Advanced Technological Education Network for Utilities and Energy Technical Education (Utilities and Energy Coordination Network) Year 2 Evaluation Report

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Summary

Northeast Wisconsin Technical College (NWTC) is addressing workforce shortages in the energy and utilities sector through the development of the *Utilities and Energy Coordination Network*. This project is designed to expand training opportunities, create new programs, and develop curricula for high-demand energy-related roles across the nation by creating a platform for industry, higher education institutions, and other stakeholders to share resources and generate partnerships in gas, electrical power, and utilities engineering to address workforce shortages.

Background

Northeast Wisconsin Technical College (NWTC) is a two-year technical college located in Green Bay, WI that offers one of the widest varieties of utility-related associate degrees, technical diplomas, and certificates in the Midwest and has partnered with local employers to meet regional economic needs for over 100 years. NWTC is also home to the Great Lakes Energy Education Center, a "living energy" laboratory featuring the latest technologies and serving as a model of sustainable building practices. NWTC's expertise and experience puts the College in an excellent position to form and facilitate a network of industry and educational partners.

Funded by the National Science Foundation's Advanced Technical Education program (NSF ATE) in 2020, the purpose of NWTC's *Utilities and Energy Coordination Network* grant is to create a platform for industry, higher education institutions, and other stakeholders to share resources and collaborate to expand training opportunities, create new programs, and develop curricula for high-demand energy-related roles across the nation. The Utilities and Energy Coordination Network, referred to as "the Network" in this report, project will leverage relationships developed through prior grants, including UPDATE: Utilities Pipeline Development for Advanced Technological Education (DUE#1304726) and the Planning Grant for a Utilities and Energy Regional Center of Excellence (DUE#1700673) to create a formal utilities and energy coordination network.

Despite increased enrollments at NWTC over the past six years, the needs of industry outweigh the ability of a single entity to fill the workforce pipeline. The energy industry is experiencing workforce shortages and skills gaps in key engineering and technical areas due to an aging workforce approaching retirement, changing technologies, and fewer qualified, younger candidates. Furthermore, qualified workers are increasingly choosing to work closer to their hometowns, limiting the ability to fill positions across a wider geography.

Matching industry partners to community colleges with expertise to train future technicians will be critical to addressing pipeline shortages. Such partnerships will help industry gain access to students, training expertise, and graduates who want to work close to home. Higher education institutions will benefit from industry partners who can provide input and feedback into program competencies and access to resources such as equipment, tools, and field experiences. The Network will provide a platform to cultivate and generate partnerships that can expand training opportunities in gas, electrical power, solar energy, energy management, and apprenticeships to address workforce shortages across the nation.

Specific project objectives are to:

1. Leverage the knowledge base of the NWTC Program Advisory Committees to cultivate a core leadership group consisting of stakeholders representing national and regional employers from across the electrical power, gas, solar technology, energy management, and telecommunications industry, academia, and workforce development sectors to lead the formation of the *Utilities and Energy Coordination Network* (the Network);

2. Create a clear, shared vision that guides the evolution of the Network; and

3. Establish the structure and norms of the Network to build relationships and trust among members.

One goal of the Network is to connect employers with educational partners in their geographic area as many workers in this sector prefer to work close to home. The addition of eight educational institutions in eight states has expanded the geography of Network educational partners from the original four in Wisconsin.

A survey was developed to begin identifying how the curriculum available at Network colleges meets the needs of employers. The survey included the key technical and professional skills identified in a review of each 33- to 38-credit curriculum, and also asked employers about additional skills not listed that were important, as well as training opportunities provided by their organizations. The survey was distributed by email in January 2022 to 169 individuals, and 17 responded (10% response rate).

[2] Williams, B., Sankar, M., & Rogers, P. (April 2004). *Evaluation of the Stronger Families and Communities Strategy 2000-2004*. Australian Government Department of Family and Community Services.

Respondents to the survey of gas utility employers were asked to identify the most important technical and professional skills they consider when hiring, as well as opportunities they provide for employee training.

Technical Skills and Certifications

Of the skills identified in the curriculum, three appear to be most in demand: pipe cutting and threading, installing plastic mains and services, and installing gas piping (Figure 3). Welding and residential appliance skills appear to be less important to employers, which may suggest areas for curriculum modification.

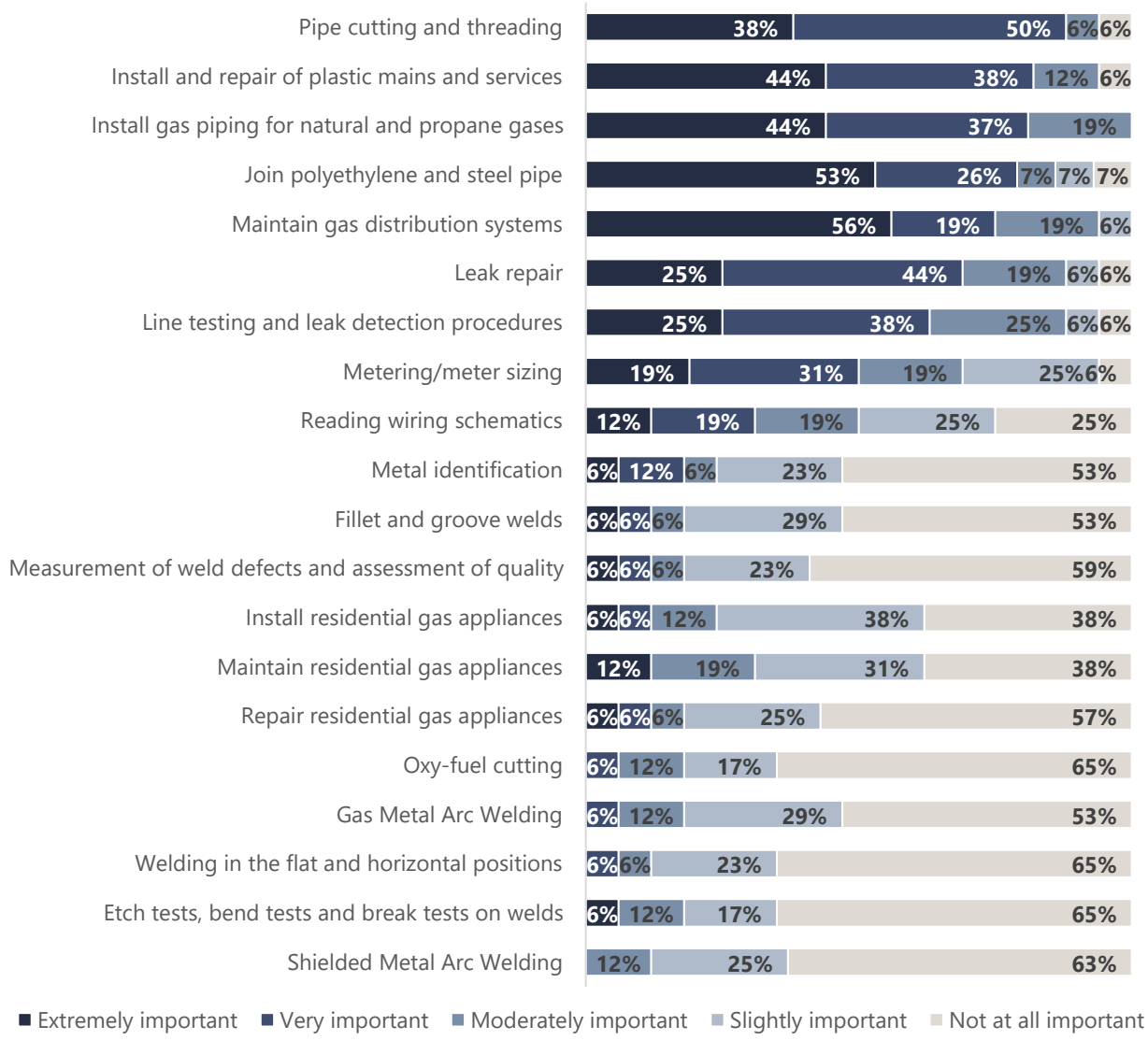

Figure 3. Employer-reported importance of gas industry skills.

Other technical skills in which employers reported interest included equipment operation (n=2) and polyethylene (PE) fusion (n=1). As one respondent stated, "We need mostly plastic gas technicians who can grasp the concepts of the installing mains and services. They need to be able to drive with commercial licenses and operate basic excavation equipment." Equipment, safety, and health certifications are also included in the program curriculum, and employers reported that these credentials vary in importance for new hires (Figure 4). Commerical Driver's License (CDL) certification is most important, with one respondent identifying "combination and air brake CDL" as another important credential. "Fire prevention" was noted by one employer as another certification that would be useful for new hires.

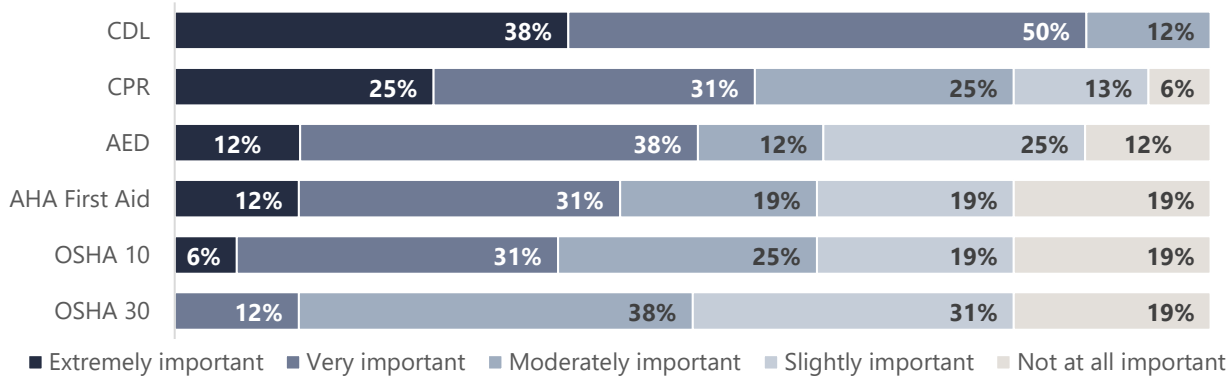

Figure 4. Employer-reported importance of gas industry certifications.

Professional Skills

In addition to the technical skills included in the Gas Utility Construction and Service programs, professional skills are also addressed through courses such as College 101, Computer Literacy – Microsoft Office, Applied Written/Job Seeking Communication, Occupational Relations, and Occupational Success Strategies. Survey respondents were asked to rank eight professional skill categories in order of importance, with results showing computer skills; diversity, equity, and inclusion (DEI); and handling feedback as the three most important (Figure 5).

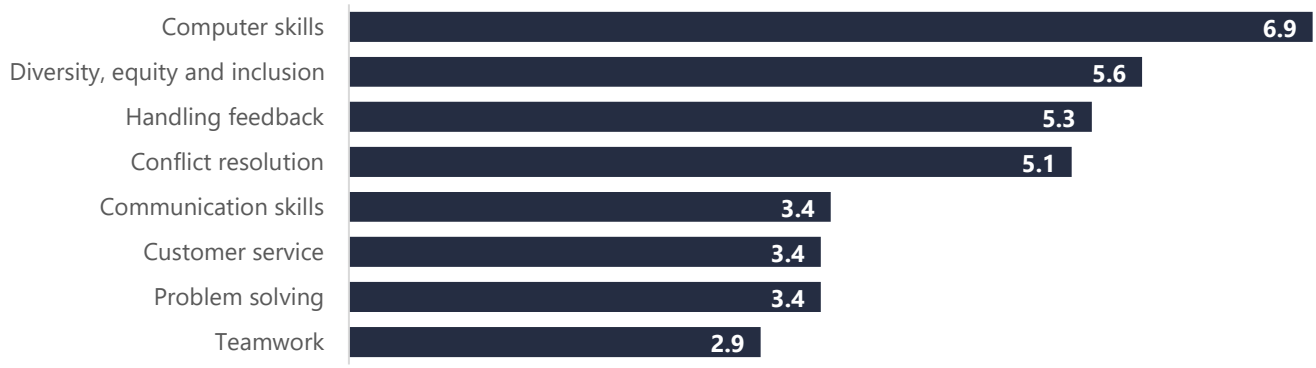

Figure 5. Employer ranking of importance of professional skills when hiring (scale: 1-least important to 8=most important).

Several employers commented on the need for computer skills, noting that "A lot of our OQ training is computer based and you would need basic computer skills," while others specifically identifyed basic computer skills, spreadsheets, and email as well as basic programs in the Microsoft Office™ suite including

Word, Outlook, and Excel. Other professional skills that employers reported as important included reading comprehension (n=1), interpersonal skills (n=1), professional appearance (n=1) and interview skills (n=1), with one commenting on the importance of, "Knowing how to do behavioral interviews and answering in the STAR method. Someone could be an excellent coworker, but they need this skill to know how to tell us they are."

Employers reported that they offer a wide variety of technical and professional training opportunities to employees (Table 1). Respondents commented that they provide training for, "The skills needed to get them to the opportunity they want to pursue" while another noted that they "train to all aspects of our work…as an employee progresses."

Technical training	Professional Training
Industry-related skills (n=2)	General employee training (n=3)
Equipment operation (n=2)	Leadership (n=2)
Pipe fusing (n=2)	Diversity and inclusion (n=1)
Natural gas installation/repair (n=1)	Teamwork (n=1)
OQ-related skills (n=1)	
Commercial Driver's License (n=1)	
Pipe laying (n=1)	
Meter connection (n=1)	
Gas distribution (n=1)	
Polyethylene fusion (n=1)	
General service/maintenance (n=1)	
Welding (n=1)	
Compliance (n=1)	
Machining (n=1)	
First aid (n=1)	
Safety awareness (n=1)	

Table 1. Employer-sponsored training opportunities.

When compared to the professional skills that employers are seeking and those that they provide training for, it is notable that none offer computer training, suggesting that there is a high expectation that new employees already have these skills. DEI is also listed as very important to employers (see Figure 4). but only one indicated that they provide training in this area, suggesting that this may also be an opportunity for colleges to address.

Conclusions

The current educational programs in the Network appear to meet employer needs, but survey results also suggest opportunities for potential modifications to some technical and professional skills addressed in the curriculum, including the role of welding courses, computer skills, and DEI skills.

- The project team has already begun discussing how the gas industry and construction coursework might evolve, including considerations about the role of welding in the curriculum and the creation of shorter-term training opportunities in lieu of the full certificate. The team should also share results from the employer survey with other colleges who would benefit from understanding employer needs in this industry, and should also identify how to engage employers in conversations to understand the implications of any curricular changes. To further leverage and develop the Network, these outreach efforts could be designed as joint conversations aimed at idea generation, knowledge sharing, and partnership development.

Appendix D: NWTC Utilities and Energy Coordination Network – Employer Skills Survey (Gas Industry)

Q2 Introduction: As part of the Utilities and Energy Coordination Network (Network) grant at Northeast Wisconsin Technical College, we are requesting your input regarding the skills needed by job candidates in the gas industry. This survey will take approximately 10 minutes and will provide valuable information for the Network to understand the extent to which the existing curricula are meeting industry's needs. Your response will remain anonymous and confidential; responses will be aggregated for reporting. Thank you.
Q1 TECHNICAL SKILLS. Please indicate how important each skill is to your company when hiring:

	Not at all important	Slightly important	Moderately important	Very important	Extremely important
Shielded Metal Arc Welding (SMAW)	○	○	○	○	○
Oxy-fuel cutting (OAC)	○	○	○	○	○
Gas Metal Arc Welding (GMAW)	○	○	○	○	○
Welding in the flat and horizontal positions on carbon steel plate and pipe	○	○	○	○	○
Fillet and groove welds	○	○	○	○	○
Measurement of weld defects and assessment of weld quality	○	○	○	○	○
Etch tests, bend tests and break tests on welds	○	○	○	○	○
Metal identification	○	○	○	○	○

Q5 Technical skills (continued)

	Not at all important	Slightly important	Moderately important	Very important	Extremely important
Line testing and leak detection procedures	○	○	○	○	○
Leak repair	○	○	○	○	○
Install and repair of plastic mains and services	○	○	○	○	○

Install gas piping for natural and propane gases	○	○	○	○	○
Maintain gas distribution systems.	○	○	○	○	○
Join polyethylene and steel pipe	○	○	○	○	○
Install residential gas appliances	○	○	○	○	○
Maintain residential gas appliances	○	○	○	○	○
Repair residential gas appliances	○	○	○	○	○
Pipe cutting and threading	○	○	○	○	○
Metering/meter sizing	○	○	○	○	○
Reading wiring schematics	○	○	○	○	○
Communicate technical information	○	○	○	○	○

Q4 What, if any, technical skills not listed above is your organization looking for in an employee?_____

Q6 For what technical skills does your organization provide training opportunities? _____

Q7 CERTIFICATIONS. Please indicate how important each certification is to your company when hiring:

	Not at all important	Slightly important	Moderately important	Very important	Extremely important
CDL	○	○	○	○	○
OSHA 30	○	○	○	○	○
OSHA 10	○	○	○	○	○
AHA Heartsaver 1st Aid	○	○	○	○	○
CPR	○	○	○	○	○
AED certification	○	○	○	○	○
Other: (please describe)	○	○	○	○	○

Q8 PROFESSIONAL SKILLS. Please rank the following list of professional skills, in the order of importance for hiring in your organization.

_____ Computer skills: Microsoft Office word processing, spreadsheets, presentations
_____ Conflict resolution
_____ Customer service
_____ Diversity, equity, and inclusion; interaction with diverse populations
_____ Handling feedback
_____ Problem solving
_____ Team-building skills, teamwork

_____ Verbal and written communication skills

Q9 What, if any, other professional skills are important to your company when hiring? _____

Q10 For what professional skills does your organization provide training opportunities? _____

Q12 What other skills should colleges help students to develop to best prepare for roles in the gas industry?
_____

Q11 For what roles does your company hire job candidates that use the above competencies? _____

Q12 Is your company connected to any educational institutions from which you regularly hire employees and/or where current employees can pursue additional education or training?

- Yes
- No

Display Q13 if Q12 = Yes

Q13 With what educational institutions are you connected? _____