

# Center for Energy Workforce Development

## Estimate of Need for Skilled Workers

According to the U.S. Census Bureau (with information on the nuclear industry from NEI), there are approximately 550,000 employees in the electric and natural gas utility industry. Of this number, a little more than 120,000 work in Generation (including nuclear) and an estimated 260,000 work in Transmission and Distribution (T&D). This does not include estimates of workers in contract positions or in the construction industry who do the same type of workers.

In 2008 CEWD conducted the second annual Gaps in the Energy Workforce Pipeline Survey to estimate the need for skilled workers in the electric and natural gas utility industry.

### **Number of skilled workers needed in the next five years**

CEWD members indicate that the most critical job categories to be filled will be in the skilled trades, specifically Lineworkers, Power Plant and Field Operators, Pipefitters / Pipelayers and Technicians (including relay technicians, electricians, instrument and control technicians and others). The data collected from this survey show that, within five years, the electric and natural gas utility industry could potentially lose 40-50 percent of the employees in these functions, with projected losses for some positions as high as 60 percent of employees.

The extent of the losses depends upon the job category, with Generation significantly more at risk than Transmission & Distribution. The potential for retirements or losses through attrition varies by position and by function.

| Job Category                | Percentage of Potential Attrition & Retirements | Estimated Number of Replacements |
|-----------------------------|-------------------------------------------------|----------------------------------|
| Technicians                 | 49.0                                            | 27,000                           |
| Non-Nuclear Plant Operators | 47.6                                            | 12,000                           |
| Pipefitters / Pipelayers    | 44.7                                            | 14,500                           |
| Lineworkers                 | 40.2                                            | 29,500                           |

Though some in the industry are beginning to hire to ward off projected shortfalls, overall there remains insufficient capacity in the workforce recruiting and training pipelines to fill the expected need. Attrition from retirement becomes a problem after workers reach age 52, increasing dramatically in subsequent age categories.

### **Lineworkers**

Lineworkers make up about one third of all jobs in T&D. They are responsible for the installation and repair of overhead and underground distribution and transmission lines, poles, transformers and other equipment. Job titles include lineworker, line installer, lineman, linewoman, underground mechanic, underground specialist, towerman and towerwoman.

Lineworkers generally require five years of training before they reach journeyman status (a level of proficiency that no longer requires direct supervision). Because of this extended learning curve, it is particularly important to keep a constant flow of new hires in the lower age brackets, so that workers have sufficient time to get up to speed before they are needed to replace those who may be retiring or leaving to seek other career opportunities.

Results of the survey indicate that 25.7 percent of lineworkers are eligible to retire in five years, with an additional 15.1 percent who will potentially leave for other work. That amounts to an estimated 30,000 lineworker positions that could need to be filled industry-wide. It is also interesting to note that lineworkers are the only job category surveyed where the number of workers begins to decline after age 47. For the other job categories, the number of workers does not begin to decline until after age 52. This difference may indicate that employees leave lineworker jobs for other positions due to the physical nature of the work.

### **Technicians**

Generation technicians are responsible for the construction, assembly, maintenance and repair of steam boilers and boiler house auxiliary equipment. The job category includes boilermakers, mechanics, welders and instrument and control technicians. The data clearly illustrate that a significant challenge exists for Generation technicians. If all of those who are eligible to retire exercise this option, the industry could lose 38.3 percent of its workers by 2013. Add to this those who leave through standard attrition and the industry faces the potential need to replace 49.4 percent of its workforce over a five-year-period.

Transmission and Distribution (T&D) technicians are those workers who install, repair and operate electrical and mechanical equipment. This includes inspecting and testing electrical equipment in power generating stations and substations. The job category includes substation mechanics, relay technicians, electricians and instrument and control technicians. On the Transmission and Distribution side the data show roughly one-third of these workers could potentially retire within five years, as those who become eligible to retire choose to do so.

Including those who may leave for other reasons, the industry could potentially face replacing roughly 30,000 Generation and T&D technicians.

### **Power Plant Operators**

Power plant operators are responsible for the maintenance and operation of all primary and auxiliary equipment required to generate electricity or meet natural gas customers' demands. The job category includes power plant operators, natural gas station operators, technical operators and mechanical

operators. Most of these jobs are within the fossil fuel, i.e., coal and natural gas, sector of the industry and all of them are in the Generation function.

As with Generation technicians, the picture presented by this data is a compelling one: Within five years, potentially half of all power plant operators, or roughly 12,500 employees, may need to be replaced. It's clear that for this job category the number of employees entering the pipeline will fall far short of projected needs.

### **Pipefitters / Pipelayers**

Generation pipefitters and pipelayers are responsible for the installation and maintenance of pipe systems and related equipment for steam, hot water, heating, sprinkling, and industrial production and processing systems. The category includes both welders and boilermakers. Based on the data gathered in this survey, it appears that a significant need exists for pipefitters and pipelayers working in Generation. There is the potential to lose more than 55 percent of these employees over the next five years.

In Transmission and Distribution, pipefitters and pipelayers are responsible for the installation and maintenance of natural gas mains and services, and also act as first responders to natural gas leaks. The category includes gas street leaders, utility mechanics, gas service specialists and welders. Since pipefitters and pipelayers are often hired as contract workers at electric power plants, and because contract workers were not included in this survey, it's difficult to make accurate projections for workforce needs in this subcategory.

### **Cost to Train**

Training for lineworker and other technician positions takes place in a variety of ways.

- **Apprenticeships:** Most companies have some type of formal apprenticeship program in place for the skilled trades. Apprenticeship programs vary in length and may be conducted in partnership with the local union or technical / community college. Formal apprenticeships are registered with the state and are required to meet various selection, curriculum and operational standards.
- **Technical / Community College:** Utilities have developed partnerships with local and community colleges to create certificate programs and 2 year associate degrees for skilled trades positions. Most programs require on the job training that is conducted at a local utility company and will require completion of internal company training and mentorship to become proficient in the trade.
- **Pre-apprenticeship programs:** Pre-apprenticeship (boot camp) programs have been developed at technical / community colleges. The programs are typically 6-8 weeks in length and include a week of on-site training at a local utility. The programs provide basic readiness training including pole climbing, CDL training and pre-employment testing. Pre-apprenticeship programs prepare students to begin an apprenticeship program and increase the likelihood of success in completing the program.

The cost of training varies by company and the type of position, but is estimated to average \$40,000 per year (unloaded cost).

| Job Category                       | Number needed in 5 years | Cost to train / year | Years to Train | Cost to Train / position | Total Cost to train per year | Total 5 year Cost to Train |
|------------------------------------|--------------------------|----------------------|----------------|--------------------------|------------------------------|----------------------------|
| Technicians                        | 30,000                   | \$40,000             | 3              | \$120,000                | \$720,000,000                | \$3,600,000,000            |
| Non-Nuclear Plant/ Field Operators | 12,500                   | \$40,000             | 4              | \$160,000                | \$400,000,000                | \$2,000,000,000            |
| Pipefitters / Pipelayers           | 8,000                    | \$40,000             | 3              | \$120,000                | \$192,000,000                | \$960,000,000              |
| Lineworkers                        | 30,000                   | \$40,000             | 5              | \$200,000                | \$1,200,000,000              | \$6,000,000,000            |

### **CEWD Gaps in the Energy Workforce Pipeline Survey**

As in 2007, CEWD conducted a survey of electric and natural gas utilities to estimate the number of skilled workers and engineers needed to replace workers in the industry due to retirememtns and attrition. The 2008 survey looked at workforce needs in the electric and natural gas industries and projected shortfalls over the next five years and beyond. The survey did not include data from the nuclear power industry or supplemental labor.

Specifically, the survey reflected age and years of service for current employees, expected attrition and current vacancies. The data were used to define retirement and hiring trends in five job categories: lineworkers, power plant operators, technicians, pipefitters/pipelayers and engineers in both Generation and Transmission & Distribution.

The updated survey includes an even larger data pool than the 2007 survey, due to responses from a broader representation of energy companies of all sizes and all regions of the United States. In addition to 56 electric and natural gas companies, responses were included from all electric cooperatives in the nation. In all, the 2008 survey includes data from more than 46 percent of all U.S. electric and natural gas employees – more than 267,800 workers.

### **About CEWD**

Formed in March 2006, the Center for Energy Workforce Development (CEWD) is a non-profit organization of electric, natural gas and nuclear energy companies and their associations – American Gas Association, Edison Electric Institute, National Rural Electric Cooperative Association, and Nuclear Energy Institute.

CEWD was formed to help member companies work together to develop solutions to the coming workforce shortage in the industry. It is the first partnership between utilities, their associations, contractors and unions to focus on the need to build a skilled workforce pipeline that will meet future

industry needs. The mission of CEWD is to “Build the alliances, processes, and tools to develop tomorrow’s energy workforce.”

CEWD is working with secondary and post-secondary educational institutions and the workforce system to create practical solutions to address the need for a qualified, diverse workforce. CEWD has established a partnership with the International Brotherhood of Electrical Workers and the Utility Workers Union of America. The large contingent of the utility workforce that is represented by the union and the apprenticeship programs that train them are a critical element of the industry solution to workforce issues. In addition, CEWD has established partnerships with the Association for Career and Technical Education, the Energy Providers Coalition for Education, and the National Association of Workforce Boards.