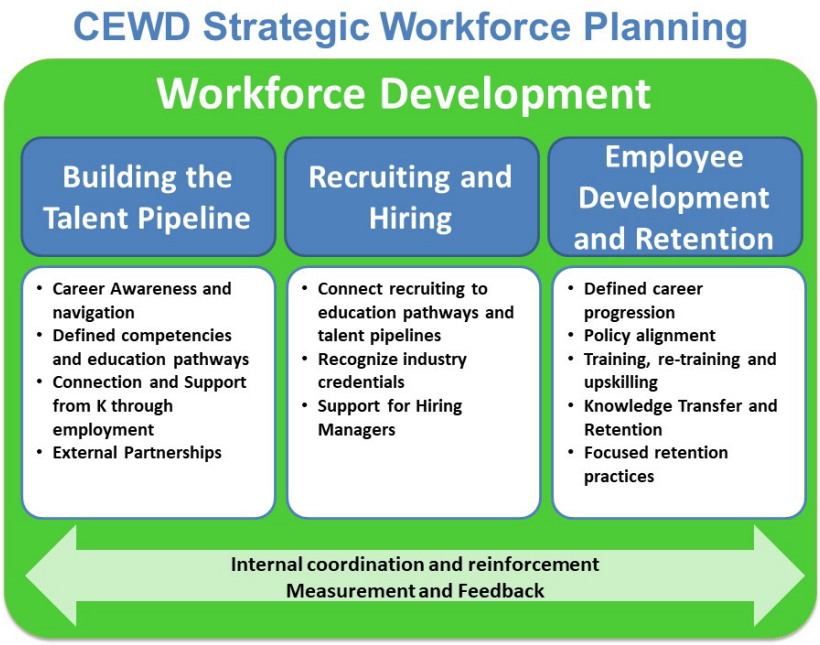
The **Execution & Metrics** phase helps companies answer these questions:

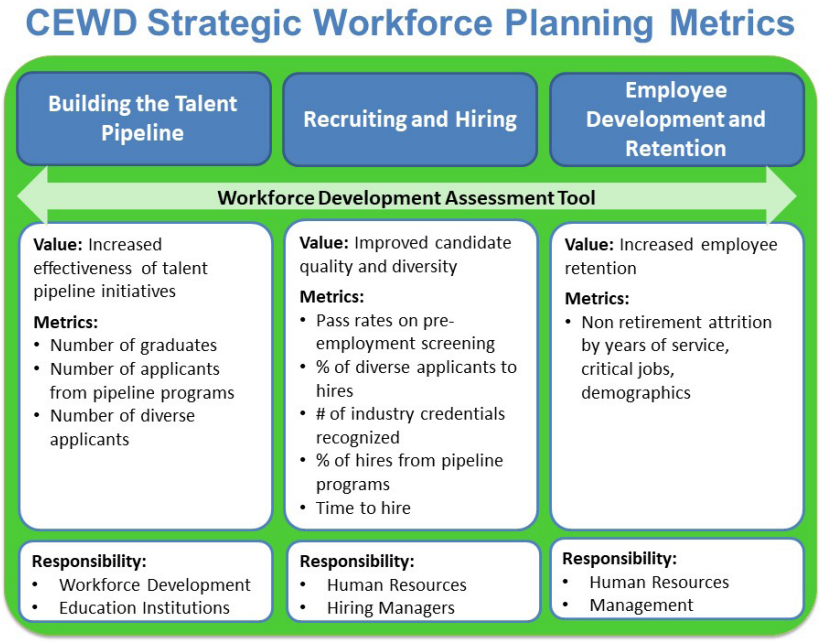
- How accurate is the forecasting process when measured against actual hires and attrition?
- How well are the pipeline organizations working in terms of quality and quantity of candidates?
- Are there enough diverse candidates being sourced for the jobs?



Although some metrics are clearly industry- or even company-specific, CEWD has worked with its members over the years to define meaningful measures that are applicable at a national level. In 2018, CEWD worked with a Measuring Progress Task Force made up of CEWD Executive Council members to take a fresh look at defining how workforce development value can best be measured. The Task Force delivered a refreshed model for measurement that was approved by the Board of Directors and in 2019 will be piloted by a small group of CEWD industry members. Their findings will help shape a permanent set of measures for the membership.

Workforce Development Value





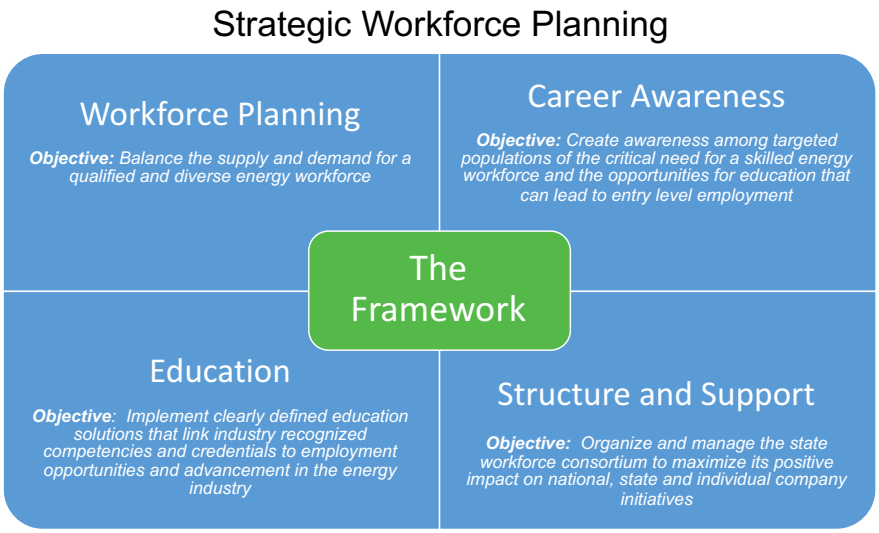
For additional guidance on developing meaningful metrics, see the Workforce Planning section of the CEWD Members Implementation Wizard at www.cewd.org.

CEWD members who would like to learn more about the proposed metrics or the Measuring Progress Task Force can contact staff@cewd.org.

Plan Development in State Consortia

As CEWD State Energy Workforce Consortia have learned with time and experience, everything they need to do to ensure an adequate pipeline of diverse and qualified workers can be organized in CEWD's four strategic pillars: Workforce Planning, Career Awareness, Education, and Structure and Support. This framework, when used consistently across states, ensures that strategies can be compared and shared more effectively.

The consortium planning framework mirrors the CEWD framework except that, within Career Awareness, consortia must define their target populations, and the Structure and Support pillar focuses on the sustainability of the state consortium.



Strategic plan development within state consortia got a significant boost in 2013 through a grant from the Joyce Foundation designed to help state consortia in the Great Lakes States become more sustainable by creating and implementing a 3-to-5-year strategic workforce plan. CEWD relied on its Four Pillars Framework to guide the plans. The outcomes of the Great Lakes project led to development of a comprehensive strategic planning workshop template that can be used by member companies and their State Energy Workforce Consortia to build or refresh a strategic plan. The template is at http://cewd.org/documents/wizard/documents/StrategicPlanningWorkshop-NationalTemplate.pdf.

CEWD's regional consultants work with consortia leadership each year to review their strategic plans and note progress against plan objectives.

State Energy Workforce Consortia build their strategic plans with core objectives and strategies to be able to compare and share best practices across states and regions. Within these strategies, the consortia develop specific actions and apply metrics to ensure their actions are adding value to employers, educators, and students.

Overarching Strategic Plan Framework for State Energy Workforce Consortia

- **Workforce Planning Objective**: Balance the supply and demand for a qualified and diverse energy workforce.

  Strategies:
  - Validate the existing state workforce plan to verify key in-demand jobs for career awareness and strategic planning purposes.
  - Measure workforce development initiatives to determine impact on critical skill and workforce gaps.

Overarching Strategic Plan Framework for State Energy Workforce Consortia

- **Career Awareness Objective**: Create awareness among targeted populations of the critical need for a skilled energy workforce and the opportunities for education that can lead to entry-level employment.

  Strategies:
  - Implement targeted career awareness campaigns to increase the diversity of talent pipelines.
  - Build state awareness of the need for a skilled energy workforce.

- **Education Objective**: Implement clearly defined education solutions that link industry-recognized competencies and credentials to employment opportunities and advancement in the energy industry.

  Strategies:
  - Close existing skill gaps to ensure a qualified applicant pool of candidates for in-demand jobs.
  - Implement core curriculum across schools to enable easier transfer of credits and faster graduation of students with needed skills.
  - Assess the skill impact of new technologies and integrate into education pathways.

- **Structure and Support Objective**: Organize and manage the State Energy Workforce Consortium to maximize its positive impact on national, state, and individual company initiatives.

  Strategies:
  - Effectively manage consortium projects and initiatives.
  - Regularly convene the consortium to build partnerships and alliances between industry, government, and education.
  - Assess the impact of energy workforce needs on state workforce policy and communicate to consortium members and partners.
  - Create mutually beneficial alliances with organizations that support and advance consortium initiatives.
  - Maintain the consortium as a self-sustaining operating structure that includes governance, management, and financial processes.

Promising Practices in Workforce Planning

Pacific Gas and Electric Integrating Workforce Planning Across Multiple Business Units

David Schutt has developed workforce-planning models for a wide range of companies across a broad spectrum of industries. But none has had such a clear need for these services as much as the energy industry.

“In all other industries I’ve worked in, you don’t have to plan so much. But this one, you do,” he said, noting that there aren’t enough other businesses like it to recruit from should a large number of skilled workers leave at once.

“We really have to grow our own in the utility industry,” he said. “If we’re not planning right and there’s a pocket in our organization of people who have a lot of knowledge and experience, if they all walk out the door and we have not planned for it, we can’t just go to another company and poach those people. Businesses like Google or Microsoft can do that. They don’t have to plan. But our planning has to be extensive.”

Schutt, Practice Leader for Workforce Strategy and Planning at PG&E, was recruited from the healthcare industry three years ago to put together a workforce-planning model that could be used across all of the company’s business units. He and his team created a model that projected attrition in every job category of every business unit company-wide and built a tool to help determine how to meet that future demand.

To ensure their model would be successful, they also took steps to align it with the company’s overall strategic planning processes, said Schutt. That meant reaching out to internal partners in finance, corporate strategy, and the executive leadership.

In doing so, said Schutt, they discovered that the corporate strategy department had already developed an enterprise-wide business plan involving multiple steps. That model, however, did not include workforce planning, so they molded the two together.

“We had a six-step process for workforce planning and we attached our steps to the ones they had already developed,” he said. “Their model was divided into two pieces: the first 50–75 percent of the planning year involved strategic planning and the latter part of the year involved executing on that strategy. So we aligned our process to fit in with theirs.”

The strategic planning department was also using a five-year plan, so they built their model to reflect a five-year look ahead for workforce planning, said Schutt. “It’s that partnership with strategic planning that made this thing really hum,” he said.

Another key to success, he said, was bringing the executive leadership and human resources (HR) departments on board and making sure everyone was trained to implement their model.

Here's how it works: The workforce planning team extracts data from the HR system for a specific business unit, such as electric distribution. They upload all of the job titles (e.g. linemen, apprentice linemen, journeymen linemen) and the number of people in each of those jobs into the tool they built for this purpose. Then they look at the projected demand for those jobs (involving factors such as growing need and potential attrition) and plug those numbers into the tool. By adding demand to their current supply (and subtracting out attrition), they determine where there are going to be gaps, he said.

At that stage, said Schutt, his team works with human resources to determine what should be done to bridge those gaps. Do they need to hire and train more workers? Do they need to work on retention of the people already there? Do they need to move people around internally? "This is where strategy comes in," he said.

Finance gets involved, said Schutt, in determining how much budget there is to pay for new hires, retention bonuses, or other strategies that will cost money. "It's an interactive process. It has to be, and it's very beneficial for other parts of our business to be involved."

For example, he said, "if there's going to be a need for a large number of new hires, HR has to know how many recruiters they're going to need and how many training programs they'll have to develop. The facilities department will need to know how many desks, office cubbies, and chairs to purchase. IT has to know how many laptops they'll need. All the support organizations can feed off of this data."

Schutt said PG&E began implementing the model in 2014 and sent out surveys at the end of the year for feedback from other departments. "We got well over 100 different suggestions and recommendations and we spent all of 2015 making the model easier to use and trying to embed it further into the corporate-wide planning program."

Along the way, they've run into some difficult challenges. For example, his department had to adjust its projections for attrition when accuracy dropped from 90 percent initially to roughly 50 percent at the end of 2015, as employees began retiring at a higher-than-expected volume. The company also went through an organizational restructuring that year that disrupted their projections even further, he said.

"When things like that happen, it takes a lot of manual adjusting because we had done our planning based on the organizational structure that existed at the time," said Schutt. "Adjustments are constantly needed," he said, in order to maintain an accurate and useful model.

Entergy Retirement Attrition Modeling

Projecting how many people will retire—and when—is a tricky business. But it's necessary for utility companies to do so in order to know how many people will need to be hired, and trained, to replace those experienced workers when they go.

Companies rely on a variety of retirement attrition models in order to make these predictions. Some, however, work better than others.

"We were getting feedback that the tool we were using wasn't accurate enough," said Brian Gary, Manager for Workforce Planning for Entergy Corporation.

He spoke with CEWD about the need for a User Group among energy industry members to share best practices. This was the genesis for the Workforce Analytics Task Force.

"It was a classic example of how to use these industry groups to come together and share ideas and make something better for everyone as a result," said Gary. "We benefited tremendously from hearing what others were doing."

What the Entergy participants learned from these discussions was that age was the critical factor in predicting retirement attrition and that they needed to expand the number of years of data they were using in their forecast from three to five. They also learned that filtering the information by business unit wasn't necessary, said Gary.

"Our former model calculated the retirement rate for different business units, but it didn't take age into consideration, just eligibility for retirement," said Alicia Menesses, Entergy's Senior Analyst for Workforce Planning. In other words, the model looked primarily at whether someone retired when they became eligible, which was either age 55 with 10 years at the company or age 65 regardless of how many years the person had worked at Entergy.

Looking more specifically at the age at which people were retiring, and using three to five years of history, the new model showed where attrition was spiking and where it was stagnant, she said. Once they made the changes to their model, accuracy in predicting attrition jumped from 80 percent to 90 percent.

Menesses said they found that people retired in stages: about 10 percent retired immediately upon becoming eligible at age 55 or 56 (depending upon what time of the year their birthdays occurred); then retirements tapered off until age 60 and spiked significantly at age 62, when employees became Medicare eligible. About 22 percent of those eligible to retire at that age did so. The final and largest spike came, when 29 percent of those age 65 and older retired.

"You would think that for every year older an employee gets, there would be an increase in retirement rates, but it really doesn't work that way," said Menesses. "Those who retire immediately at age 55 are those who seem to have planned for it. If you're still here at 57 after becoming eligible for early retirement, you have a lesser probability of retiring until much later."

The discussions with the CEWD task force also helped Entergy representatives sell the changes to the program owner, said Menesses. "I know definitely our benchmarking and our meetings with other industry members and subject matter experts gave us a level of comfort that we were adjusting in the right direction," she said. "This age-driven model aligns with industry standard practice and that helped convince Entergy's talent management leadership to buy in to our changes."

What's more, the improved data from the new model has helped convince the executive leadership of the need to focus on workforce planning and the issue of knowledge transfer, a problem that arises when more experienced employees leave the company in large numbers.

"I've been in the company for 20 years, and while we could see the age curve coming at us, sunshine is really the best disinfectant," Gary said. "In this case, data is the sunshine. And data is really driving us on this issue now. Sharing the data with executive leadership led us down a path to take more proactive steps."

Southern Company Dashboarding

Before David Slicker and his team developed dashboards for Southern Company, it was tough for the utility to visually track how employees were performing, how managers were progressing on diversity opportunities, or how frequently and which employees were being developed.

But then Slicker, Human Resources (HR) Analytics and Reporting Manager at Southern Company, and his team developed a process that allowed them to connect to HR data online, refresh it each night, and share it internally on a closed, read-only, live site.

He first tested the program by aggregating data on performance management ratings. "We went from a paper-based performance system to an online one," he said. "Before this, HR had to call managers and ask, 'How did you rate these people?' The new system allowed us to give HR a better insight into the distribution of ratings and the completion of ratings and to have discussions around how people were being rated overall. So that was a quick win for us."

From there, Slicker and his team found numerous ways that dashboards could help the company improve, giving managers insights into everything from how well they were doing recruiting veterans to the success of their co-op programs.

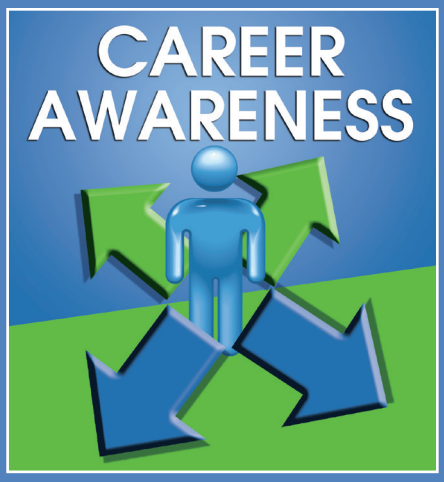
"It started out as a small way to get information in front of people, and now we have more than 400 dashboards for our business units and functions, all using HR data," he said.

"For us, the biggest advantage of having these dashboards is that we used to have people in the field who were spending a lot of time running reports and aggregating data, but nobody had the same presentation, none of those reports had the same look or feel, and it was hard to make comparisons. Now we can show how the organization is performing from a people standpoint. As the old adage goes, if you don't measure, you can't improve."

Another area the dashboards have been useful, said Slicker, is in showing the company's progress towards increasing the diversity of its workforce. "We have very low turnover at Southern Company," he said. "So the opportunity to bring in new employees and make a change in representation is much slower than in some other places. We really wanted to help managers understand that every time somebody leaves, the organization has an opportunity to affect diversity, to make that conscious decision to make sure that we are giving consideration to all applicants. Diversity dashboards are out there in real time."

Slicker said he serves on the CEWD workforce analytics task force so that he can share information about how Southern Company is using data, but also so that he can learn from others. "Typically when I serve on these councils, I learn a lot more than I share," he said. "The same goes for all of us. When you get 30 people in a room, you're going to get nuggets from everyone. No one person or company has the answer. People are not widgets. They're hard to measure. The best we can do is listen to people, find out what they are trying to affect and what data they have, and how we can present it to them.

"That's my team's charge: Listen to the business and then figure out how to make their lives easier through data."



Objective: Create awareness among students, parents, educators, and nontraditional workers of the critical need for a skilled energy workforce and the opportunities for education that can lead to entry-level employment.

Chapter 3:
Career Awareness

Get Into Energy (GIE)

getintoenergy.com

Five Quick Things That Support a Military Recruitment Strategy

Veterans in Energy – For Veterans, By Veterans

Branding at Work

Other Career Awareness Resources

Get Into Energy / Get Into STEM

Strategic Linkages: Linking Strategies to Improve Workforce Diversity

Promising Practices in Career Awareness

Get Into Energy (GIE)

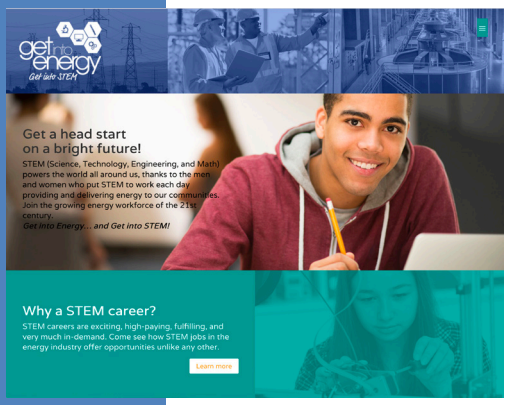
In a series of CEWD surveys with member companies and state consortia in 2018, career awareness continued to be one of the most important priorities in building a diverse, qualified energy workforce. CEWD launched its national career awareness brand, **Get Into Energy (GIE)**, in 2006 and has since launched a family of brands and career awareness resources.

From the CEWD homepage, www.cewd.org, members have a lot of options! You can shop for Careers in Energy Week materials at **ShopCEWD**; you can search for relevant curricula and education materials on the CEWD Energy Industry Curriculum Center; and you can find everything you need to know about attracting, recruiting, and hiring targeted populations on www.getintoenergy.com and www.troopstoenergyjobs.com.

This chapter explores all that CEWD has available to build career awareness with the candidates CEWD members want and need to bring into the energy industry.

getintoenergy.com

The Get Into Energy website (getintoenergy.com) was created to raise awareness of jobs in the energy industry. Energy jobs offer competitive pay and benefits, are widely available and generally immune from outsourcing, and provide a valuable service to the community. This public site, which can be reached from the CEWD site or through a general website search, offers important career information designed for five distinct populations: Youth, Engineers, Military, Transitioning Workers, and Women. The site also includes a tab to connect with getintoenergy.jobs, the job search tool provided through DirectEmployers, and a link to the **Training Program Locator**, which connects back to CEWD's National Energy Education Network.



Youth

The Youth tab of getintoenergy.com was redesigned in 2018 to become its own microsite that focuses on science, technology, engineering, and math (STEM) skills and their natural connection to energy careers.

Features of the updated stem.getintoenergy.com include:

- Descriptions of energy careers and hot STEM careers
- Cutting-edge STEM trends in the energy industry
- How to find postsecondary scholarships, contests, and other supports for achieving a career in energy

The **Getting Started and GIE Test Prep** tab gives potential students an understanding of the industry's employment requirements and an overview of the pre-employment tests commonly required by the industry. A new addition is a link to scholarship opportunities for various energy-related programs.

Engineers

The Engineering tab describes the types of Engineers needed by the energy industry.

Features include:

- Podcasts and videos about career opportunities and interviews with Engineers
- A resources page with important career-related links
- Outline of the different types of Engineers (e.g. nuclear and mechanical) and how they fit into the industry

Transitioning Workers

The Transitioning Workers tab was created for workers or youth transitioning into the energy field from another career.

Features include:

- A GIE Transitioning Workers Roadmap tool that helps those interested in an energy career through the steps from exploring careers to applying for positions.
- A section that allows a transitioning worker to input his or her current or previous job to identify how skills they've already learned may match up with those needed for energy jobs

Women

The Women tab on getintoenergy.com provides resources for women who are considering a career in energy. Energy companies recognize the value of a diverse workforce and are working to appeal more to women who are interested in nontraditional jobs.

As companies focus on women as a key demographic for their future workforce, CEWD is creating tools and resources to help women and energy companies find each other. One recent example is CEWD's Strategic Linkages Guide for Recruiting, Hiring, and Retaining Women Engineers in the Energy Industry.

Military

Clicking the Military tab on the Get Into Energy website transports visitors to www.troopstoenergyjobs.com, created in 2013 to help veterans make a successful transition to a career in energy. The Troops to Energy Jobs Roadmap guides veterans step-by-step in exploring energy careers, transferring credit for military training and translating military experience to energy job requirements, identifying any additional education and credentials the veteran may need, and finding support in their job search.

Clicking on the green button located on the homepage takes veterans to the Roadmap page, where they can:

- Explore the Troops to Energy Jobs Roadmap tool
- Connect with and get support from a virtual career coach
- Explore energy careers, including Lineworker, Technician, and Power Plant Operator
- Apply for energy jobs
- Register on the Veterans Database

Five Quick Things That Support a Military Recruitment Strategy

In 2017, CEWD developed a series of recommendations energy companies can take to improve their career awareness with the military and veteran communities.

1. Sign the Troops to Energy Jobs (TEJ) Commitment

The TEJ Commitment demonstrates a company's support and commitment to the Troops to Energy Jobs initiative and its engagement in one or more of the following objectives:

- Make it easier for veterans to find your jobs and to translate their skills and training.
- Accelerate the time it takes veterans to earn required credentials or degrees.
- Provide full value for military training and experience when hiring.
- Create a military-friendly environment within the company.
- Increase the number of veterans who are recruited, hired, and retained.

Follow this link to complete the commitment form: https://www.surveymonkey.com/r/TroopsCommitment

2. Add the TEJ Employer Badge to your website as well as all veteran-related material

CEWD created a badge member companies can post on their military recruiting or career site that not only shows the company's commitment to hiring veterans but also takes veterans directly to the Troops to Energy Jobs site and enables CEWD to track veteran activity. Once a company signs the TEJ Commitment, the Troops to Energy Jobs Employer Badge will be added next to the company's name on the TEJ Roadmap. Go to the ***Build section of the Troops Wizard*** and click on "Step 2" to see an example of how the badge can be used on a company site.

3. Register on the TEJ Veterans Database

The Veterans Database helps connect veteran jobseekers with employers who are interested in hiring veterans. Registered companies are able to find veterans using several search criteria: state, MOS code, or skills. The database enables recruiters to reach out proactively to veterans to alert them to job openings, career fairs, testing opportunities, or just to inform them of veteran-related activities. Follow this link to register on the database: http://www.troopstoenergyjobs.com/registration/company/index.php

4. Join the TEJ Community of Practice

CEWD holds quarterly Troops to Energy Jobs Community of Practice calls. The Community of Practice includes military recruiters, military outreach specialists, and those responsible for implementing the veteran strategy within their company. The calls serve as an opportunity to share and learn from others.

5. Ensure your open jobs are posted on the TEJ Job Posting Site

CEWD has created a one-stop job search site for veterans where all member companies' open positions are posted. DirectEmployers scrapes CEWD member company sites each night for job postings, and adds them to our posting site. Veterans can click and view job descriptions as well as be taken to the company site to apply for these jobs. Any changes to applicant tracking systems may affect the scraping process. Companies can check the site at http://troopstoenergy.jobs to ensure their open positions are posted.

Veterans in Energy – For Veterans, By Veterans

While Troops to Energy Jobs focuses on attracting veterans to the energy industry, Veterans in Energy (VIE) is a national employee resource group that provides transition, retention, and professional development support to the growing population of military veterans who have chosen energy careers.

VIE was established in 2017 by the Utility Industry Workforce Initiative (UIWI), a working group that brought utility industry trade associations, federal agencies, and labor groups together to identify new initiatives the energy industry can undertake to support veterans working in energy jobs.

Led by veterans in the energy industry, VIE provides the opportunity to expand best practices identified in the Troops to Energy Jobs National Template by connecting military veteran employees to others around the country and by providing leadership opportunities at the state, regional, and national level.

An annual VIE Forum celebrates energy employees who have served in the military. To learn more, visit veteransinenergy.org.

Branding at Work

Careers in Energy Week

Career awareness—or, more precisely, the lack of career awareness—is a common theme in State Energy Workforce Consortia meetings across the country. There is overwhelming agreement that jobseekers, students, and parents need a greater understanding of the availability of high-quality energy jobs and the requirements to work in the industry. In an effort to help the industry change those perceptions, CEWD introduced **Careers in Energy Week** in October 2010 as a common time for CEWD members to build awareness of opportunities in the industry.

Each year, Careers in Energy Week celebrations demonstrate the creativity and ingenuity of state consortia and individual companies. From welding contests to classroom grants and governors' proclamations, activities aimed at showcasing the industry as a desirable employer are growing.

I Got Into Energy

In 2018, CEWD introduced a new career awareness tool just in time for Careers in Energy Week: I Got Into Energy. This initiative leverages cell phone technology and social media to highlight messages from current employees. An I Got Into Energy campaign can be used at any time of the year to reinforce other career awareness activities. Follow this link to see examples of how CEWD's members celebrated Careers in Energy Week 2018! https://cewd.org/careers-week-social-media.

Other Career Awareness Resources

ShopCEWD

Always a great resource for Get Into Energy materials, **ShopCEWD** is a one-stop location for career awareness materials, many of which can be branded by state consortia or individual industry partners, giving local energy workforce efforts greater visibility and reinforcing CEWD's approach: **Industry Solutions - Regional Implementation**.

GIE materials available through **ShopCEWD** offer potential applicants information about the types of energy careers that are available and also a realistic picture of the requirements for entry-level jobs, including education, physical abilities, pre-employment testing, background, and drug screening. This type of career guidance information is valuable in helping students make the right career choice earlier in the process. Visit http://www.cewd.org/shop/.

National Energy Foundation Partnership

In 2013, CEWD formalized a strategic partnership with the National Energy Foundation (NEF) (www.nef1.org) to leverage the career awareness and education initiatives between the organizations. Through this partnership with NEF, CEWD is able to provide members with lesson plans and other branding materials. To see a full list of alliances, go to: https://cewd.org/about/partners-alliances/.

Get Into Energy / Get Into STEM

When CEWD was approached by its members in 2014 and asked to help strengthen the visibility of energy jobs in the national ***FIRST*® Robotics** competition, it wasn't hard to envision yet another use for the Get Into Energy brand. So **Get Into Energy / Get Into STEM** was born!

This addition to the Get Into Energy brand family is intended to reinforce that STEM competencies go hand-in-hand with the qualifications needed for highly skilled technical jobs in the energy industry. The new brand, originally developed for *FIRST*® Robotics in 2015, has since been used broadly in career awareness materials and has become the focal point of CEWD's youth site, http://stem.getintoenergy.com/.

FIRST® (For Inspiration and Recognition of Science and Technology) is a national organization that designs innovative programs to build self-confidence, knowledge, and life skills while motivating young people to pursue opportunities in science, technology, and engineering.

"These kids are the technicians, the IT professionals, the engineers, and the statisticians of the future. And with the partnership between our industry and FIRST® *Robotics, we can tap into that talent pipeline early and build a great reputation as an industry where technology and change are happening and where these kids can join our teams."*

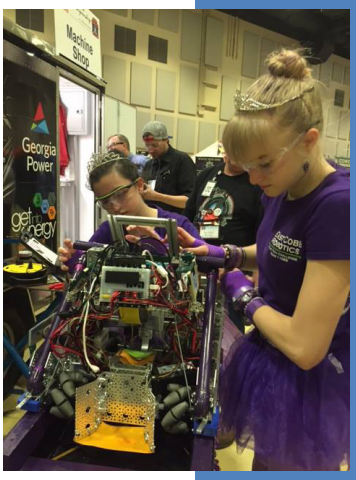
Patti Poppe,
President and
Chief Executive Officer,
CMS Energy Corporation and
Consumers Energy Company

FIRST® students have both the technical and employability competencies the energy industry is looking for in its future employees. Through *FIRST*® Robotics, the *FIRST*® Tech Challenge, and the *FIRST*® LEGO League, *FIRST*® inspires young people to be science and technology leaders by engaging them in exciting mentor-based programs that build science, engineering, and technology skills; that inspire innovation; and that foster well-rounded life capabilities including self-confidence, communication, and leadership.

The Get Into Energy / Get Into STEM initiative was created to raise awareness of the energy industry and energy careers through sponsorship of *FIRST*® teams and competitions across the nation. In 2015 and 2016, through generous support from member companies, CEWD provided a regional and national presence including hands-on exhibits and events with sponsoring CEWD member companies. The favorite attraction by far was the **Robot Doctor**! Robot Doctor Stations at the super-regional competitions and national competition were staffed by volunteers from sponsoring CEWD members and CEWD. Support for *FIRST*® Robotics at the regional level continued in 2017 where the Robot Doctor was again open for business!

The 2017 Super Regional competitions also resulted in an impressive amount of social media exposure, reaching more than 22,000 users on Twitter, nearly 600 of whom liked, clicked on, followed, or retweeted CEWD's tweets. Another 10,515 people saw CEWD's Facebook posts from the events, with 77 users reacting to, commenting on, or sharing them. The Facebook posts also generated 469 viral impressions, extending their reach even further.

Following the regional competitions in 2017, CEWD and its sponsoring companies assessed CEWD's national and regional participation in *FIRST*® and made a decision to shift support to local *FIRST*® initiatives. At the local level, companies are better able to have personal engagement and develop long-term relationships with students that potentially lead to employment in the industry.



CEWD continues to support local *FIRST*® and STEM outreach through a robust toolkit and list of resources. Check out http://cewd.org/first/ to find out how to become a mentor, sponsor a team, and build strategic linkages to your other career awareness and educational activities.

Strategic Linkages: Linking Strategies to Improve Workforce Diversity

We all know the importance of having a diverse workforce. Let's begin with some fundamental beliefs:

- Everyone benefits when our workforce mirrors the communities we serve.
- Diversity of thought broadens our problem solving, creative thinking, and innovative capabilities, all of which help our companies prosper.
- Real progress in improving diversity, like quality and safety, must start at the top and be reinforced company-wide.

But how are we doing as an industry, and as individual companies, on this critical issue? And what will it take to make real progress?

"If we want to develop a qualified, diverse workforce, we must intentionally connect programs to strengthen and support our relationships with people of diverse backgrounds at all levels."

Ann Randazzo, Executive Director, CEWD

In 2016 and 2017, CEWD began researching how energy companies are creating a diverse workforce by exploring the questions of, "What works? What doesn't? How can we make progress? What else should we be doing?" Through discussions at regional meetings and the CEWD Annual Summit, documenting best practices, and utilizing the Diversity Advisory Group as a sounding board, CEWD created new tools and resources to help member companies "strategically link" their efforts and initiatives to gain more benefit.

The result was the concept of "strategic linkages" that connect diversity efforts all along the energy career pathway, beginning in elementary school and continuing through the hiring process well into employee development.

CEWD defined four distinct phases along the career pathway where strategic linkages can have the greatest impact in building a more diverse workforce:

- **Starting Early**, which focuses on middle and high school career-awareness building for energy careers and development of energy competencies among diverse student populations.
- **Keeping the Momentum Going**, which focuses on providing a seamless transition for students from high school to postsecondary education. Here students confirm their fit for an energy career through work-based experiences, accelerate earning credentials through dual enrollment, and seek out energy-focused scholarships.
- **Providing Support Through Postsecondary**, which reinforces students' relationships with energy employers through career navigation, scholarships, mentoring, and internships.
- **Retaining Diverse Talent**, which focuses on retaining diverse qualified employees, in part by creating an environment that supports, promotes, and rewards diversity.

CEWD also developed a number of resources, beginning with Strategic Linkages Guides for recruiting, hiring, and retaining two distinct diverse populations: individuals with disabilities and women engineers.

In 2017 came the **Diversity and Inclusion National Template**, to include the previously developed Strategic Linkages Guide and a new family of resources called **Making the Connection** that includes a step-by-step playbook for building a more diverse workforce, a diversity and inclusion assessment companies can take, and a CEWD member showcase that highlights strategic linkages that work.

Find these resources and more at https://cewd.org/diversity/.

Also, the following Promising Practices reinforce the power of strategic linkages in building career awareness with young girls, veterans, and young women and men of color.

Promising Practices in Career Awareness

Southern Nuclear: Creating Strategic Linkages to Young Girls in Georgia

Like many companies, Southern Nuclear's Plant Vogtle in Waynesboro, GA, wants to attract a diverse, skilled workforce, but the number of women entering the nuclear industry remains scant.

The problem actually starts much earlier—there aren't many women in the industry because they aren't enrolling in energy or STEM pathways back at the high school level. So Southern Nuclear decided it would have to go much further back for its recruitment efforts—all the way back to 6th grade.

"The research shows that middle school can be a pivotal time for girls," said Nora Swanson, workforce development coordinator for Southern Nuclear.

It's at this time that girls often lose confidence—and, consequently, any interest—in pursuing math and science courses. However, studies have shown that girls who are involved early in STEM-related afterschool activities and who receive support and encouragement from teachers and industry mentors are more likely to have positive attitudes about pursuing STEM-related careers. They're also more likely to develop the skills they need to be successful in STEM areas.

Armed with this information, three years ago Swanson and Suzanne Sharkey from Georgia Power launched a series of programs called STEM Power for local middle schools. The programs are geared toward generating greater interest and abilities in STEM among girls.

They began with a hands-on afterschool program for 6th graders that exposed the girls to STEM-related projects and information about the energy industry. The program was then expanded to include 7th graders and field trips to local colleges offering STEM programs of study that feed Southern Nuclear's pipeline. The girls met with professors and female students who talked to them about the numerous career opportunities open to women majoring in math, science, and engineering.

Wanting to continue their relationship with the girls as they advanced through school, Swanson said last year they launched a pilot program for 8th-grade girls to join a *FIRST*® Tech Challenge (FTC) Robotics team to build robots and enter them into competitions. It was at a CEWD regional meeting that the idea of building the FTC team came to her, said Swanson.

"CEWD was promoting energy partners to Get Into Energy / Get Into STEM through the *FIRST*® initiatives, and this seemed the natural next step for STEM Power," she said.

The FTC pilot team included 13 8th-grade girls and will soon expand to include 9th- through 12th-grade girls. This will give the students a chance to continue their participation while building a larger team, or dividing into two or three teams, said Swanson.

"The great thing about this program is that we can continue expanding as they move through high school and can stay in contact with these girls through 12th grade," she added. "That means we can mentor a girl through STEM Power initiatives for up to seven years."

Both Southern Nuclear and Georgia Power provide coaches, mentors, and support for the FTC teams, said Swanson. The program teaches the girls much more than how to build robots.

"It teaches them about coding, problem solving, and the engineering design process, but it also teaches them gracious professionalism—a trademark of *FIRST*®," said Swanson. "It builds character in the girls. To succeed, they have to forge alliances with other teams. They build friendships. They learn to help each other when needed."

The FTC program—as well as the other energy-related afterschool programs that Southern Nuclear and Georgia Power have created—are also a means for giving back to the communities they serve, said Swanson. The programs are offered at Title One schools, "and it's all free to the girls."

With each of these programs, said Swanson, the utilities are building awareness of energy careers. She's hoping this will pay long-term dividends in terms of guiding these students down the energy pathway into their postsecondary partner programs, and ultimately into rewarding careers in the energy industry.

Xcel Energy: Connecting Veterans to Energy Jobs in Colorado

Lacey Golonka spends much of her time matchmaking. A Veterans Diversity Consultant for Xcel Energy, it's her job to find qualified veterans and transitioning military with the skills to fill openings in all departments of the company's 15 Colorado plants, as well as those in seven other states. But she doesn't have to do this alone. With six military bases in Colorado alone and both a state workforce system and State Energy Workforce Consortium deeply committed to veterans, she has plenty of resources at her disposal.

"We're very lucky in that respect," said Golonka, herself a veteran still active in the Army National Guard. "The pool is very large for recruiting."

One of the more useful tools at her disposal, said Golonka, is Connecting Colorado, a database built by the Colorado Department of Labor and Employment that matches job openings to applicants using a series of filters that allow employers to look specifically for veterans in the area. There are more than 127,000 veterans in the database, with more than 12,000 actively seeking work.

"For example, if we need a gas fitter with specific skills, we can ask the workforce centers to search the database for veterans who meet these criteria," she said. "That's a phenomenal resource for us, especially for hard-to-fill positions."

Like many utilities, Xcel sees the value in hiring veterans and transitioning military service members because of the skills they've developed as part of their military training. "They're always on time, they excel quickly, and they make great team leaders," said Golonka. "They also know how to think outside the box. So in the supply chain, for example, they may bring new ideas from their experience from the military and be able to suggest new ways of doing things in the corporate environment. Hiring veterans has really worked well for us."

In addition to the database, the Colorado workforce system offers utilities and other employers the opportunity to participate in networking events for veterans tailored to specific job categories. Golonka said the state uses the database to build its invitation list for veterans looking for jobs and invites employers to come to these events to talk about their companies and the jobs they are looking to fill.

"They always try to have an energy representative at those events," which are held monthly, Golonka said. "If we can't go, then another energy employer in the area will go." She added that workforce centers in Minnesota, which is also in Xcel's coverage area, hold similar networking events for veterans.

"There will be maybe 40 veterans in the room," she said. "We talk about the jobs we have to offer, best practices for jobseekers, and resume writing in order to network and increase their chances for an interview."

The Colorado Workforce System makes hiring veterans a priority, using trained veteran outreach staff to collaborate with employers in the energy and other industries to promote hiring veterans. Last year, they worked with the Colorado Energy Workforce Consortium to hold an in-person and virtual job fair for veterans, which they promoted on their computer network for the week leading up to the event, held during Careers in Energy Week.

Golonka said members of the Colorado Energy Workforce Consortium also collaborate informally when looking to fill jobs. For example, if she has a veteran candidate she cannot hire, she'll pass that person along to other members. "When we have good veteran candidates, we do a lot of sharing," she said. "I had a veteran fellow who spent 11 weeks as an HR intern. However, at the end of the fellowship we did not have any open HR positions so I passed him along to another energy company."

Golonka said consortium members also conduct their own veterans outreach efforts. For example, Xcel recently hosted a plant tour for 30 people, including business partners, employees, representatives from workforce centers in the region, and others with connections to veterans, as a means of promoting the company and the jobs it has to offer. "I gave a talk about who we are, the jobs we have, what we do, and what our jobs are going to look like over the next 10 years," she said. "Half our workforce is going to be eligible for retirement. We have positions to fill."

In Omaha, Utilities Reach Out to Young Women and Men of Color Through Energy Career Days

Raising awareness of energy careers and attracting more diverse, qualified candidates to them are two of the biggest challenges faced by utilities looking to maintain a steady flow through their workforce development pipelines. Targeted career days offer energy companies a way to address both of these issues head on.

Based on a successful model used by the Oregon Tradeswomen for more than 20 years, the Nebraska Energy Workforce Consortium created a Women in Trades Career Day four years ago to spark interest in the energy field among middle and high school young women in the Omaha area. The one-day event, featuring hands-on demonstrations and activities, was so successful that the consortium has now expanded it to include a second day of events geared toward young men of color.

"In general, the make-up of the workforce at our companies is predominantly male and white," said Joyce Cooper, Workforce Development Manager of Omaha Public Power District (OPPD), "even though Omaha is the most diverse community in this state. Even with that going for us, our employees are only 21 percent female and for people of color, we're at 11 percent."

Cooper said the Energy Career Days give them an opportunity to increase awareness of opportunities within the energy industry among the diverse population of young people who live within their service territory. OPPD and others in the consortium are striving to generate a more representative pool of job candidates down the line.

"We're finding that students are not even aware of what we do," she said. "We want to immerse them in our world, so they can remember who we are and what we do when they're beginning to think of potential careers."

The Energy Career Days for young men and women are held back-to-back in October at an OPPD service center and now include workshops focused on the types of jobs in greatest demand, based on an analysis conducted by the consortium, said Cooper. Some of those high-demand jobs include engineering, field technicians, plant operators, and cyber security specialists. Each member of the consortium—which includes OPPD, Nebraska Public Power District (NPPD), Lincoln Electric System (LES), Black Hills Energy (BHE), and the Metropolitan Utilities District (M.U.D.)—will conduct hands-on activities for students, specific to these high-demand jobs. The workshops will also include participation from the utilities' educational partners, who will talk to students about the degree programs they offer that can help prepare them for these jobs.

"This provides a really nice way of connecting the dots for students," said Cooper.

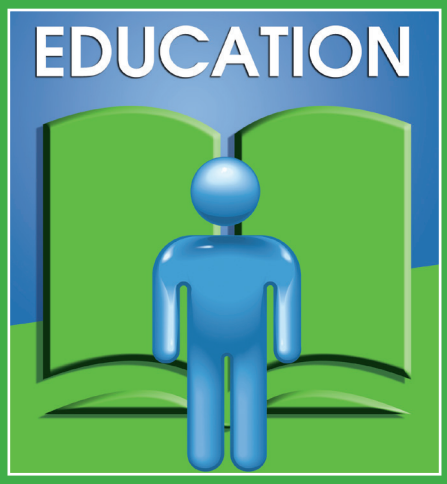
OPPD decided to host the career days at one of its training centers so students could see for themselves what's required—such as climbing a utility pole—to actually do the jobs they're learning about, said Cooper. "They can see everything in operation."

Recruiting for both career days is done through the Omaha Public School (OPS) system, where the student population is 72 percent people of color. Besides working directly with the administrators at OPS, students are recruited from other local school districts, said Cooper. "We also partner with organizations such as the Urban League of Nebraska, Partnership 4 Kids, and Avenue Scholars to help to recruit students for the two career days," she said.

Roughly 100 young women attended the Careers in Energy Day last year and 30 young men attended the first Careers in Energy Day for males. Cooper said she expects the number of boys to double this year and hopes to attract about 120 girls.

In addition to the Career Days, OPPD sends career ambassadors to schools in the service territory to engage students in classes throughout the year. The 24-member employee outreach team includes women and people of color who are also involved in the company's employee resource groups. OPPD also hopes to develop an afterschool program for students.

"We are committed to better reflect the customers that we serve," she said, "and little by little, we are making progress."



Objective: Implement clearly defined education solutions that link industry-recognized competencies and credentials to employment opportunities and advancement in the energy industry.

Chapter 4:
Education

Progress in Developing a Diverse, Qualified Workforce

Get Into Energy Career Pathways Model

GIE Career Pathways Model Case Study

- Troops to Energy Jobs

CEWD Energy Competency Model

- Personal, Academic, and Workplace Competencies: Tiers 1–3
- Industry-Wide and Industry-Specific Technical Competencies: Tiers 4–5
- CEWD Legacy I^3 Credential: Supporting Tiers 1–5
- Occupation-Specific Competencies: Tiers 6–8

The CEWD Energy Industry Curriculum Center

Promising Practices in Education

Progress in Developing a Diverse, Qualified Workforce

Significant progress has been made in developing a diverse, qualified energy workforce since CEWD and its members began work in 2006. Partnerships with technical schools, community colleges, vocational programs, and high schools are delivering quantifiable value to the industry. The value comes in the form of diverse, qualified applicants who have the desired skills and through reductions in recruiting and training costs. It is clear that these partnerships work.

While educators are working more closely with industry to fill the talent pipeline, all educational programs are not created equal. The most successful ones are based on a common set of competencies and industry requirements, which readies graduates to have the necessary qualifications for the same job in different parts of the country or with different companies in the same state. When curriculum is not built on a common set of foundational skills that are common to all jobs, a student graduating from one program may have to start over in another program if a job is not available in the area or location they originally targeted.

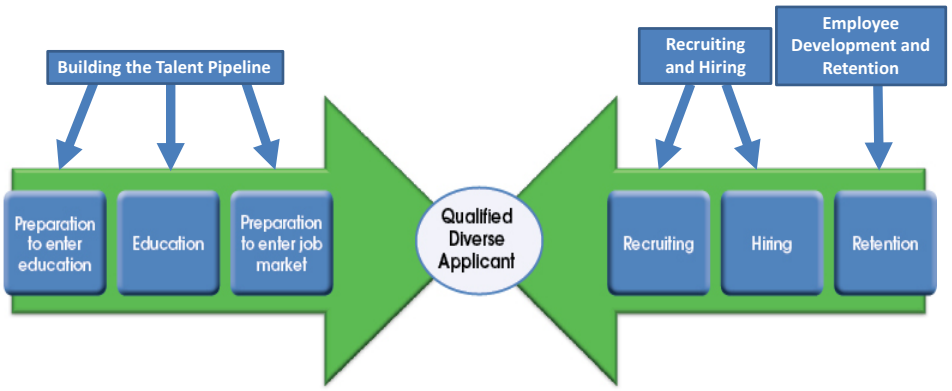
This is why CEWD continues to encourage its National Energy Education Network (NEEN) members to use the **Get Into Energy Career Pathways Model** and take the following actions in developing a diverse, qualified pipeline of applicants for the energy industry:

- Conduct **boot camps** at every stage of the pathway for concentrated skill development.
- Accelerate the time it takes a student to earn his/her credential by **recognizing prior learning**.
- Focus on the **common denominator**, by organizing programs of study around core essentials first and then technical competencies.
- **Bundle curriculum** with transferable certificates and stackable credentials that integrate industry-recognized credentials into energy programs of study.
- Provide industry partners with **supply data** on students in the pipeline.

Get Into Energy Career Pathways Model

CEWD's **Get Into Energy (GIE) Career Pathways Model** offers a roadmap for entry into skilled positions in the Electric and Natural Gas Utility Industry. These positions include Lineworkers, Generation Technicians, Transmission and Distribution (T&D) Technicians, and Plant/Field Operators. Details on each of the jobs, along with resources for implementing the pathways model, can be found on the CEWD website, www.cewd.org. Successful implementation is dependent on partnerships between energy companies, contractors, educators, and other training providers to ensure that youth, military, and transitioning workers can successfully enter energy careers.

The model offers an in-depth view of three key phases for which every successful **applicant** for an energy job will need industry and education support, as well as the three key phases the companies themselves must drive internally to ensure qualified applicants are hired and retained. These phases align to the measurement areas described in the new **CEWD Measurement Framework** described in Chapter 2: Workforce Planning.



Retention is a key issue for many companies and should be addressed as part of a company's Workforce Development strategies. See Chapter 2 for more about solutions CEWD members have developed to address retention.

Student entry into key energy jobs may not be as linear or clean as this model would suggest, but each phase is important to success.

Preparation to enter education: *Interest to Acceptance into program*

Preparation to enter education: Preparing for and selecting the right education pathway is critical for those aspiring to a career in the energy industry. This phase covers steps involved in understanding energy careers, selecting and preparing for the appropriate education pathway, and ends with acceptance into a program of study for a specific job category. Resources for career awareness and career navigation range from the Get Into Energy website and career navigation materials to the Troops to Energy Jobs website created specifically for transitioning military and military veterans.

Education: *Enrollment to Completion of credential with Labor Market Value*

Education: Steps in this phase start with enrollment in an appropriate program of study, to completion of defined credential(s) with labor market value. CEWD has defined specific education pathways and the competencies and credentials that will prepare potential applicants for success in energy careers.

Preparation to enter job market: *Preparation to Selection*

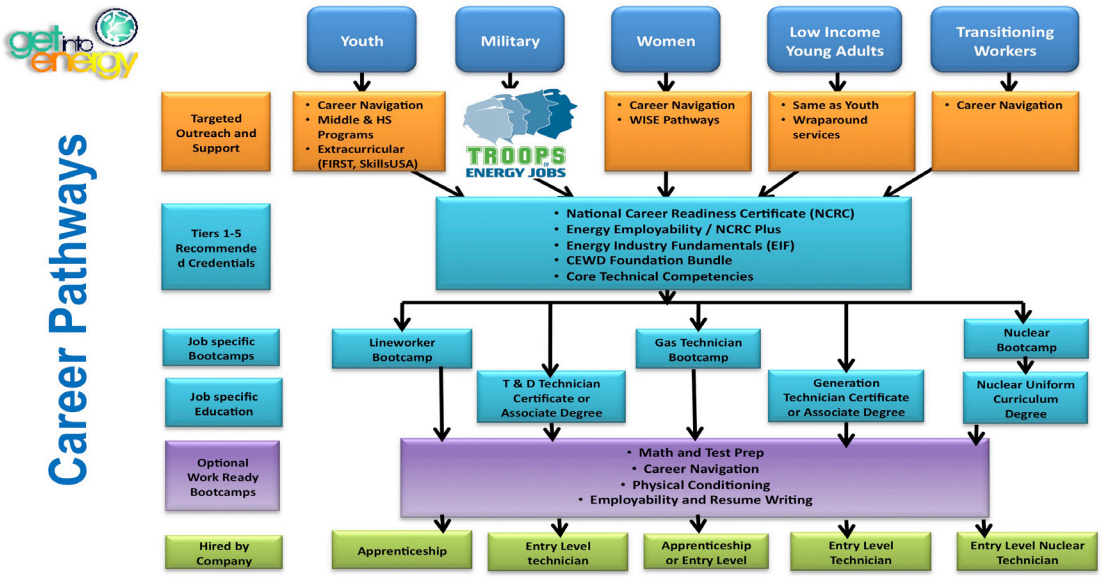
Preparation to enter job market: Upon completion of an energy pathway, candidates begin preparation to enter the job market. This phase may include research into a specific company's application requirements and preparation for pre-employment testing and screening. There are a number of best practices being used in the energy industry to help make this transition successful. These include providing support for pre-employment testing with CEWD's Get Into Energy Test Prep Workshop, using the Troops to Energy Jobs Roadmap for Veterans, or registering on the **Get Into Energy Registration Site**.

CEWD's Career Pathways Model helps you decide the best way to appeal to and achieve competency for various demographics: **Youth**, **Military**, **Women**, **Low Income Young Adults**, and **Transitioning Workers**. For each of these groups, the pathway may look different based on experience and skills but all of them have the option to earn common industry-recognized credentials, which are detailed in the following pages.

Options include **Job-Specific Boot Camps and Education** that align to positions such as Lineworker, Technician (Gas, Generation, or T&D), or a nuclear-specific career, all of which require some type of postsecondary education.

Work-Ready Boot Camps enable individuals to brush up on general, Work-Ready skills, such as preparing for pre-employment testing, resume writing, interviewing, and navigating one's career. In addition, there are Work-Ready Boot Camps that can provide physical conditioning for those careers more physical in nature, such as a Lineworker.

Hiring by Company: Depending on the occupation, individuals may be hired as an apprentice (Lineworker or Gas Technician) or as an entry-level employee (Generation, T&D, or Nuclear).

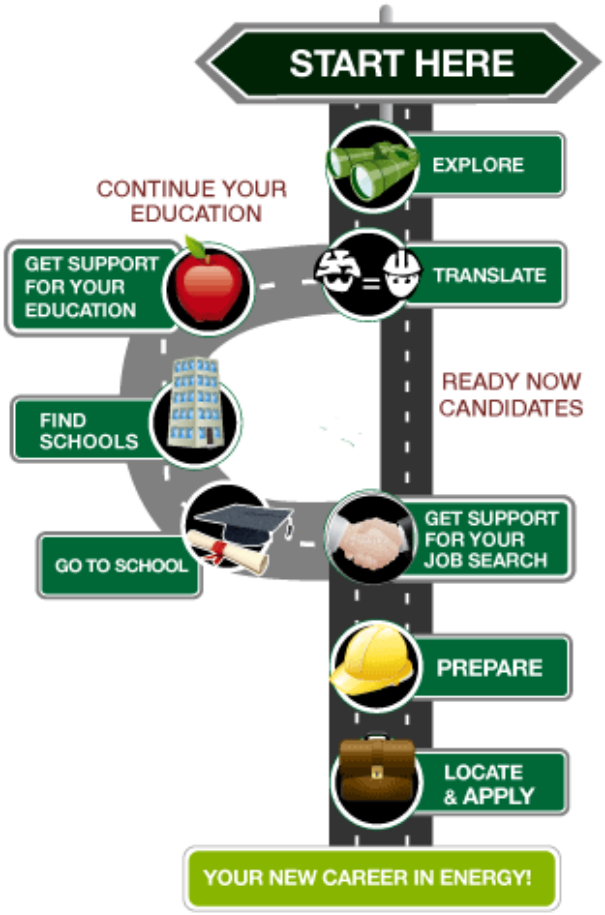


GIE Career Pathways Model Case Study: Troops to Energy Jobs

Troops to Energy Jobs is a perfect example of targeted outreach, support, and education in CEWD's Career Pathways Model. The outreach, support, and educational requirements needed for a veteran moving into an energy job can differ greatly from that required for other demographics. The U.S. Department of Veterans Affairs estimates that between 190,000 to 200,000 active-duty personnel will separate from the military in the next 25 years. Combine those numbers with career opportunities in the energy industry, and having a dedicated support model for veterans is a win-win strategy for energy companies and returning veterans.

The Troops to Energy Jobs National Template guides employers through four key phases–Prepare, Build, Implement, and Measure–which help them prepare internally to recruit, hire, and retain veterans. The Troops to Energy Jobs website (www.troopstoenergyjobs.com) guides veterans through a unique Roadmap to a Career in Energy, including access to virtual career coaching and a job posting site (www.troopstoenergy.jobs) that is updated daily.

The National Template aligns with and complements the Troops to Energy Jobs Roadmap (found at www.troopstoenergyjobs.com) created by CEWD to provide veterans with step-by-step advice on how to transfer their military training to new energy careers. Together, these tools 1) make it easier for veterans to find jobs, 2) accelerate the time needed to earn required credentials, 3) ensure the veteran is receiving credit for military experience, and 4) create a military-friendly environment within the company. The overriding goal of these tools is to increase the number of veterans who are recruited, hired, trained, and retained.



CEWD's Partners in Developing the Troops to Energy Jobs National Template:

AMERICAN ELECTRIC POWER BOUNDLESS ENERGY

aps

Dominion Energy

nationalgrid

PG&E Corporation

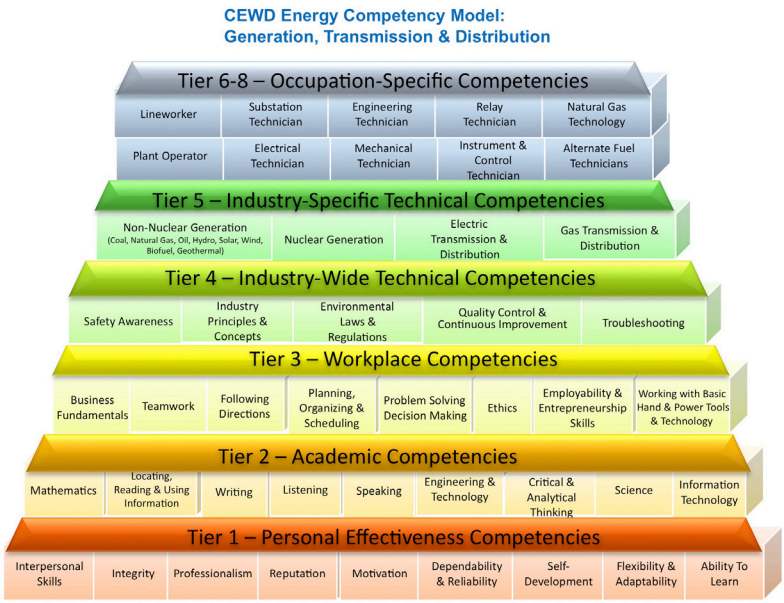
Southern Company

CEWD Energy Competency Model

The CEWD Energy Competency Model has proven to be a valuable tool for educators, workforce investment professionals, and businesses to articulate the skills required to perform successfully in various jobs in the energy industry.

A competency model is a collection of competencies that together define the potential for successful performance in a particular work setting. Competency models are the foundation for important human resource functions—such as recruitment and hiring, training and development, and performance management—because they specifically define essential skills as well as train and develop a diverse, qualified candidate pool.

CEWD, in partnership with the U.S. Department of Labor, developed the **Energy Competency Model** that defines basic competencies, industry fundamentals, industry technical competencies, and job-specific competencies in eight separate tiers. The Energy Competency Model is designed to provide a consistent definition of the competencies required to work in the industry.



Tiers 1–4 define the common competencies required for any position in an electric and natural gas utility. Tier 5 identifies competencies that are unique to positions in four industry functions: **Nuclear Generation**, **Non-Nuclear Generation (coal**, **natural gas**, **oil**, **hydro**, **solar**, **wind**, **biofuel**, **or geothermal)**, **Electric Transmission & Distribution**, and **Gas Transmission & Distribution**. The remaining tiers describe occupational-specific competencies.

Potential candidates on an energy career pathway must master personal, academic, and workplace competencies (Tiers 1–3), as well as industry-wide and industry-specific competencies (Tiers 4–5), which provides a foundation of knowledge about the energy industry and its functions, and occupation-specific competencies (Tiers 6–8).

In the following pages, we detail some of the competency-based education that supports and reinforces the competencies outlined in each tier of the CEWD Competency Model.

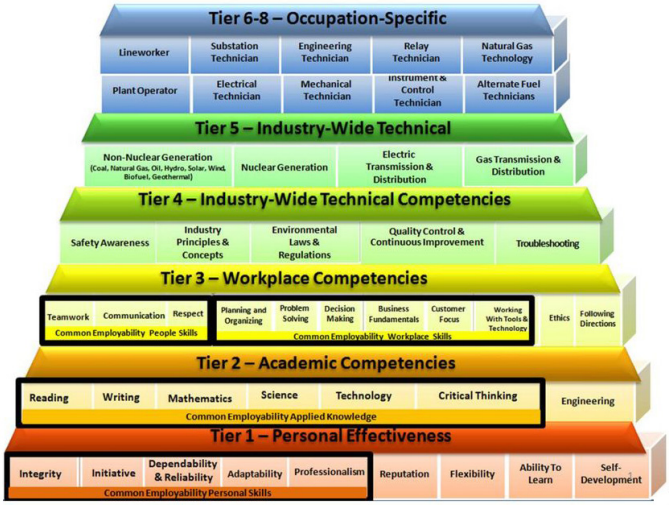
More information about the CEWD Competency Model can be found on the CEWD Members Implementation Wizard under Education: https://cewd.org/wizard/educators/.

Personal, Academic, and Workplace Competencies: Tiers 1–3

Tiers 1–3 of the Energy Industry Competency Model include the categories of Personal Effectiveness, Academic Requirements, and Workplace Requirements. These competencies are an essential foundation to success in any career pathway in the energy industry. CEWD is a member of the National Network of Business and Industry Associations (NNBIA) which has published a Common Employability Skills (CES) Framework that establishes a vivid, unifying description of the requisite knowledge and skills needed to gain employment.

CEWD is a sponsor of the CES, along with other leading industries, including advanced manufacturing, retail, IT, and transportation. These skills directly align to Tiers 1–3 of the Energy Industry Competency Model, though there are a few industry-specific areas, such as engineering and technology, hand and power tools, and some more advanced math concepts, which are part of the CEWD version of the CES Model.

As a result of the partnership with NNBIA, CEWD developed an energy industry version of the CES, including skill "add-ons" like engineering, enhanced decision-making, and other skills especially important in energy careers. The CES skills were then overlaid on the existing CEWD Competency Model, as shown here.



A valuable outcome of CEWD's partnership with the NNBIA is three booklets for use by NEEN educators to assess and teach employability skills through contextualized learning and to build awareness among students on the importance of these skills in the workplace. The three booklets, **CES Assessment Guide for the Energy Industry**, **CES Contextualized Learning Guide for the Energy Industry**, and **CES Student Communication Guide for the Energy Industry**, can be found at https://cewd.org/wizard/educators/ces-for-educators/.

Industry-Wide and Industry-Specific Technical Competencies: Tiers 4–5

CEWD developed the **Energy Industry Fundamentals (EIF) Certificate** in 2011 to support and test the achievement of competencies in Tiers 4–5. The curriculum was reviewed and updated in 2018, at which point there were approximately 69 Approved Course Providers (ACPs) for Energy Industry Fundamentals. Since inception, 3,526 students have taken the assessment and 2,533 EIF Certificates have been issued.

Community colleges and high schools that have become ACPs are able to adapt the curriculum to meet different needs, including incorporating OSHA-10 certification or using a blended learning approach with students reading material independently and instructors "bringing it to life" through instruction, labs, and projects.

EIF provides a broad understanding of the Electric and Natural Gas Utility Industry and the energy generation, transmission, and distribution infrastructure, commonly called the "largest machine in the world," which forms the backbone for the industry. The course includes business models; regulations; types of energy and their conversion to useable energy, such as electric power; how generated power is transmitted; emerging technologies; and the connection to careers in the energy industry.

There are seven course modules which may be offered separately or as a **certificate program** totaling approximately 130 hours of instruction. Five of the modules are designed to be taught in person in a classroom setting (either high school or community college) and include Instructor Guides, Student Guides, and PowerPoint presentations. Modules 6 and 7 are online modules that can be used in a classroom setting, but are also effective for students to explore on their own. In addition, a new online, instructor-led version of the course is available.

New in 2017: Students who successfully complete EIF and pass the assessment receive a digital credential which can be shared via social media and included on their jobseeker profiles.

To learn more about how to offer EIF or to review the modules, visit http://www.cewd.org/curriculum/eif-modules.php.

CEWD Legacy I³ Credential: Supporting Tiers 1–5

In 2018, CEWD was awarded a grant from the National Network of Business and Industry Associations (NNBIA) to develop a joint **CEWD/Legacy I³ Credential** that incorporates the Energy Industry Common Employability Skills, Energy Industry Fundamentals, and the OSHA-10 certification. The new credential recognizes students who complete the Legacy I³ Model and demonstrate competency in all areas of Tiers 1–5.

The TCI Solutions Legacy I³ Model is designed to identify and systematically address the factors that cause industries to falter in attracting, developing, and retaining qualified, local, and diverse young adults. It is based on a collaborative approach that synchronizes and leverages existing resources from industry, education, and support organizations and prepares high school juniors and seniors for entry-level employment or further education. The Model provides character and skills training after school and on weekends and connects families with community-based agencies that provide support services.

The Legacy Model has been implemented successfully in Minnesota and Nebraska. In Minnesota, with lead energy partner Xcel Energy, 32 students had completed the program as of 2018, with 22 of them enrolling in college, 6 enrolling in a lineworker program, and 18 completing business internships.

In Nebraska, with lead energy partner Omaha Public Power District (OPPD), 23 students had completed the program as of 2018, with all 23 enrolled in college and having earned 4 college credits for their completion of Legacy. Twenty of the students interned with OPPD.

Legacy I³ has incorporated the Legacy I³ Energy Industry Credential as part of its programming for seniors in high school and in their intensive summer program for high school graduates.

Occupation-Specific Competencies: Tiers 6–8

Credentials for the competencies detailed in Tiers 6–8 are delivered in many ways, including **high school career pathways**, **postsecondary 2- or 4-year degrees**, **apprenticeships**, and **boot camp certificates**.

CEWD offers boot camp curricula in its Energy Industry Curriculum Center, detailed in the following pages.

Program offerings for postsecondary completion are detailed at a state, regional, and national level through CEWD's National Energy Education Network (NEEN). NEEN includes more than 200 sponsored educational institutions across the country that collectively offer more than 400 energy programs to train students for key technical careers. Educators in NEEN include universities, community colleges, technical schools, high schools, and career centers.

The CEWD Energy Industry Curriculum Center

As the need for targeted and responsive energy curriculum has grown, so too has CEWD's offerings to its members and their sponsored educators. The **Energy Industry Curriculum Center**, with its own direct link (http://www.cewd.org/curriculum/) that can be found on the CEWD homepage, houses an array of energy-related educational materials, tools, and resources. In addition to the EIF curriculum, options include Get Into STEM lesson plans, a newly developed "Fundamentals of Energy" curriculum for middle school students, and guidance on how to implement a 17th Career Cluster in Energy in your state or a High School Energy Career Academy in your service area. Some examples of resources on the CEWD Energy Industry Curriculum Center are highlighted here.

Fundamentals of Energy

Designed for Grades 6–8, Fundamentals of Energy is a 150-hour course designed to assist students in making informed decisions regarding their future academic and occupational goals and to provide information regarding careers in the energy industry. The content includes but is not limited to a variety of careers; energy sources; and electrical power generation, transmission, and distribution. Divided into seven modules with both Teacher and Student Guides, Fundamentals of Energy is correlated to the Next Generation Science Standards, the Common Core, as well as STEM connections. All materials have been developed by CEWD's partner, the National Energy Foundation (NEF).

High School Energy Career Academy

A career academy is a small learning community within a school that has a career theme, shows students links between their academic subjects and this theme, and involves employers and higher education institutions in preparing students for college and a career. CEWD's High School Energy Career Academy curriculum helps communities "grow their own" workforce by preparing students in Grades 9–12 for entering postsecondary education or moving directly to employment in an energy job. The curriculum has a heavy STEM focus and not only helps students to build their knowledge of the energy industry, but includes employability skills and integrated academic components as well.

Get Into Energy Test Prep Workshop

The Get Into Energy Test Prep Workshop is a structured instructor-led program that provides candidates the opportunity to not only learn more about pre-employment testing, but to experience it firsthand. Candidates are exposed to the types of problems they will encounter in real-life testing situations, including being timed while taking practice tests. They also learn strategies for solving the types of questions they will encounter on the EEI CAST, MASS, and POSS tests.

The workshop is best suited for candidates that have already been screened and either have work experience similar to the positions for which they may qualify through the CAST, MASS, and POSS tests or have recently been through some type of education or training experience to prepare them for these positions. It should be offered to individuals who have gone through the company qualifying process and are ready to take the pre-employment test.

The workshop is approximately 20–25 hours in length, depending on which pre-employment test is the focus, and should be completed 2–3 weeks in advance of the testing date. This allows candidates to continuing preparing for the test, utilizing the resources provided at the workshop. The workshop is modular, so the program format is flexible and can be taught boot-camp-style or over a longer period of time.

For maximum impact of the workshop, it is important that GIE Test Prep Workshop facilitators utilize the lesson plans as they are written. For this reason, CEWD requires that any members who plan to use the workshop materials participate in a virtual orientation. After completion of the orientation, CEWD provides members with a full instructor guide, student guide, and a take-home practice booklet designed for candidates to keep preparing until the testing date. CEWD, in turn, asks that members report to CEWD how the materials were used (for example, the target audience and how the program was structured) and the percentage of individuals that pass the pre-employment test.

CEWD has resources available on the Get Into Energy website for candidates who aren't able to access the Get Into Energy Test Prep Workshop in person, including links to math practice quizzes, energy industry reading passages, and mechanical concepts practice.

Lineworker Pathway

A Lineworker Boot Camp is a short-term program (most are 8–10 weeks) that includes basic information about the industry and the requirements for the position, a climbing certificate, a commercial driver's license, and a safety certificate. The boot camp includes an on-the-job training experience to ensure that the student fully understands the job requirements.

Students are hired into an apprenticeship where they begin an extensive training period (in some cases, up to five years), including classroom sessions with on-the-job reinforcement of the skills learned. All apprentices are paired with experienced lineworkers. Some of the items that are included in the apprenticeship training are cable splicing, installation of transformers and other pole-top equipment, and stringing cable.

Natural Gas Technician Pathway

In 2013, CEWD developed the Natural Gas Boot Camp in partnership with the Midwest Energy Association (MEA). It is a 10-week program that incorporates the Energy Industry Fundamentals; math skills enhancement; resume and interviewing skills; and Natural Gas Technician-specific skills, such as safety, piping, valves, excavation, customer service, and corrosion. This introductory course is designed for individuals who are interested in the natural gas industry, but have limited knowledge of the work.

The program provides students with an understanding of the principles of natural gas, how to use natural gas in a manner that is safe for the public, and the types of tools and equipment used in the industry. This is an instructor-led online program that incorporates classroom training and hands-on activities to give participants actual work experience. CEWD members have access to the Natural Gas Boot Camp through the CEWD curriculum site and MEA.

Utility Technician, Power Plant Operator, and Generation Technician Pathways

These Technicians are generally trained as part of a certificate program or two-year associate degree. There are many programs already in existence at local community colleges.

The training programs generally include courses on basic electricity—alternating and direct current, physics, print reading, three-phase power theory, safety, overview of the energy industry, electrical system components—and general education courses such as mathematics, English, and economics. There are also job-specific courses depending on the discipline the student wishes to follow.

Upon graduation and hiring, individuals in these positions would begin an apprentice program of varying duration. There they would be able to apply classroom training in on-the-job situations.

Individuals who are interested in a career in energy can learn more about which curriculum offerings are required for the occupations described in the Career Pathway by exploring the Get Into Energy website at www.getintoenergy.com and the Troops to Energy Jobs website at www.troopstoenergyjobs.com.

Promising Practices in Education

How to Succeed in EIF:
VA School Achieves 100 Percent Pass Rate—Two Years in a Row

Like all industries, the energy industry is in constant competition to attract the best and the brightest students. But too often, students are unaware of the opportunities available to them in energy. To remedy this, a growing number of high schools and community colleges are introducing students to careers in the energy industry through the Energy Industry Fundamentals (EIF) course. Developed by CEWD, EIF provides a broad overview of the energy industry and the wide range of jobs available on this career path.

While earning the EIF credential can be challenging for high school students, one school in Virginia has found a way to achieve high levels of success.

The Bridging Communities Career and Technical Center and Governor's STEM Academy in New Kent, VA, has been offering the course to high school seniors for the past two years. And for the past two years, they've had a 100 percent pass rate, with all students earning the EIF credential upon completion of the program. Students who pass the course also earn college credits through a dual enrollment program with Rappahannock Community College.

Pat Roane, instructor for the two-year Engineering and Technology program at Bridging Communities, said he attributes the high pass rate to several variables, such as the maturity of the students, small class size, a wide range of instructional methods tailored to the students' strengths, and the fact that he is concurrently teaching the students Introduction to Alternative Energy.

The importance of having a high maturity level in order to take the course should not be underrated, said Roane. "There is a lot of work in this course. By the time they have finished, they have taken 14 in-class quizzes, completed 14 online modules, completed 14 online quizzes, 14 note-taking guides, and there's a lot of reading on top of that. The online module assignments put a burden on them to keep pace. It requires a lot of self-motivation."

Roane teaches the EIF course three days a week to students, alternating between it and the Introduction to Alternative Energy course. There is a small amount of overlap between the two courses, which also helps.

Roane uses a wide range of instructional methods to keep the students engaged, such as lectures, field trips, lab projects, and online coursework, along with guest speakers from their two energy industry partners, Dominion Energy and Columbia Gas of Virginia. The utilities also provide representatives who serve on an advisory committee for the curriculum.

The four college credits students earn through the dual enrollment program are transferrable to an undergraduate degree. Half the students who have completed the course have gone on to study engineering at a college or university. One was recently selected for the Apprentice School at Newport News Shipbuilding.

"It's too early to tell if these kids are going into energy careers," he said. "The ones that completed EIF last year are just finishing their first year in college."

However, he added, several of those who completed the course this year have applied for entry-level energy industry positions.

"Having the EIF credential makes them more competitive candidates for these positions," he said. "From an energy industry perspective, it makes them better prepared."

Creating an Energy Career Pathway in Michigan

In 2013, the Michigan Energy Workforce Development Consortium (MEWDC) identified the need to improve visibility for their skilled jobs. The consortium, led by Consumers Energy and DTE Energy, realized one reason the industry had no visibility was that the state lacked an official energy career cluster. Instead, curriculum that aligned to energy in the secondary school system was embedded in other career clusters like manufacturing and agriculture.

Then an opportunity arose with the U.S. Chamber of Commerce to apply for a grant to develop a Talent Pipeline Management Model. The grant provided the necessary funding to work collaboratively with education, government, and other industry partners to pursue an energy career cluster, which was approved in February 2016.

Having an official energy career cluster allows high school students to learn about career opportunities specific to this field and what's needed to follow that pathway. Through the process, the state's energy industry was able to help education, government, and other partners understand just what it was they needed in a successful job applicant.

As they worked on creating the career cluster, they evaluated all the energy-related curricula being offered at postsecondary schools in Michigan. They also identified community colleges most appropriate for offering energy-related programs based on the regions in which Consumers Energy and DTE Energy provide service. Based on those criteria, the MEWDC identified regions where they would have more intense focus on energy career educational pathways, including both secondary and postsecondary schools.

A key activity in bringing the industry and education requirements together was the implementation of an Industry and Education Partnership Summit. The day-long event, held at Lansing Community College, gave industry members a much better understanding of education's priorities and capabilities in Michigan. And it gave the educators in the regions a clear understanding of what Consumers Energy and DTE Energy needed in their applicants from the standpoint of competencies and credentials.

The consortium conducted a gap analysis to see to what extent the selected schools were covering energy industry fundamentals and found that some went even further than teaching the fundamentals.

Since the effort began, the MEWDC has been able to embed CEWD's Energy Industry Fundamentals (EIF) course into the offerings at five high schools and three community colleges.

To initially help others understand how EIF should be taught, Consumers and DTE Energy organized a "Go and See" event at Oakland Public Schools Career and Technical Education Center, where they observed the curriculum in action, and organized a second Industry and Education Partnership Summit to help all the regions understand what's needed to establish a fully aligned energy career pathway.

For students, having an energy cluster and an energy career pathway helps them understand not just what they need to know to work in the industry, but where they can go to get those credentials.

The value of establishing such a pathway is that if educators and students know what's required for energy jobs, applicants will arrive better prepared and it will take less time for employers to vet, as well as train, them. It's also important that employers agree to recognize the credentials students are earning once they obtain them.

Partnerships Spell Success for Mecklenburg Electric Cooperative's Power Line Worker Program

In 2016, Mecklenburg Electric Cooperative launched the Power Line Worker Program, a partnership with Southside Virginia Community College (SVCC). The 11-week certificate program is supported by the 13 members of the Virginia, Maryland & Delaware Association of Electric Cooperatives (VMDAEC) and is designed to meet the need for electric lineworkers driven by retirements and to address other economic conditions in southside Virginia.

John Lee, President and CEO of Mecklenburg Electric Coop, was instrumental in bringing together the cooperatives and SVCC and has stayed engaged as the program has grown as a resource, and as a member of the school's advisory board.

"The need to address our retirement attrition was an initial and powerful driver for the Power Line Worker Program," Lee said, "but its impact on our industry, on our regional economy, and on the graduates has been phenomenal. The key all along the way has been in building meaningful community partnerships with entities who share common goals."

Since the inaugural class began March 1, 2016, eight cohorts have graduated, leading to nearly 150 new lineworkers now employed in the region. From development of the program with SVCC through hiring, the partnership has been the primary success factor. Graduates of the program have been hired at 37 different companies including the cooperatives, investor-owned utilities including Dominion, and contractors including Pike. The program is seeing more than a 95 percent placement rate.

To meet a continually growing demand, what began as a class of 20 students has grown into classes with 34 students, and still there is a waiting list. As a result, SVCC has had to increase its number of instructors.

Successful partnerships supporting the program also include state government. Virginia Governor Terry McAuliffe attended the graduation ceremony for the Power Line Program in November 2017 to commemorate the 100th graduate, and current Virginia Governor Ralph Northam had also visited the school to commemorate its success.

Louisiana Consortium Addresses Need for Lineworkers

Louisiana—driven by Entergy's needs in the state to replace retiring lineworkers—is one of CEWD's newest State Energy Workforce Consortia.

"We were hiring and training a lot of new people but only having marginal success," said Melonie Stewart, Vice President of Customer Service for Entergy Louisiana and original chair of the Louisiana Energy Workforce Consortium (LEWC). "Some of the hires simply wanted to get their foot in the door and after months of training were seeking to move into a different assignment. Others underestimated the physical demands of the job. In both cases, we were spending a lot of time recruiting, on-boarding, and training, only to lose the hire."

In January of 2017, Stewart began working with CEWD and using the Strategic Planning Workshop National Template (http://cewd.org/documents/wizard/documents/StrategicPlanningWorkshop-NationalTemplate.pdf) to form a state consortium for Louisiana, first engaging other energy industry members and contractors with similar needs and then inviting technical colleges to the table.

"In April, we asked employers to submit a five-year hiring projection for the state of Louisiana," said Stewart, who now serves as Executive Sponsor of the LEWC. "In May, we were able to show the technical colleges the number of hires we were going to be needing. We did this because we understood the colleges wanted to make sure all of their graduates would get hired. That's their goal."

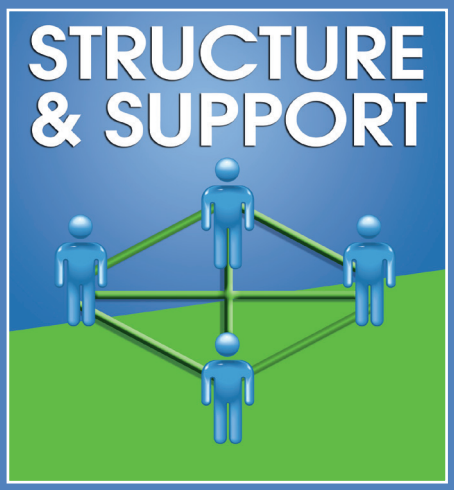
The LEWC then formed education and career awareness committees that held weekly conference calls to make sure everyone stayed on track, said Stewart. While they initially thought they'd be able to launch a lineworker training program by August, it quickly became apparent they would need more time, so the launch date was moved to January 2018. By then, they were ready to implement programs with two schools in the highest demand areas: Fletcher Technical College and Delgado Community College.

Prescreening and content for both programs were identical, said Stewart. The only difference was that Fletcher offered the course on a full-time basis for 16 weeks and Delgado delivered it over six months on evenings and weekends. "But the students graduate with the exact same skills and certifications," she said.

To date, three cohorts have completed the curriculum and graduated, two at Fletcher and one at Delgado. Eighteen of the graduates have been hired.

Stewart said much of the program's success is due to the rigorous prescreening process, which all of the employers helped to develop. Drug testing and background checks are done prior to acceptance into the program. Employers then interview the students and rate them.

Students who complete the program are hired at a higher level than other first hires, said Stewart. "They come in one step up from apprentice, and they get a higher salary."



Objective: Organize energy industry workforce development efforts to maximize the effectiveness of national, state, and individual company initiatives.

Chapter 5:
Structure and Support

CEWD's Structure and Support Model

- Annual Convenings
  - The Annual Summit
  - The National Forum
  - Regional Meetings
- Communities of Practice
- Additional Resources

The National Energy Education Network (NEEN)

State Energy Workforce Consortia

CEWD Partnerships for the Benefit of All

CEWD's Structure and Support Model

CEWD was originally formed to develop solutions for replacing an aging skilled workforce. Today, CEWD is viewed by its members as the industry's most comprehensive resource for energy workforce solutions, offering practical support and solutions all along the talent pipeline, from awareness-building to retention. CEWD's membership has grown significantly, now including well over 100 industry utilities, all major energy industry trade associations, and some of the largest utility contractor companies in the nation. A growing interest in workforce development by international utilities led CEWD in 2017 to revise its charter to accept international members. The industry's broad support of CEWD underscores in a very visible manner its track record for helping the industry develop a qualified and diverse workforce to meet the country's energy needs.

CEWD's support of its members is broad and diverse. Membership in CEWD provides unlimited access to workforce resources, tools, and best practices through a variety of direct and indirect support services. Perhaps the greatest benefit of CEWD membership and affiliation is the ability to learn, grow, and share best practices through this national network of support opportunities.

Annual Convenings

- The **CEWD Annual Summit**, held each November in the DC area, brings together leaders from the industry, operations and workforce professionals, educators, and others from across the country. The Annual Summit features national workforce experts and opportunities to network and learn from others.

- The **National Forum**, held the day before the Annual Summit, is by, for, and about the nation's **State Energy Workforce Consortia**. Representatives from the nation's consortia share progress in developing and delivering on state energy workforce plans and collaborating with education to provide industry training and pipeline development.

- The **CEWD Regional Meetings** are the Center's annual "road show" for each of the country's seven CEWD regions. Each meeting includes a reception the night before, and the full-day's agenda focuses on region-specific workforce issues and examples of best practices within the region for developing talent pipelines. Dates for the regional meetings are released in January.

CEWD Association Members:

Edison Electric Institute (EEI)

Nuclear Energy Institute (NEI)

American Gas Association (AGA)

American Public Power Association (APPA)

National Rural Electric Cooperative Association (NRECA)

Distribution Contractors Association (DCA)

CEWD Labor Partners:

International Brotherhood of Electrical Workers (IBEW)

Utility Workers Union of America (UWUA)

CEWD Communities of Practice have grown in number and importance over the past two years and have evolved into true "think tanks" for CEWD and its members.

- **The Knowledge Transfer and Retention (KT&R) Community** is focused on sharing process and procedure information that might improve their own or others' KT&R programs. This community shares implementation ideas and best practices. For most of the companies involved, the opportunity for improvement is successful implementation and measurement of success. The community meets monthly.

- **Diversity and Inclusion Community**: Increasing diversity in the talent pipeline continues to be a driving force behind the energy industry's workforce development efforts. The Diversity and Inclusion Community includes both companies and educators who work together to implement CEWD's diversity assessment tool and playbook.

- **Troops to Energy Jobs Community**: Each quarter, interested member company representatives meet through teleconference to discuss current practices and events in military recruiting, training, and retention. CEWD has more than 50 members who have officially committed to the Troops to Energy Jobs objectives.

- **The Energy Industry Fundamentals Approved Course Providers Community of Practice** provides EIF curriculum and credential implementation support to a growing network of nearly 70 EIF educators. This group shares ideas on what has been successful teaching the course. This community meets monthly via conference call.

- **The High School Community of Practice** provides support and idea-sharing on ways to build awareness around energy careers, as well as how to implement education efforts such as energy academies and adding a 17th career cluster. The group has quarterly conference calls and shares resources.

- **Contractors Community of Practice**: A number of national contractors joined CEWD in 2017 and, while they share many of the workforce challenges of IOUs, municipalities, and coops, the purpose of this Community of Practice is to identify workforce issues unique to the contractor environment and to ensure CEWD resources and tools are directed to addressing them. This group meets quarterly.

- **The Workforce Planning Council Analytics Community of Practice** shares insights and experiences in the world of workforce analytics, which focuses on forecasting attrition, both retirement and non-retirement, and discovering how employees move within their corporate structures. Some members have active analytics teams inside their companies that are helping improve attrition forecasting. An additional area of exploration is new software designed to improve analytics and WFP activities.

Additional Resources

- **Benchmarking Support** is provided to industry and education members as requested. CEWD consultants work with the members in their regions to organize mini surveys and meaningful, "just in time" interactions on a wide variety of topics—from measuring diversity to requirements for military status.

- **Virtual and on-site member resource refreshers and strategic planning workshops** are provided by the CEWD Executive Director and regional CEWD consultants as requested.

- **Monthly CEWD Newsletters** highlight member successes and cutting-edge practices in workforce development. To read more, go to: https://cewd.org/gie-newsletter/.

- **Free Webinars** for CEWD members are scheduled periodically to promote learning on topics of interest. Examples include *Delivering the Nuclear Promise Series*, *Establishing a 501(c)3 in a State Energy Workforce Consortium*, *EEI Testing Update and Strategies to Enhance Testing Outcomes*, and *Making the Connection to a Diverse, Qualified Pipeline* webinar series.

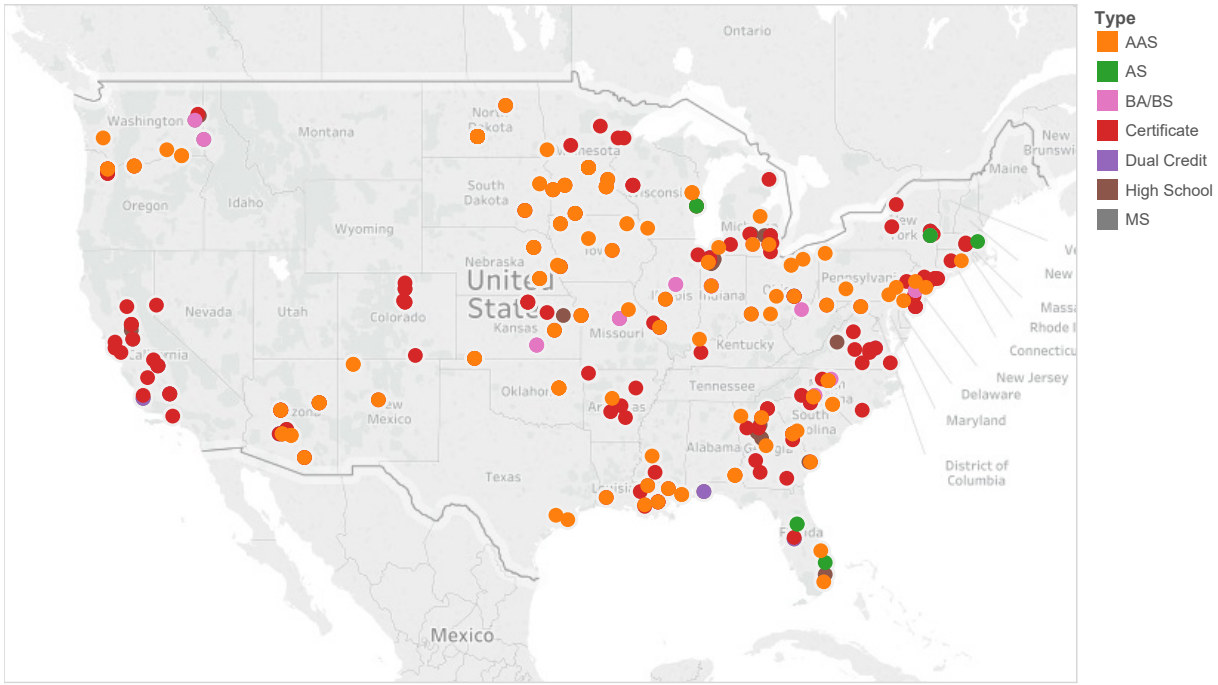
The National Energy Education Network

CEWD's **National Energy Education Network (NEEN)** comprises more than 200 sponsored educational institutions across the country that collectively offer more than 400 energy programs to train students for key technical careers. Educators in NEEN include universities, community colleges, technical schools, high schools, and career centers.

For employers and educators to form strong, productive partnerships, they must have: shared and clear goals and objectives, a commitment to success, collaboration and cooperation, measurable outcomes, and an accurate flow of information between them. CEWD supports these partnerships through the National Energy Education Network.

To be a member of NEEN, educators must be in a partnership–or in the process of establishing a partnership—with at least one CEWD industry member and must be willing to provide education required by the industry member, report results to the sponsoring partner and to CEWD, and be willing to share best practices that might benefit an education program in another state or region.

The benefits for the NEEN members are significant. Sponsorship includes membership in CEWD with access to "members only" tools, resources, and curricula, as well as publication of their program information and location on the "**NEEN Map**," an interactive training program locator Google map accessible to students and industry members for the purposes of identifying local training programs (http://www.getintoenergy.com/googleapp/).



State Energy Workforce Consortia

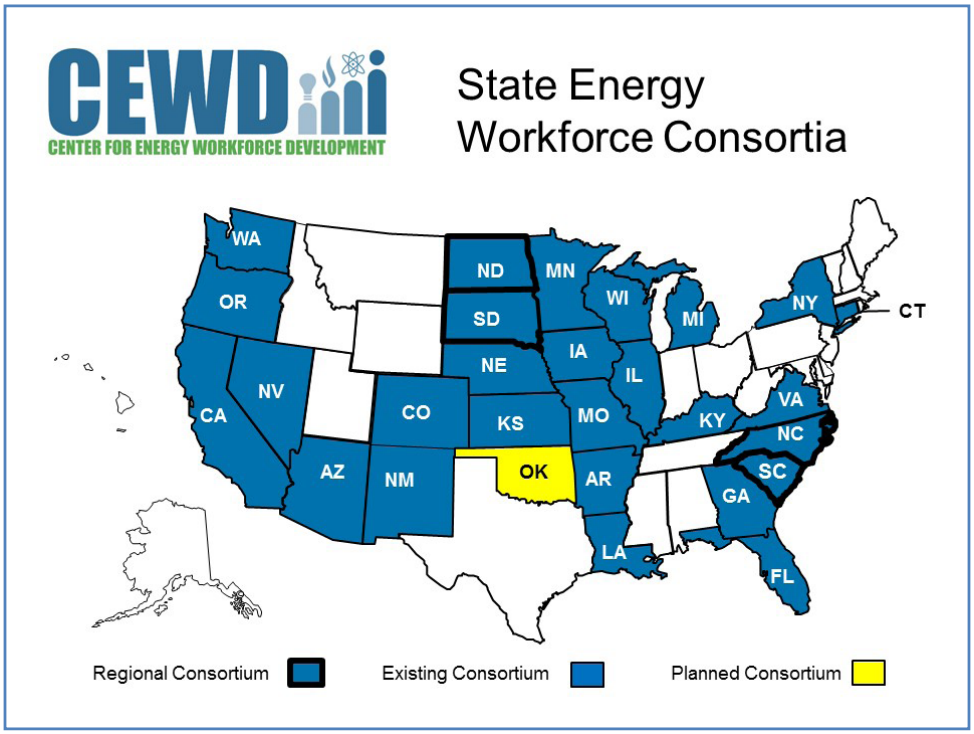
"What can we do better together than separately?"

That is the question utilities and energy companies across the U.S. have asked each other as the CEWD model for State Energy Workforce Consortia has grown and matured.

Today, nearly 30 states are represented by State Energy Workforce Consortia, including six that have recently organized or been reenergized: **Arizona**, **Arkansas**, **Carolinas**, **Louisiana**, **Missouri**, and **Nevada**. Each of these states began like others before them: developing a strategic workforce plan for the state.

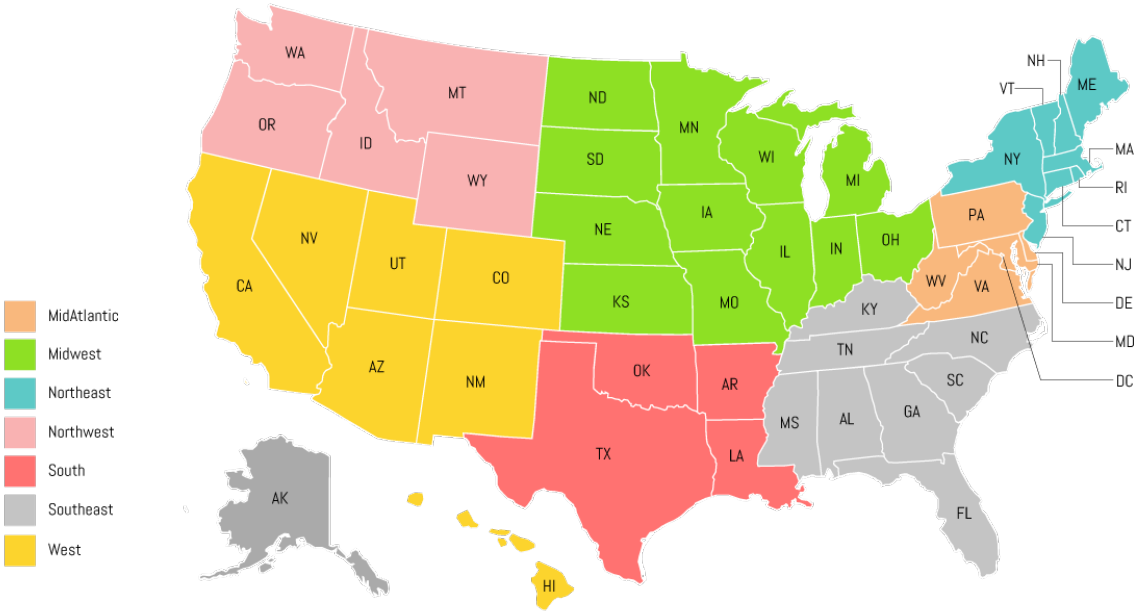
The purpose of each state consortium is to identify and develop programmatic solutions that consortium members use to meet the current and future workforce needs of the energy industry in their state. Each consortium is encouraged and supported in developing a strategic workforce plan that takes into account specific challenges of the industry in the state. CEWD provides assistance in organizing and starting a consortium and has a state consortium page on the CEWD Members Implementation Wizard with resources and tools for starting and maintaining a state consoritum. Consortia leads are also encouraged to attend the **National Forum** and participate in the **CEWD State Consortia Quarterly Calls.**

The calls are used to announce new workforce initiatives, report results, and hear from state consortia leads about best practices in workforce development.



Regional Support for a Consortium

CEWD provides support to State Energy Workforce Consortia through its **regional consulting support model** based on seven geographic regions. The model ensures that members and consortia have a single point of contact for help in accessing relevant CEWD resources and quickly connecting with consortia in other regions for benchmarking and data collection.



The Business Case for a Consortium

One of the tools business leaders use in their companies to communicate the value of participating in a state consortium is **State Energy Workforce Consortia: The Business Case**. Following are some highlights.

It's a Smart Decision

Individual companies often have workforce needs that are unique to their business portfolio, but common needs, such as education and training of skilled utility technicians, can be met much more efficiently in partnership with other companies. The consortia bring together industry members, their contractor partners, their education partners, government, workforce investment boards, unions, and others to plan and develop programs that directly address the shared energy workforce needs of the state. Such programs are much more able to withstand the ups and downs of a single company's recruiting needs, especially when the programs are grounded in a common denominator of industry-recognized credentials and core curriculum. Plus, a strong applicant pool helps reduce the time necessary to recruit, hire, and train them. The ROI is there and is being proven repeatedly through the workforce development efforts of the companies involved in CEWD.

It's About Pride

Employees of energy companies take great pride in their companies, in their communities, and in the customers they serve. And their companies want the next generation of workers to carry on that tradition. In a consortium model, pride in the community is transformed to a much broader base that includes the community's educators, state and local offices, and workforce development agencies, all of whom have a stake in seeing the community succeed.

It's About Security

Affordable, reliable, and safe energy is crucial to the American economy. As demand for energy continues to grow, developing a new, highly skilled workforce is key to maintaining reliability and customer service and to securing our nation's grid and infrastructure. Workforce planning in collaboration with other energy partners helps ensure an adequate supply of qualified workers when and where they are needed.

It's About Opportunity

State Energy Workforce Consortia provide the key energy partners in the state with an incredible opportunity to develop its workforce and attract individuals who otherwise may not be aware of the energy industry and its high-quality careers. Formalizing and operating specialized programs to attract and train workers from targeted demographics is resource-intensive and can be more successful when companies work together through a State Energy Workforce Consortium.

To learn more about the State Energy Workforce Consortia, identify whether one is active in your state, and know who to call to get involved, visit http://cewd.org/about/state-consortia/state-consortia-2/ or send an email to staff@cewd.org.

CEWD Partnerships for the Benefit of All

CEWD and its members have participated in numerous studies and grants over the years as one approach to fulfilling its mission: **to build the alliances, processes, and tools to develop tomorrow's energy workforce**.

A requirement of CEWD membership for industry members and their sponsored educators is the willingness to share what they learn with other members. Serving as grant development partners, technical advisors, and project managers, CEWD staff members work to leverage the benefits by documenting best practices, developing guides and toolkits, and facilitating communities of practice to ensure **what benefits one will benefit all**.

Following are some current examples of CEWD partnerships that serve to broaden the reach and application of related workforce development initiatives.

The National Network of Business and Industry Associations (NNBIA) has created a Common Employability Skills (CES) Framework that establishes a vivid, unifying description of the requisite Applied Knowledge along with Personal, People, and Workplace Skills needed to gain employment. CEWD is a sponsor of the CES, along with other leading industries including Manufacturing, Retail, IT, and Transportation. These skills directly align to the Energy Industry Competency Model. There are a few industry-specific areas, such as engineering and technology, hand and power tools, and some more advanced math concepts, which are part of the CEWD version of the Model. For more information about Common Employability Skills, see Chapter 4: Education.

CEWD and four State Energy Workforce Consortia have agreed to partner with the **Quality Assurance (QA) Commons for Higher & Postsecondary Education**. QA Commons is an independent project funded through the National Center for Higher Education Management Systems (NCHEMS) under a grant from the Lumina Foundation that has developed a set of Essential Employability Qualities (EEQs)—the people skills, problem-solving abilities, and professional strengths that graduates need to thrive in the changing world of work—which address many of the same knowledge, skills, and abilities identified in the NNBIA Common Employability Skills. The next step is to develop a certification for higher and postsecondary education programs based on how effectively college programs prepare their students to exhibit EEQs in the workplace. Learn more about this project at https://theqacommons.org/.

CEWD has a new strategic partnership with **CSMlearn**. CSMlearn has an online education course and credential centered on High Performance, which includes fluent math and literacy, problem solving, ability to learn on one's own, attention to detail, persistence, high personal expectations, and self-efficacy. CEWD and several of its member companies are engaged in a pilot program to test out the High Performance credential with Get Into Energy Career Pathways target audiences. To learn more, visit https://www.csmlearn.com/.

CEWD participated in **The Learning First Alliance** employer engagement meeting. The Learning First Alliance, which is a partnership of leading education associations representing more than 10 million members, supports improved student learning in America's public schools by engaging individual and organizational expertise, leadership, and advocacy efforts.

Chapter 6:
Recommendations

Employers

Educators

State Energy Workforce Consortia

Associations

CEWD

CEWD Recommendations

Every situation is different, and every energy company and State Energy Workforce Consortium is at a slightly different stage of identifying and planning to meet its workforce needs. But there are common lessons and learnings that we know work. From that perspective, CEWD offers the following recommendations for employers, educators, State Energy Workforce Consortia, and CEWD associations. And we wrap up with what CEWD commits to do to support your journey.

The most important things energy employers can do to develop a diverse, qualified pipeline of applicants:

- Visibility: Make it easier for students and jobseekers to find us, understand our jobs, and know what education pathways in your region will lead to an energy job.
- Communication of Requirements: Signal to students, jobseekers, and educators which credentials are required, preferred, and recognized by employers in your state, and are being used in hiring decisions.
- Partnerships: Develop partnerships with other employers and educators to engage students from interest through employment.
- Internal Reinforcement: Organize and educate within your company to communicate strategies, initiatives, policies, and funding and align company personnel, systems, policies, and practices to support the needs of diverse, qualified applicants.
- Measurement and Feedback: Provide data on the timing and demand for jobs in your company and feedback to educators and pipeline organizations on the quality of hires from their organizations.

To support companies in implementing these recommendations, CEWD has developed the **Get Into Energy Career Pathways Assessment for Employers**. The Assessment tool takes company leaders through each recommendation to gauge their current strengths and weaknesses and then provides links to CEWD tools to address each of the areas.

CEWD's goal for 2019 is to make the Assessment interactive online.

The most important things educators can do to develop a diverse, qualified pipeline of applicants:

- Conduct boot camps at every stage of the pathway for concentrated skill development.
- Accelerate the time it takes a student to earn his/her credential by recognizing prior learning.
- Focus on the common denominator, by organizing programs of study around core essentials first and then technical competencies.
- Bundle curriculum with transferable certificates and stackable credentials that integrate industry-recognized credentials into energy programs of study.
- Provide industry partners with supply data on students in the pipeline.

The most important things State Energy Workforce Consortia can do to develop a diverse, qualified pipeline of applicants:

- Develop and maintain a state energy workforce plan to steer industry-led workforce efforts.
- Build state awareness of the need for a skilled energy workforce and awareness of energy careers among targeted populations.
- Implement core curriculum across schools to enable easier transfer of credits and faster graduation of students with needed skills.
- Assess the impact of energy workforce needs on the state's workforce policy and communicate to consortium members and partners.
- Create mutually beneficial alliances with organizations that support and advance the consortium's initiatives.
- Maintain the consortium as a self-sustaining operating structure that includes governance, management, and financial processes.

The most important things CEWD's Association Members can do to develop a diverse, qualified pipeline of applicants:

- Convene: Use member convenings to engage associated organizations and ensure there are alignment, integration, and a shared understanding of industry workforce issues and what is needed to address them.
- Advocate: Be advocates for industry workforce efforts and policy issues at both the company and the national government level.
- Communicate: Ensure a vocal presence in the Nation's Capital for energy industry workforce issues; share workforce successes within the industry; create integrated teams of legislative and communications representatives.
- Provide heightened focus on employee processes and systems that are most critical to workforce development and knowledge transfer, including human resources policy, compensation and benefits practices, and succession planning.

What CEWD will continue to do to support its members:

Build the alliances, processes, and tools to:

- Ensure companies and State Energy Workforce Consortia are equipped to develop sustainable workforce plans that balance the supply and demand for a qualified and diverse energy workforce.
- Create awareness among students, parents, educators, and nontraditional workers of the critical need for a skilled energy workforce and the opportunities for education that can lead to entry-level employment.
- Implement clearly defined education solutions that link industry-recognized competencies and credentials to employment opportunities and advancement in the energy industry.
- Organize the energy industry workforce development efforts to maximize the effectiveness of national, state, and individual company initiatives.

CEWD's mission began in 2006 and has continued to evolve as the industry and its need for skilled talent has changed. CEWD will continue to support all members of the energy industry in building, developing, and retaining a skilled workforce as long as our members realize value.

Formed in March 2006, the Center for Energy Workforce Development (CEWD) is a nonprofit consortium of electric, natural gas, and nuclear utilities, contractors and their associations—Edison Electric Institute, American Gas Association, American Public Power Association, Nuclear Energy Institute, National Rural Electric Cooperative Association, and Distribution Contractors Association.

701 Pennsylvania Ave., NW, Washington, DC 20004-2696 • 202-638-5802

www.cewd.org www.getintoenergy.com

For information, please contact us at staff@cewd.org.

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CENTER FOR ENERGY WORKFORCE DEVELOPMENT