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ADVANCED TECHNOLOGICAL EDUCATION NETWORK FOR UTILITIES AND ENERGY TECHNICAL EDUCATION (UTILITIES AND ENERGY COORDINATION NETWORK) ENERGY MANAGEMENT SURVEY RESULTS REPORT

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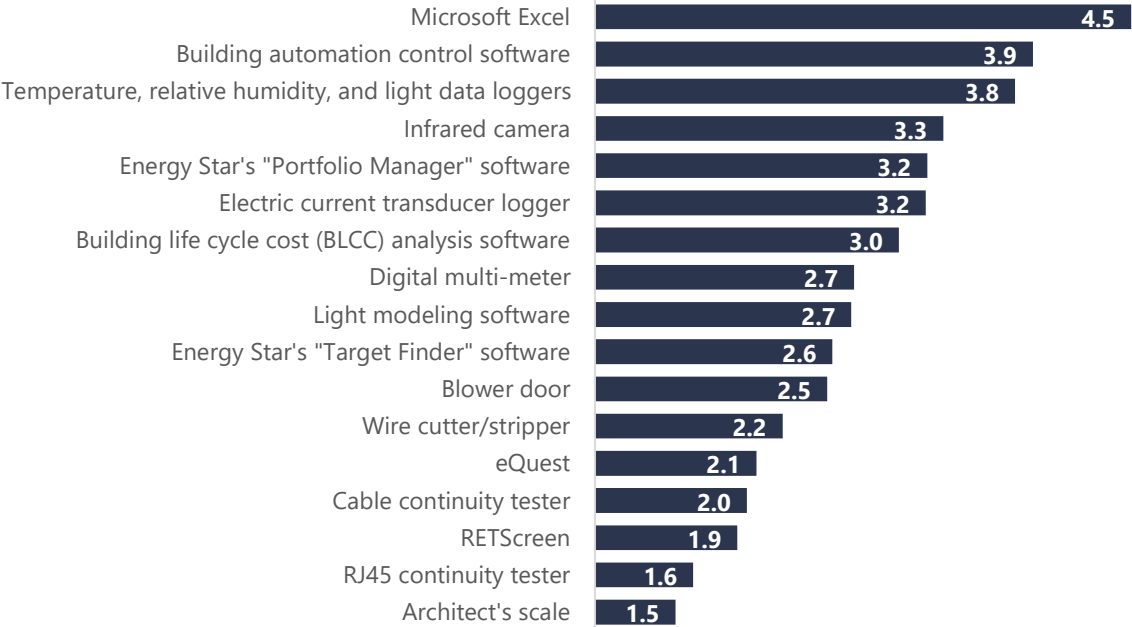THE RUCKS GROUP LLC

Table of Contents

Background

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 (UECN). 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.

A key objective of this project is to understand the extent to which the curricula offered by colleges in the Network align with industry needs by gathering input from employers across a variety of utilities and energy-related sectors. The findings presented in this report represent the results of a survey of employers in the Energy Management industry. This survey was sent to 46 individuals in the Energy Management field; seventeen responses were received (37% response rate). This results report includes a summary of the quantitative and qualitative findings from the survey. A copy of the survey can be found in Appendix A.

Findings

When asked about to indicate the importance of hiring candidates' ability to use each of the identified tools and software, respondents rated Microsoft Excel as being of highest importance (Figure 1).

Tool/Software	Rating
Microsoft Excel	4.5
Building automation control software	3.9
Temperature, relative humidity, and light data loggers	3.8
Infrared camera	3.3
Energy Star's "Portfolio Manager" software	3.2
Electric current transducer logger	3.2
Building life cycle cost (BLCC) analysis software	3.0
Digital multi-meter	2.7
Light modeling software	2.7
Energy Star's "Target Finder" software	2.6
Blower door	2.5
Wire cutter/stripper	2.2
eQuest	2.1
Cable continuity tester	2.0
RETScreen	1.9
RJ45 continuity tester	1.6
Architect's scale	1.5

Figure 1. Average ratings to the question, "Please indicate how important the ability to use each of the following tools and software is to your company when hiring" (n=17). Scale: 1=not at all important to 5=extremely important.

Respondents were then asked to identify proficiencies in other tools or software not listed in the previous question that they are looking for in potential hiring candidates (Table 1).

What, if any, tools or software not listed previously is your organization looking for in an employee?
- AutoCad (2D drafting) - COMcheck software - for interior lighting compliance - Controls line diagram tools - Electric data logging equipment (i.e. Dent Elite Pro) and the different connection types - IP Networks; IP addresses and networking protocols (basic understanding) - Microsoft Word, PowerPoint, and Outlook - EnergyPlus - Load Calculation Software (such as Trane Trace or similar) - Microsoft Office Suite - Power metering - Project justification - Psychrometric Charts/Software - Revit (3D Modeling) - Solar path finder - TeamViewer - Utility bill trend analysis - VOIP - Wye, Delta, single phase vs 3 phase, etc.

Table 1. Open-ended responses to the question, "What, if any, tools or software not listed previously is your organization looking for in an employee?"

Respondents rated the identification of energy efficiency measures as being the most important calculations and analyses for potential candidates to know (Figure 2).

Figure 2. Average ratings to the question, "Please indicate how important the ability to conduct each of the following calculations and analyses is to your company when hiring" (n=17). Scale: 1=not at all important to 5=extremely important.

When asked what "other" tools and software their organization is looking for in an employee, one respondent reported experience with building automation communication via BACnet, Modbus, and Lon as important.

Survey participants were asked to describe training opportunities their organization provides for calculation and analysis skills (Table 2).

For what calculation and analysis skills does your organization provide training opportunities?
- C&I training covers many equipment types you would see in the field (boilers, compressed air, HVAC, lighting, etc.) - Energy Efficiency calculations - Usually provided through utility webinars across the US - Energy estimation - Energy modeling - Excel - Heating/Cooling Load Calculations - HVAC fundamentals, control strategies, etc. - Lifecycle savings - Load Calculation tools - Psychrometrics - Savings estimates - Simple payback - Solar net energy - Unit conversions - Utility rate analysis

Table 2. Open-ended responses to the question, "For what calculation and analysis skills does your organization provide training opportunities?"

One respondent reported that their organization provide no calculation and analysis skills training, while others indicated that they use on-the-job training as well as union training.

Similarly, when respondents were asked to rate the importance of the provided technical skills when considering potential candidates, the identification of energy efficiency measures in new and existing buildings was rated the highest (Figure 3).
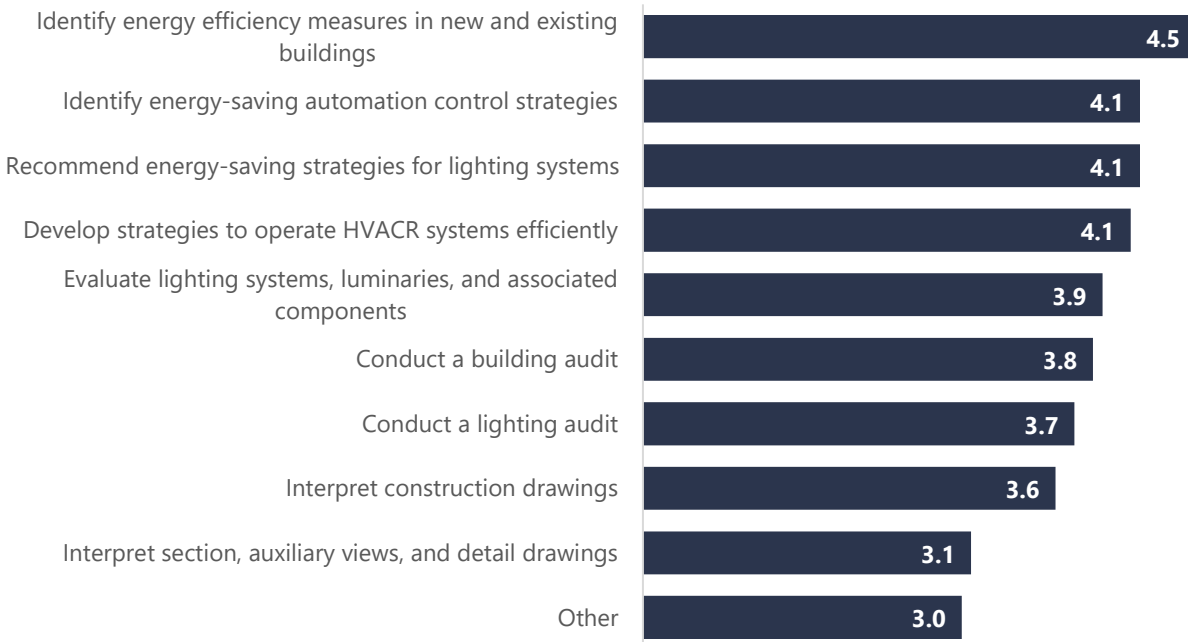
Figure 3. Average ratings to the question, "Please indicate how important each of the following technical skills is to your company when hiring" (n=17). Scale: 1=not at all important – 5= extremely important
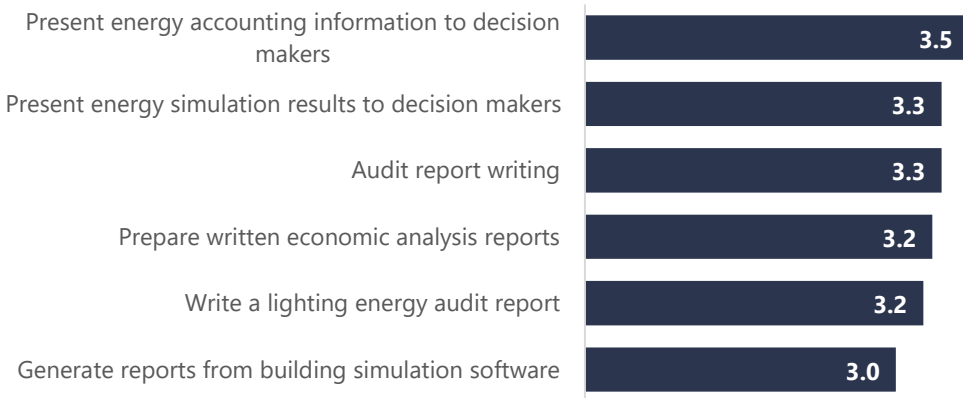
When asked what "other" technical skills their organization is looking for in an employee, one respondent reported experience with retro-commissioning strategies as important.

Respondents were then asked to describe the training opportunities that their organizations provide to develop technical skills among new or existing employees (Table 3).

For what technical skills does your organization provide training opportunities?
- Advanced energy technologies
- All
- Company sponsored trainings are available for specific technologies or general efficiency. Job shadowing opportunities always recommended to learn from colleagues on site.
- Construction drawing fundamentals, software training, etc.
- Job shadowing new hires on site visits, C&I training described earlier, third party conducted trainings.
- Lighting analysis, payback, energy vs demand impact
- Lighting technologies
- None
- On-the-job training
- Proprietary software
- Typically whatever is offered through Utility webinars

Table 3. Open-ended responses to the question, "For what technical skills does your organization provide training opportunities?"

When asked to rate the importance of applicants' reporting skills for their organization when hiring, respondents rated the presentation of energy accounting information to decision makers as the highest priority (Figure 4). They also described the reporting skills for which their organization provides training opportunities for employees (Table 4).
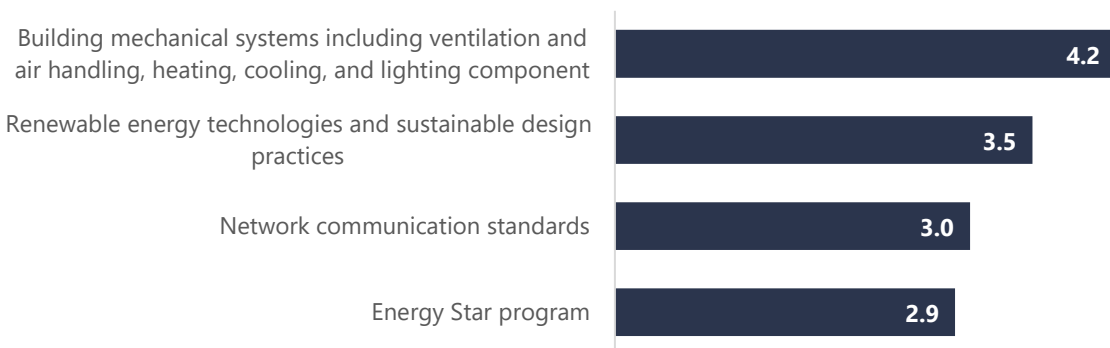
Present energy accounting information to decision makers	3.5
Present energy simulation results to decision makers	3.3
Audit report writing	3.3
Prepare written economic analysis reports	3.2
Write a lighting energy audit report	3.2
Generate reports from building simulation software	3.0

Figure 4. Average ratings to the question, "Please indicate how important each of the following reporting skills is to your company when hiring" (n=17). Scale: 1=not at all important – 5= extremely important

For what reporting skills does your organization provide training opportunities?

- All
- All reporting is from proprietary software, so all training is included.
- Assembling an assessment report, peer reviews, and job shadowing on delivery until comfortable.
- Hands on training only
- None
- On-the-job training
- Onboarding presentations and trainings do cover areas of reporting to customers and internally regarding EE projects. Most training opportunities can be obtained from outside the organization using other tools online. Paid conferences or trainings can be reimbursed by the organization however.

Table 4. Open-ended responses to the question, "For what reporting skills does your organization provide training opportunities?"

When asked to rate the importance of each knowledge area to their organization when hiring, respondents rated building mechanical systems as the highest priority (Figure 5). Additional knowledge areas identified by one respondent included DesignLights Consortium, Energy Star Product Certifications, AHRI Directory, and other third party testing and savings verification companies.

Building mechanical systems including ventilation and air handling, heating, cooling, and lighting component	4.2
Renewable energy technologies and sustainable design practices	3.5
Network communication standards	3.0
Energy Star program	2.9

Figure 5. Average ratings to the question, "Please indicate how important each of the following knowledge areas is to your company when hiring" (n=17). Scale: 1=not at all important – 5= extremely important

Respondents were then asked to rank the provided list of professional skills in order of importance for hiring in their organization (Table 5).

Professional Skill	Average Rank
Customer service	2.9
Problem-solving	3.1
Verbal and written communication skills	3.4
Computer skills	3.9
Teamwork	5.1
Conflict resolution	5.8
Diversity, equity, and inclusion	5.8
Handling feedback	6.0

Table 5. Average rankings to the question, "Please rank the following list of professional skills, in the order of importance for hiring in your organization" (n=17). Scale: 1=most important – 8=least important

Other professional skills identified by employers but not included in the above list were also identified (Table 6).

What, if any, other professional skills are important to your company when hiring?
- Self-motivation (3 responses)
- Willingness to learn; curiosity (3)
- Communication (2)
- Professionalism (2)
- Adaptability (1)
- Leadership (1)
- Project management (1)
- Social skills (1)
- Technical writing (1)

Table 6. Coded responses to the question, "What, if any, other professional skills are important to your company when hiring?"

Respondents identified several professional skills that were available through training opportunities (Table 7).

For what professional skills does your organization provide training opportunities?
- Customer service training, selling energy efficiency,
- Energy Efficient Certificates like BOC, CEM, BEP
- Leadership, technical, communication,
- Nearly all when asked for.
- No formal training -- on-the-job training only
- None
- Technical training regarding most energy efficiency measures, technologies, and equipment can be provided through the organization.
- Training is offered depending on needs of employees

Table 7. Full responses to the question, "For what professional skills does your organization provide training opportunities?"

When asked to describe other skills that colleges should help students develop to prepare for roles in energy management, customer service and communication skills were among the skills reported (Table 8).

What other skills should colleges help students to develop to best prepare for roles in the energy management industry?
- Communication skills (3 responses)
- Social/customer service skills (3)

What other skills should colleges help students to develop to best prepare for roles in the energy management industry?
-    Coding skills (1)
-    Commissioning of equipment (1)
-    Energy auditing (1)
-    Excel (1)
-    Familiarity with databases (1)
-    Openness to change (1)
-    Pneumatic controls (1)
-    Steam systems (1)
-    Sustainability (1)
-    Willingness to learn (1)

Table 8. Coded responses to the question, "What other skills should colleges help students to develop to best prepare for roles in the energy management industry?"

Respondents described the roles that their company hires candidates for, given that they have the aforementioned competencies, with energy engineers being the most common (Table 9).

For what roles does your company hire job candidates that use the above competencies?
-    Energy engineer (7 responses)
-    Installers/technicians (5)
-    Energy advisor (4)
-    Project coordinators/managers (3)
-    Programmers (2)
-    Analysts (2)
-    Controls designer (1)
-    Electrical engineer (1)
-    Mechanical engineer (1)
-    Performance consultants (1)

Table 9. Coded responses to the question, "What other skills should colleges help students to develop to best prepare for roles in the energy management industry?"

Lastly, respondents were asked to report whether their company was connected with any educational institutions. Over half of respondents said that their organization was not connected to an educational institution (Figure 6).

33%	67%

■ Yes ■ No

Figure 6. Response frequency to the question, "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?" (n=15).

For those whose organizations were connected with specific educational institutions, they were then asked to identify which institutions they were affiliated with (Table 10).

With what educational institutions are you connected?
- UW-Madison (2)
- Local 400, Manufacturer Training
- MSOE
- Several local technical colleges

Table 10. Full responses to the question, "With what educational institutions are you connected?"

Final Thoughts

This results report is intended to provide a clear and concise summary of the survey responses from industry partners who responded to the energy management industry employer skills survey. The interpretation of this information in relation to this project's evaluation questions along with corresponding recommendations will be included in the annual evaluation report.

Appendix A: Energy Management Industry Employer Skills Survey

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 energy management 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 TOOLS and SOFTWARE. Please indicate how important the ability to use each of the following tools and software is to your company when hiring:

	Not at all important (1)	Slightly important (2)	Moderately important (3)	Very important (4)	Extremely important (5)
Architect's scale	○	○	○	○	○
Digital multi-meter	○	○	○	○	○
Cable continuity tester	○	○	○	○	○
RJ45 continuity tester	○	○	○	○	○
Wire cutter/stripper	○	○	○	○	○
RETScreen	○	○	○	○	○
eQuest	○	○	○	○	○

Q2 Tools and software (continued)

	Not at all important (1)	Slightly important (2)	Moderately important (3)	Very important (4)	Extremely important (5)
Temperature, relative humidity, and light data loggers	○	○	○	○	○
Electric current transducer logger	○	○	○	○	○
Infrared camera	○	○	○	○	○
Blower door	○	○	○	○	○
Building automation control software	○	○	○	○	○
Energy Star's "Target Finder" software	○	○	○	○	○
Energy Star's "Portfolio Manager" software	○	○	○	○	○
Building life cycle cost (BLCC) analysis software	○	○	○	○	○
Light modeling software	○	○	○	○	○
Microsoft Excel	○	○	○	○	○

Q3 What, if any, tools or software not listed previously is your organization looking for in an employee? _____

Q4 ANALYSIS SKILLS Please indicate how important the ability to conduct each of the following calculations and analyses is to your company when hiring:

	Not at all important (1)	Slightly important (2)	Moderately important (3)	Very important (4)	Extremely important (5)
Energy performance of commercial buildings, including BIN methodology and degree-day	○	○	○	○	○
Parametric studies of building energy use	○	○	○	○	○
Utility bill analysis	○	○	○	○	○
Identification of energy efficiency measures	○	○	○	○	○
Energy savings and investment calculations	○	○	○	○	○
Calculate life cycle cost analysis of energy projects	○	○	○	○	○
Financial investment analysis of energy savings	○	○	○	○	○
Calculate equipment efficiencies	○	○	○	○	○
Building heating and cooling loads analysis	○	○	○	○	○
Program building automation control strategies	○	○	○	○	○
Analysis of energy savings based on energy control strategies	○	○	○	○	○
Apply utility rates to utility consumption data	○	○	○	○	○
Analyze Energy Use Intensity (EUI) data	○	○	○	○	○
Analyze commercial building energy end use profiles	○	○	○	○	○
Lighting design analysis (21)	○	○	○	○	○
Other: (please describe):	○	○	○	○	○

Q5 For what calculation and analysis skills does your organization provide training opportunities? _____

Q6 TECHNICAL SKILLS. Please indicate how important each of the following technical skills is to your company when hiring:

	Not at all important (1)	Slightly important (2)	Moderately important (3)	Very important (4)	Extremely important (5)
Interpret construction drawings	○	○	○	○	○
Interpret section, auxiliary views, and detail drawings	○	○	○	○	○
Conduct a building audit	○	○	○	○	○
Identify energy efficiency measures in new and existing buildings	○	○	○	○	○
Develop strategies to operate HVACR systems efficiently	○	○	○	○	○
Identify energy-saving automation control strategies	○	○	○	○	○
Evaluate lighting systems, luminaries, and associated components	○	○	○	○	○
Conduct a lighting audit	○	○	○	○	○
Recommend energy-saving strategies for lighting systems	○	○	○	○	○
Other: (please describe)	○	○	○	○	○

Q7 For what technical skills does your organization provide training opportunities? _____

Q8 REPORTING. Please indicate how important each of the following reporting abilities is to your company when hiring:

	Not at all important (1)	Slightly important (2)	Moderately important (3)	Very important (4)	Extremely important (5)
Generate reports from building simulation software	○	○	○	○	○
Present energy simulation results to decision makers	○	○	○	○	○
Audit report writing	○	○	○	○	○
Present energy accounting information to decision makers	○	○	○	○	○
Prepare written economic analysis reports	○	○	○	○	○
Write a lighting energy audit report	○	○	○	○	○

Q9 For what reporting skills does your organization provide training opportunities? _____

Q10 KNOWLEDGE. Please indicate how important each of the following knowledge areas is to your company when hiring:

	Not at all important (1)	Slightly important (2)	Moderately important (3)	Very important (4)	Extremely important (5)
Renewable energy technologies and sustainable design practices	○	○	○	○	○
Building mechanical systems including ventilation and air handling, heating, cooling, and lighting component	○	○	○	○	○
Network communication standards (i.e., OSI model, IP protocol, network signal transmission, media, physical and logical topologies, hardware, and typical building automation networks and sub-networks)	○	○	○	○	○
Energy Star program	○	○	○	○	○
Other (please describe):	○	○	○	○	○

Q11 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

Q12 What, if any, other professional skills are important to your company when hiring? _____

Q13 For what professional skills does your organization provide training opportunities? _____

Q14 What other skills should colleges help students to develop to best prepare for roles in the energy management industry? _____

Q15 For what roles does your company hire job candidates that use the above competencies? _____

Q16 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?

- o Yes
- o No

Q17 With what educational institutions are you connected? _____