DELAWARE’S ENERGY INDUSTRY LABOR MARKET LANDSCAPE

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**Mission:** The Center for Industry Research & Workforce Alignment, in close partnership with local businesses, government, and academia, delivers future-focused labor-market data and workforce information enabling educational institutions to make proactive and flexible decisions in response to the evolving workforce needs of Delaware's competitive industries.

**Vision:** The Center for Industry Research & Workforce Alignment strives to be Delaware's key source of labor-market insight to enable educational institutions to better align their program and training resources to meet the skill demands of business and industry.

**Acknowledgements**

The Center for Industry Research & Workforce Alignment would like to recognize the individuals listed below. Their leadership and guidance throughout the creation and start-up of CIRWA has been invaluable. Their shared commitment to accurate, reliable labor-market intelligence and workforce excellence will ensure that CIRWA is successful in better informing and aligning Delaware Tech's educational offerings to meet our industries' changing needs.

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CIRWA would also like to recognize and thank the more than 40 businesspersons, researchers, and government leaders whose support and guidance throughout the development of this report was critical to its successful completion. Their expertise, commitment, and continuous feedback is appreciated and valued. For a complete list of individuals that contributed to this study, please see Appendix A.

Lastly, CIRWA would like to thank the many Delaware Technical Community College faculty and staff that assisted with or participated in the development of this study.
Executive Summary

In 2011, Delaware Technical Community College established the Center for Industry Research and Workforce Alignment (CIRWA) in an effort to better connect the college to local businesses, government, and fellow educators. These connections were meant to ensure alignment of educational programs with current and future workforce needs and identify emerging occupations requiring 2-year technical degrees or short-term training for specialty skills. Delaware Tech’s growing interest in the State’s energy sector led to CIRWA’s pilot study, a high-level assessment of Delaware’s energy landscape, which seeks to address the following questions:

- How are the various segments in Delaware’s energy market broken down and defined?
- Which segments are growing and which are declining from both an economic and workforce perspective?
- What are the economic and workforce trends affecting market growth and development?
- Where/What are the emerging/changing occupations?
- What can Delaware Tech and other educational providers do to ensure current workforce needs are met and programs are developed to successfully address future workforce needs?

The vast nature of Delaware's energy market makes identifying and addressing workforce needs and emerging opportunities challenging. The following study examines Delaware’s current energy market and identifies growing and changing opportunities in some of the state’s most complex energy subsectors. The study reveals several trends currently affecting and driving the market and provides recommendations for addressing the complex challenges businesses and workers face as this dynamic industry continues to advance.

Findings from this study were determined based on interviews with more than 40 Delaware energy leaders. These interviewees were a combination of industry service providers and equipment manufacturers, energy researchers, and government and economic development leaders. Twenty-three of the individuals interviewed were industry employers and represent both small and large companies all throughout Delaware. Their input, combined with pre-existing and real-time labor-market data, provides the foundation for all findings and recommendations outlined in this report.

Study Conclusions

Based on several key trends and findings from our research and interviews, three broad conclusions were drawn from this study. These conclusions are comprehensive of both economic and workforce trends and are addressed more in-depth in the body of this study.

1. The most near-term potential for economic and job growth within Delaware’s energy industry lies within its energy efficiency/management sector for public-sector commercial buildings. This segment, more so than energy generation & distribution or alternative/renewable energy technologies, provides the opportunity for Delawareans to secure short-term, technical training leading to family-sustaining wage jobs with the possibility to advance up a career ladder.
Supportive Trends/Findings:

- Delaware has largely divested itself from energy generation. While many surrounding states are seeing significant job creation in the natural gas drilling sector due to the Marcellus Shale, that job growth has not propagated into Delaware.

- The record low prices of natural gas are significantly reducing the demand for alternative and renewable energy sources across the state. All sectors of end users are quickly making the switch to natural gas-fueled systems to take advantage of low rates.

- The volatility of Delaware’s alternative energy market makes workforce training and program development very challenging. Competing policy mandates and incentive programs, high-cost alternative/renewable energy sources versus traditional fuel sources, and technological setbacks related to reliability and availability are hindering the growth of this market in Delaware. Changes in any of these dynamics could stimulate demand.

- The industry is choosing in-house, incumbent worker training in energy efficiency concepts and principles more so than creating new positions or hiring new personnel. New responsibilities related to energy efficiency and building operations are being added to incumbent worker job descriptions.

- The municipals, universities, school districts, and hospitals (MUSH) sector in Delaware is the primary market for large-scale energy efficiency projects. Unlike the private sector, these public and quasi-public entities are in a position to be able to recognize cost-savings over long periods of time, usually 10-12 years.

- Several large scale commercial companies and multi-facility employers expressed difficulty finding expertise in commercial HVAC systems, particularly troubleshooting digital controls and building automation. Currently, Delaware Tech only provides customized, company-specific training in the commercial sector.

2. Delaware’s energy sector, similar to the rest of the nation, is becoming increasingly technological and digitized as highly-intelligent and communicative energy operating systems are being integrated into traditional electrical and mechanical infrastructures. There is a growing need for workers with a baseline understanding of engineering technology, system integration (heating, cooling, ventilation, plumbing, electricity, etc.) and operational cause and effect of energy efficient processes and strategies.

Supportive Trends/Findings:

- Analysis of job vacancies posted online for Delaware’s energy efficiency sector supports a need for professional mechanical and electrical engineers and six of the employers we spoke with confirmed a future need for electro-mechanical engineering technologists in this industry.

- Specialty skill sets such as IT networking, evaluation, measurement, and verification of energy use, and building operation and commissioning are in high demand due to the growth of performance-based contracting to comply with energy policy mandates.
Specialty certifications and relevant work experience are becoming a requirement for hire given the competitive labor market and increasing complexity of the energy industry.

Building Automation Systems (BAS) and Building Operations are two specialty certifications quickly gaining momentum in Delaware.

3. **Currently, the labor market for 2-year technical degrees within this sector is not highly-recognized or well defined. Today's labor force is primarily comprised of 4-year professional engineers and individuals with little to no post-secondary education. Right now, the greatest opportunity for 2-year graduates lies within the building/construction and maintenance repair subsectors of Delaware’s energy market, but our interviewees revealed that there may be an emerging opportunity for engineering technicians within this field.**

**Supportive Trends/Findings:**

- Analysis of job vacancies posted online for Delaware’s energy efficiency sector revealed that only 1% of postings call for a 2-year technical degree (see Appendix B). The majority call for a bachelor's degree (77%) or a high school diploma (22%). Jobs requiring a post-graduate degree were not analyzed.

- Many employers are unaware of curricula components available through Delaware Tech's program offerings. While employers may be aware a program exists, many are surprised to discover the range of competencies graduates possess and admit that a successful graduate could add value to their company.

- Factors such as a flooded, highly-qualified labor pool and the increasing technological nature of the industry have led to companies hiring mainly 4-year engineers rather than 2-year technicians. Companies admit that this trend is the “status quo” and the complex nature of some aspects of this work requires a conceptual and theoretical understanding of system components.

- Employers offered that there is unrecognized value in utilizing the hands-on, practical skills of a 2-year graduate to supplement the expertise of professional engineers to reduce overhead costs and maximize efficiency in the workplace.

**Recommendations for Delaware Tech**

The Center for Industry Research & Workforce Alignment offers the following multi-faceted recommendations to support Delaware Tech's goal of providing responsive, high-quality education and training programs to address the energy industry's changing workforce needs:

1. **Explore expansion and reorganization of mechanical and electrical engineering technology programs to better reflect current and future market needs.**
   This recommendation includes the following strategies:
   a. Identify opportunities to articulate to a nearby 4-year institution to provide an educational pathway to potential students.
b. Further investigate companies’ workforce needs specific to mechanical and electrical engineering technology within this market segment to better inform program reorganization/expansion.

c. Explore how other community colleges have adapted their electrical/mechanical engineering technology programs to increase focus on automation/digital controls and building simulation and integration.

2. **Develop a marketing capability for the energy and engineering technologies programs that includes the following key components:**
   
a. Outreach to industry to better inform them of program offerings and graduate competencies.

b. Collaborate with national energy education leaders and business/industry associations to determine a strategy for “growing the market” for 2-year graduates in Delaware's energy economy.

3. **Explore the possibilities for addressing employers’ commercial HVAC needs as well as specializations such as facility operations and building automation controls**

   Three key strategies to address this recommendation include:
   
a. Conduct additional research to better understand companies’ specific skill needs related to this specialty, supply and demand, and benchmark existing commercial HVAC programs.

b. Evaluate the college’s ability to integrate knowledge of controls, switches, and building automation systems into already-existing HVAC, engineering technician, and energy management programs and the possibility of non-credit courses focused on mastering these specialized skills.

c. Initiate the development of industry-recognized certifications in specialty areas like Building Operations and Building Automation Systems (BAS) to demonstrate the value Delaware Tech can provide in this industry.

4. **Increase focus on improving student readiness for entry into the workforce.**
   
The following strategies aim to prepare new graduates to be successful job-seekers in an energy market currently geared toward 4-year graduates and individuals with significant work experience:
   
a. Prepare students to effectively market themselves to an employer through effective communication and demonstration of their skills, ability, and value.

b. Increase emphasis on internships, co-ops, and other workplace experiences while students are completing coursework.

c. Ensure all programs and coursework are aligned with relevant certifications and credentialing requirements.

d. Increase access to and availability of certification testing on campus.

e. Develop a strategy for better connecting to/aligning with primary and secondary education to build and strengthen students’ STEM skills at an early age.
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Introduction

Created as part of a federal USDOL grant program, CIRWA was established by Delaware Technical Community College as a means of helping Delaware’s educational institutions better connect and align with the state’s ever changing industries and ensure that academic and training programs are designed to meet both the current and future workforce needs of local employers. In its grant proposal, Delaware Tech committed CIRWA’s first study to investigating the State’s growing and complex energy sector. Delaware’s commitment to a clean energy environment and its many energy-related research and workforce training projects made the energy sector a natural choice for CIRWA’s debut study.

On February 17, 2010, Governor Jack A. Markell signed Executive Order 18, committing all of the state’s executive branch agencies to a rigorous set of energy efficiency standards focused on reducing overall electricity and fuel consumption 30% by 2015, increasing the use of renewable energy sources for electrical generation 30% by 2013, integrating LEED building design into all construction and renovation practices, and improving recycling procedures.

Not long before E.O. 18, the federal government announced that it would be directing a significant amount of ARRA stimulus funding toward energy efficiency projects and workforce training. As a result of these combined initiatives, local businesses and education and training providers began ramping up for what was predicted to be a boom in sales and distribution of energy-related services and materials. While the economic downturn slowed the momentum and growth of the clean energy market across the country, Delaware's continued focus on achieving the benchmarks outlined in E.O. 18 sought to mitigate the effects of the recession and create a clean energy marketplace ripe for job creation and technological innovation.

The following landscape study outlines Delaware’s current energy industry and provides a snapshot of key market drivers, current and projected employment, economic and workforce trends, as well as skill set and certification needs impacting the industry right now. To assist Delaware Tech and other educational providers with making proactive decisions regarding their credit and non-credit programs, an analysis of the information and data is provided as well as key findings and recommendations for action within the community college system in Delaware.

The information in this report was compiled from one-on-one interviews and phone conversations held with more than 40 of the state’s leading energy experts and business leaders. For a comprehensive list of contributors, please see Appendix A. These conversations provide the basis for the much of the qualitative data and findings outlined throughout the report. In addition, all findings and study outcomes are supported by labor-market data and statistics issued by EMSI (Economic Modeling Specialists Intl.) within the last 3 months. Occupational and projection data is provided by the Bureau of Labor Statistics and O*Net to support arguments for specific occupational needs throughout the region. Labor Insight/Burning Glass was used to identify current trends of online job posting data (Appendix B).

Overview of Delaware’s Energy Marketplace

Delaware's current energy market (excluding transportation) can be divided into three overlapping, but distinct market segments: Energy Generation and Distribution, Alternative Energy Technologies, and Energy Efficiency and Management. Each of these segments presents a very different set of economic and workforce opportunities.
Energy Generation and Distribution - Given that Delaware has largely divested itself from energy generation, the majority of the potential for job growth in this sector falls within transport and distribution. Due to the dramatic drop in natural gas prices across the county and the new technological capabilities of smart meters, this market segment is experiencing significant change. The Marcellus Shale Natural Gas Play provides job opportunities in energy generation, but only for Delaware’s neighboring states which are gas-rich geographical areas. Unfortunately, this job growth does not propagate down the energy value chain. Therefore, while the boom of natural gas has significantly impacted the energy source mix in Delaware, its impact on job creation and growth within the energy generation sector in the state has not been significant.

Smart meters, net metering, and the enhanced potential for peak load management is a growing trend in the distribution market, but must be evaluated more in-depth for job growth potential given the widely expanding market for natural gas. Current information suggests that while we may not see significant job growth in this market segment, these jobs will require a much deeper understanding of information technology (IT) integration with current mechanical and electrical systems. One of the major challenges the industry currently faces is how it will replace its aging workforce with one of increased technological skill and ability.

On the Horizon: This segment will experience a large number of retirements within the next 5 to 10 years. The replacement workforce will need a more advanced, computer-based skill set to reflect the increasingly technological and digital nature of the utilities industry. This could result in an opportunity for Delaware Tech to provide short-term specialty training courses for incumbent workers needed to replace retirees.

Alternative Energy Technologies - Most alternative energy technologies present in Delaware’s energy market, with the exception of solar, remain in the research or market development stages. They still require significant technological advancement to make them economically feasible and their viability in the market depends almost entirely on government subsidies and incentives. The workforce opportunities in this segment tend to be either cyclical in nature – providing work for only a few months at a time – or are very technologically advanced, requiring a graduate or doctoral degree.

The exception to this is the state’s solar market which, with a few key socio-political developments, could potentially create significant job openings for 2-year technicians and sales professionals. The viability of Delaware’s solar industry currently depends on a number of key factors. Conversations with 6 industry leaders, including 4 solar energy experts, suggest that any of the factors listed below have the potential to significantly impact the solar market at any time:

- Legislation expanding the variety of energy sources allowable to meet the benchmarks outlined in the state’s Renewable Energy Portfolio Standard (REPS) or permitting energy conservation to substitute for use of renewable energy;
- The industry’s degree of organization and strategic planning relative to anticipating the availability of additional Solar Renewable Energy Credits (SRECs) in 2016;
- Increased government support by way of more substantial subsidy and incentive programs; or
• Increased education on energy use and behaviors that would include more accessible and informational programs to help users understand their energy use and how it affects not only their bottom line, but also general rate structures and the environment.

Solar industry experts we spoke with agree that the solar market is extremely difficult to predict, particularly from a workforce perspective, because it is so dependent on the factors previously listed and because solar growth tends to occur in 2 to 3 year cycles. Schools are typically unable to develop programs and produce graduates in enough time to meet industry needs while the market is booming. Businesses active in Delaware’s solar market do not anticipate any large scale job creation or growth within this sector until at least 2015, but warn that this anticipated growth will likely only occur if legislation and supportive subsidy and incentive programs exist to assist with market development.

**On the Horizon:** Alternative energy markets are very regional and highly-responsive to government support programs. In Delaware, policy focused on low-cost natural gas has significantly reduced the local market for applications of alternative technologies such as solar. Delaware Tech should continue to closely monitor energy policy, government mandates, technological advancements, and pricing while maintaining strong relationships with solar providers in the event that policy changes occur. In addition, CIRWA recognizes and will continue to track regional development of the hydrogen fuel cell, wind power, electric vehicle & vehicle-to-grid, and biomass subsectors of alternative/renewable energy technology.

**Energy Efficiency and Management** – Despite being heavily driven by government subsidy and incentive programs, regulations, and mandates such as the Energy Efficiency Resource Standards (EERS), this segment unarguably presents the most robust opportunity for job growth and workforce development in Delaware's energy labor market right now. This market segment is very complex and still not well defined in terms of job titles, career ladders, or industry standards. However, it is the area that our sources agree will continue to grow as business and industry continually evaluate ways to cut energy costs and upgrade outdated equipment and systems. In addition, the need for building managers and operators that can effectively maintain and troubleshoot these technologies is a rapidly growing need for facilities statewide.

While Delaware’s energy efficiency and management segment may not be highly organized yet, there are identifiable trends that enable CIRWA to focus in on specific services and providers that are currently driving this market. Our conversations with 23 industry leaders and businesses in this sector throughout the state revealed that commercial public and quasi-public real-estate is the primary target for most medium- and large-scale energy efficiency projects carried out by energy services companies, “ESCOs”. In addition, Delaware’s energy efficiency and management labor market is currently driven by traditional job clusters rather than newly established job clusters focused exclusively on clean energy and efficiency. As opposed to establishing entirely new business models and labor forces, engineering, building materials, and construction firms have instead integrated energy efficiency principles and concepts into their already-existing business models and practices. This enables businesses to have the expertise and capacity to meet market demand when it gains momentum, but also allows for flexibility if or when the market declines.

In-depth interviews with five major ESCOs and value chain employers in Delaware revealed that there is a consistent project model used by these companies. This model offers a variety of employment opportunities throughout phases of a typical large-scale project. This model is provided on the next page.
The variety of occupational opportunities encompassed within the model above can be classified into three broad categories: Engineering and Engineering Technology, Skilled Trades, and Specialty Certifications. Opportunities for Delaware Tech to provide 2-year and short-term, specialty training are highlighted in green font. While many of these occupations are typically categorized into other industry clusters besides energy, a niche opportunity lies in Delaware Tech’s ability to create a highly-skilled workforce trained in energy efficiency principles rather than just the traditional skill sets. Given the degree of opportunity identified above, the next two sections of this landscape study focus on Delaware’s energy efficiency and management subsector of the energy industry an effort to gain perspective on what the state’s current labor force looks like, what trends are affecting market growth and development, and where Delaware Tech can take action now to ensure current and future workforce needs are met.
**Defining Delaware’s Energy Efficiency Labor Market**

A 2011 study conducted by the University of Delaware found that 8.5% of Delaware business establishments produce “green” goods or offer “green” services. These companies employ approximately 16,250 persons in the state, or approximately 4.2% of the state’s workforce. The majority of these businesses are classified in construction or the professional and technical services industries and offer services related to efficiency. For the purposes of this study, CIRWA defined Delaware’s energy efficiency/management sector as inclusive of the following occupations:

<table>
<thead>
<tr>
<th>Job Title</th>
<th>O*Net – SOC Code</th>
</tr>
</thead>
<tbody>
<tr>
<td>General and operations managers (commercial and industrial facilities)</td>
<td>11-1021.00</td>
</tr>
<tr>
<td>Methane/Landfill Gas Collection Systems Operators</td>
<td>11-3051.05</td>
</tr>
<tr>
<td>Construction Managers</td>
<td>11-9021.00</td>
</tr>
<tr>
<td>Compliance Managers</td>
<td>11-9199.02</td>
</tr>
<tr>
<td>Supply Chain Managers</td>
<td>11-9199.04</td>
</tr>
<tr>
<td>Energy Auditors</td>
<td>13-1199.01</td>
</tr>
<tr>
<td>Chemical Engineers</td>
<td>17-2041.00</td>
</tr>
<tr>
<td>Mechanical Engineers</td>
<td>17-2141.00</td>
</tr>
<tr>
<td>Electrical Engineers</td>
<td>17-2071.00</td>
</tr>
<tr>
<td>Energy Engineers</td>
<td>17-2199.03</td>
</tr>
<tr>
<td>Solar Energy Systems Engineers</td>
<td>17-2199.11</td>
</tr>
<tr>
<td>Mechanical Engineering Technicians</td>
<td>17-3027.00</td>
</tr>
<tr>
<td>Electrical Engineering Technicians</td>
<td>17-3023.03</td>
</tr>
<tr>
<td>Mechanical Engineering Technologists</td>
<td>17-3029.07</td>
</tr>
<tr>
<td>Electrical Engineering Technologists</td>
<td>17-3029.02</td>
</tr>
<tr>
<td>Energy Brokers</td>
<td>41-3099.01</td>
</tr>
<tr>
<td>Solar Sales Representatives and Assessors</td>
<td>41-4011.07</td>
</tr>
<tr>
<td>Boilermakers</td>
<td>47-2011.00</td>
</tr>
<tr>
<td>Electricians</td>
<td>47-2111.00</td>
</tr>
<tr>
<td>Insulation Workers, Floor, Ceiling, and Wall</td>
<td>47-2131.00</td>
</tr>
<tr>
<td>Pipe Fitters and Steamfitters</td>
<td>47-2152.01</td>
</tr>
<tr>
<td>Solar Photovoltaic Installers</td>
<td>47-2231.00</td>
</tr>
<tr>
<td>Construction and Building Inspectors</td>
<td>47-4011.00</td>
</tr>
<tr>
<td>Weatherization Installers and Technicians</td>
<td>47-4099.03</td>
</tr>
<tr>
<td>HVAC Mechanics &amp; Installers</td>
<td>49-9021.01</td>
</tr>
<tr>
<td>Refrigeration Mechanics &amp; Installers</td>
<td>49-9021.02</td>
</tr>
<tr>
<td>Electrical Power-Line Installers and Repairers</td>
<td>49-9051.00</td>
</tr>
<tr>
<td>Maintenance &amp; Repair Workers (commercial and industrial systems)</td>
<td>49-9071.00</td>
</tr>
<tr>
<td>Power Distribution and Dispatchers</td>
<td>51-8012.00</td>
</tr>
<tr>
<td>Stationary Engineers and Boiler Operators</td>
<td>51-8021.00</td>
</tr>
<tr>
<td>Methane/Landfill Gas Generation Systems Technicians</td>
<td>51-8099.02</td>
</tr>
</tbody>
</table>

The occupations listed above were chosen for inclusion in this study based the O*Net Green Economy Sector Occupations List for Energy Efficiency and Green Construction. A number of occupations were not included based on the parameters of this study and regional definitions of energy efficiency-related occupations. While skills data for all of these occupations exists in O*Net, labor-market data remains difficult to capture because several of them have not yet been coded by the U.S. Bureau of Labor Statistics.

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1 Energy, the Environment, and Delaware Jobs, University of Delaware Center for Applied Demography and Survey Research, 2011.
Current and Projected Employment for Delaware’s Energy Efficiency Sector

Current and projected employment data was gathered using EMSI, an economic modeling labor-market tool with the ability to produce current and reliable data and projections. It does not include occupations listed on the previous page that have not yet been coded by the U.S. Bureau of Labor Statistics (BLS). The chart below provides current employment, growth projections, and replacement data through 2018 for those occupations that have been recognized by BLS and have established SOC (Standard Occupational Classification) codes. Occupations shown to have the highest combination of openings and growth over the next six years have been highlighted.

**Figure 2. Current and Projected Employment for Delaware’s Energy Efficiency Sector (Dec 2012)**

<table>
<thead>
<tr>
<th>Description</th>
<th>2012 Jobs</th>
<th>2018 Jobs</th>
<th># Jobs Gained/Lost</th>
<th>% Job Gain/Loss</th>
<th>Replacement Jobs</th>
<th>6 yr. Replacement Rate, %</th>
<th>Total # of Openings</th>
<th>Annual Openings</th>
<th>Education Level</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chemical Engineers</td>
<td>513</td>
<td>463</td>
<td>(50)</td>
<td>(10%)</td>
<td>105</td>
<td>20%</td>
<td>105</td>
<td>17</td>
<td>Bachelor’s degree</td>
</tr>
<tr>
<td>Electrical Engineers</td>
<td>495</td>
<td>511</td>
<td>16</td>
<td>3%</td>
<td>75</td>
<td>15%</td>
<td>91</td>
<td>15</td>
<td>Bachelor’s degree</td>
</tr>
<tr>
<td>Mechanical Engineers</td>
<td>636</td>
<td>649</td>
<td>13</td>
<td>2%</td>
<td>137</td>
<td>22%</td>
<td>150</td>
<td>25</td>
<td>Bachelor’s degree</td>
</tr>
<tr>
<td>Electrical and Electronics Engineering Technicians</td>
<td>251</td>
<td>269</td>
<td>18</td>
<td>7%</td>
<td>29</td>
<td>12%</td>
<td>47</td>
<td>8</td>
<td>Associate’s degree</td>
</tr>
<tr>
<td>Mechanical Engineering Technicians</td>
<td>149</td>
<td>142</td>
<td>(7)</td>
<td>(5%)</td>
<td>20</td>
<td>13%</td>
<td>20</td>
<td>3</td>
<td>Associate’s degree</td>
</tr>
<tr>
<td>Sales Reps, Wholesale and Manufacturing Technical and Scientific Products</td>
<td>1,380</td>
<td>1,495</td>
<td>115</td>
<td>8%</td>
<td>197</td>
<td>14%</td>
<td>312</td>
<td>52</td>
<td>Bachelor’s degree</td>
</tr>
<tr>
<td>Boilermakers</td>
<td>39</td>
<td>44</td>
<td>5</td>
<td>13%</td>
<td>10</td>
<td>26%</td>
<td>15</td>
<td>2</td>
<td>Long-term OJT</td>
</tr>
<tr>
<td>Electricians</td>
<td>1,914</td>
<td>2,159</td>
<td>245</td>
<td>13%</td>
<td>309</td>
<td>16%</td>
<td>554</td>
<td>92</td>
<td>Long-term OJT</td>
</tr>
<tr>
<td>Insulation Workers, Floor, Ceiling, and Wall</td>
<td>100</td>
<td>97</td>
<td>(3)</td>
<td>(3%)</td>
<td>40</td>
<td>40%</td>
<td>40</td>
<td>7</td>
<td>Short-term OJT</td>
</tr>
<tr>
<td>Plumbers, Pipefitters, and Steamfitters</td>
<td>1,858</td>
<td>2,122</td>
<td>264</td>
<td>14%</td>
<td>322</td>
<td>17%</td>
<td>586</td>
<td>98</td>
<td>Long-term OJT</td>
</tr>
<tr>
<td>Construction and Building Inspectors</td>
<td>442</td>
<td>465</td>
<td>23</td>
<td>5%</td>
<td>78</td>
<td>18%</td>
<td>101</td>
<td>17</td>
<td>Relevant Work Experience</td>
</tr>
<tr>
<td>Heating, Air Conditioning, and Refrigeration Mechanics and Installers</td>
<td>1,093</td>
<td>1,297</td>
<td>204</td>
<td>19%</td>
<td>116</td>
<td>11%</td>
<td>320</td>
<td>53</td>
<td>Postsecondary non-degree award</td>
</tr>
<tr>
<td>Electrical Power-Line Installers and Repairers</td>
<td>363</td>
<td>334</td>
<td>(29)</td>
<td>(8%)</td>
<td>83</td>
<td>23%</td>
<td>83</td>
<td>14</td>
<td>Long-term OJT</td>
</tr>
<tr>
<td>Maintenance and Repair Workers, General</td>
<td>3,373</td>
<td>3,620</td>
<td>247</td>
<td>7%</td>
<td>372</td>
<td>11%</td>
<td>619</td>
<td>103</td>
<td>Moderate-term OJT</td>
</tr>
<tr>
<td>Power Distributors and Dispatchers</td>
<td>36</td>
<td>33</td>
<td>(3)</td>
<td>(8%)</td>
<td>8</td>
<td>22%</td>
<td>8</td>
<td>1</td>
<td>Long-term OJT</td>
</tr>
<tr>
<td>Stationary Engineers and Boiler Operators</td>
<td>45</td>
<td>51</td>
<td>6</td>
<td>13%</td>
<td>6</td>
<td>13%</td>
<td>12</td>
<td>2</td>
<td>Long-term OJT</td>
</tr>
<tr>
<td>Plant and System Operators, All Other</td>
<td>18</td>
<td>20</td>
<td>2</td>
<td>11%</td>
<td>4</td>
<td>22%</td>
<td>6</td>
<td>1</td>
<td>Long-term OJT</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>12,705</strong></td>
<td><strong>13,771</strong></td>
<td><strong>1,066</strong></td>
<td><strong>8%</strong></td>
<td><strong>1,911</strong></td>
<td><strong>15%</strong></td>
<td><strong>3,067</strong></td>
<td><strong>511</strong></td>
<td></td>
</tr>
</tbody>
</table>

Source: EMSI Complete Employment 2012.Q4
The chart below provides a county-based breakdown of the 17 occupations identified in Figure 2. In addition, annual openings and hourly wage data are provided for comparison purposes.

**Figure 3. County Breakdown of Energy Efficiency Occupations for Delaware (Dec 2012)**

<table>
<thead>
<tr>
<th>County Name</th>
<th>2012 Jobs</th>
<th>2018 Jobs</th>
<th># Change</th>
<th>2012 Annual Openings</th>
<th>Median Hourly Earnings</th>
<th>2012 National Location Quotient²</th>
</tr>
</thead>
<tbody>
<tr>
<td>New Castle</td>
<td>9,123</td>
<td>9,720</td>
<td>597</td>
<td>320</td>
<td>$28.07</td>
<td>1.11</td>
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<tr>
<td>Sussex</td>
<td>2,195</td>
<td>2,480</td>
<td>285</td>
<td>97</td>
<td>$19.65</td>
<td>0.96</td>
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<tr>
<td>Kent</td>
<td>1,387</td>
<td>1,571</td>
<td>184</td>
<td>67</td>
<td>$21.21</td>
<td>0.70</td>
</tr>
<tr>
<td>TOTAL</td>
<td>12,705</td>
<td>13,771</td>
<td>1066</td>
<td>485</td>
<td>$25.87</td>
<td></td>
</tr>
</tbody>
</table>

Source: EMSI Complete Employment 2012.Q4

As shown in the data on the previous page, most of the occupations projected to experience significant job growth and annual openings are in traditional trades such as maintenance and repair, HVAC installation and maintenance, electricians, and plumbers, pipefitters and steamfitters. This data demonstrates that the majority of job growth in this sector will occur at the 2-year degree and certificate level and also supports the trend of integrating energy efficiency principles into already existing jobs, which is explored later in this study. In our interviews with approximately 23 employers and business leaders throughout the state, 20 of them voiced that IT, building operation, controls and automation, and systems integration are now becoming critical job functions for these trade-related occupations, making improved education and training in these concentrations an important area of focus for Delaware Tech. The next section outlines additional trends currently influencing Delaware’s energy labor market.

**Trends Impacting Delaware’s Energy Labor Market**

- Delaware’s large energy efficiency service providers are hiring primarily 4-year graduates and professional engineers.

Real-time labor market data of online job posting for Delaware (Appendix B) indicates that 4-year mechanical and electrical engineers are currently the two most in-demand occupations for the energy efficiency sector as well as Professional Engineering certifications. Our conversations with five of the leading large-scale energy services companies in the state revealed that this is an industry that traditionally hires bachelor’s prepared individuals. However, when asked if they felt that there are aspects of their engineers’ daily job functions that could be done by engineering technicians, all five of them responded ‘yes’. In addition, representatives from three ESCOs explained that they feel two critical skills that their new-hire engineers lack are hands-on, practical experience that 2-year graduates possess and an understanding of basic energy efficiency principles. They explained that most engineers and project managers come on board with the theoretical knowledge of engineering, but must be given supplemental training on concepts of energy efficiency and application prior to working in the field.

² National location quotient is a calculation of the degree of concentration for an industry, occupation, or group of occupations for a specific region in comparison to the rest of the nation. A location quotient greater than 1.0 demonstrates a concentration above the national average.
The ESCO project model on page 12 identifies a number of job opportunities for Delaware Tech graduates within the scope of a typical large-scale energy efficiency project. Most of the opportunities fall into the building/construction and maintenance repair sectors of the model. However, there is a very real, yet still underutilized, opportunity for companies to recognize cost savings by supplementing their existing engineering workforce with mechanical and electrical engineering technicians throughout the planning and development stages of a project.

➢ **The industry is choosing in-house, incumbent worker training in energy efficiency concepts and principles more so than creating new positions or hiring new personnel.**

Several years ago, energy industry associations and research experts across the country attempted to quantify the potential job growth for this emerging industry segment. Today it has become clear that, due to a number of socio-economic factors, there will not be a boom of energy efficiency jobs poised to pull us out of the current recession. Instead, companies are opting to provide in-house training and education to incumbent workers – traditional maintenance personnel and building/facility managers – that are becoming residential experts on building performance and efficiency. Building owners/operators are also opting to contract with energy services companies for highly-specialized services such as energy audits, retrofits and upgrades, and building commissioning to improve building performance. This enables a company to receive energy advice and strategies through regularly scheduled visits without having to hire a dedicated staff person.

This trend underscores the need for incumbent workers to have a clear understanding of how state-of-the-art IT intelligence is now being layered on top of traditional mechanical and electrical systems to enable integration, communication, and automated response to constantly changing environments and situations to optimize energy use.

➢ **Delaware’s commercial “MUSH” sector is the target market for large-scale energy efficiency projects.**

Another important trend that repeatedly emerged during interviews regardless of which segment of the industry the interviewee represented is that Delaware’s primary target for large-scale energy efficiency projects is the commercial “MUSH” (Municipal, University, School District, and Hospital) market. This trend is a result of a number of key factors.

1. Unlike private-sector companies, which often require a return on their investment within 1-3 years, the MUSH market is better positioned financially to recognize cost savings over 10-12 years. This enables performance-based contracting, where ESCOs absorb the initial costs of a project and the customer is able to utilize energy savings over time to pay back the costs. This strategy avoids companies or organizations having to dip into capital budgets for upfront expenditures. It also avoids having to finance these projects through traditional loans, which have become increasingly difficult to obtain since the economic downturn.

2. It is currently not cost effective for energy services companies (large or small) to concentrate on the residential sector. The energy efficiency market for residential real-estate is still very sparse and requires several personnel along the value chain to market,
secure, scope out, install, and maintain a project. Three interviewees representing small energy services and consulting firms confirmed that it often requires the same number of individuals to complete a residential project as it does to complete a small-scale commercial project, but the profit is much greater with the latter.

3. **Industrial energy efficiency projects often require in-depth assessments and audits of process-based operations, meaning a company must shut down operations for a significant period of time.** This is not a viable option for many industrial facilities where hours of shut down time can mean thousands or even millions of dollars in profit losses.

This trend brings to light three critical workforce needs that Delaware is currently struggling with: 1) expertise in commercial HVAC, 2) general maintenance & repair (troubleshooting) for commercial operating systems, and 3) building operations/facilities management. These challenges will be explored more in-depth in later sections of this study.

➢ *Certifications and work experience are becoming a requirement for hire*

The energy industry is unarguably highly technical, highly specialized, and constantly advancing. Because of this, there is a widely growing need for individuals that possess industry-recognized certifications and credentials to perform specific services. The most in-demand certifications vary by employer. When asked to name their most highly sought-after certifications, interviewees representing ESCOs, consulting firms, solar energy, and utilities responded:

- CEM – Certified Energy Manager
- BOC – Building Operations Certification
- CEA – Certified Energy Auditor
- HVAC Certifications (varied specialties)
- BAS Certificate – Building Automation Systems

The trend of requiring specialized certifications in addition to traditional education and training programs is one that is likely to continue according to industry leaders. One employer offered that as building systems continue to become more and more technology-based, workers must be willing to seek continuing education opportunities as they advance through their careers. This need has become essential to a business’s ability to remain competitive in the global marketplace.

Related to the need for specialty certifications, but perhaps more relevant to new graduates seeking work in this industry, is the need for relevant work experience upon applying for a position. As a result of the economic downturn, today’s labor market is flooded with highly qualified individuals unable to find work in their field. Making résumé or job applications stand out among the crowd has become extremely difficult, particularly for associate’s degree graduates competing against bachelor’s degree graduates for the same jobs. However, employers agree that there is one key thing they are looking for in reviewing résumés – prior experience. While, many employers are looking for individuals with at least 5 years of experience, they admit that any type of experience is valuable including internships, co-ops, or part-time jobs while in school. Employers want to see that an individual has had exposure to a workplace setting and can walk on the job the first day and be productive.
Study Findings

➤ Policy and the economic environment greatly influence the momentum of this industry.
State and federal policy is the primary driver for Delaware’s clean and renewable energy economy. It is also one of the most influential factors on labor-market growth and development. Because of energy mandates such as E.O. 18, EERS, and REPS, the overwhelming majority of experts we interviewed agreed that the energy efficiency/energy conservation segment is the one area likely to experience continuing market stabilization and job growth because identifying opportunities for energy conservation and efficiency is a company’s first step in laying out an energy performance strategy prior to exploring alternative or renewable energy sources.

As stated previously in this report, Delaware’s current renewable energy market is driven entirely by state and federal policy mandates. While there is a small market for commercial solar panel installation and a growing interest in hydrogen fuel cells due to the emergence of Bloom Energy in Newark, this segment of the clean energy economy is still struggling to gain momentum and stand on its own. Lawmakers could significantly impact the renewable and efficiency market by taking steps to achieve better strategic alignment of energy policies that currently compete against one another and impede growth and development of specific segments.

➤ There is a lack of awareness about Delaware Tech programs and curricula which is leading to unrecognized market potential for graduates within this industry.
Based on the real-time labor market data collected (Appendix B) and conversations with industry employers, a defined and recognizable market does not exist for 2-year technicians within Delaware’s energy sector. Approximately four of the employers that we interviewed were surprised to discover the wide range of competencies and skills that Delaware Tech’s energy programs encompass. This reveals that while employers may be aware of certain programs offered through the college, they may not be aware of the capabilities of graduates or the value of an associate’s degree in this field. Local companies that have worked with 2-year graduates agree that the skills and abilities of these individuals are most effective when used in conjunction with 4-year engineers for processes such as auditing, assessing, data logging, process improvement, installation, and troubleshooting. As the graduate gains on-the-job experience and conceptual knowledge, he or she is more able to effectively function independently and advance upward along a career pathway within the industry.

➤ Today’s energy and operating systems are highly engineering-based and require both new graduates and incumbent workers to focus on strengthening and expanding their STEM core knowledge and abilities.
The highly technical nature of today’s HVAC and electrical systems requires a new set of skills heavily focused on engineering principles and IT infrastructure, sensors, and controls. It is no longer enough to understand the mechanical or electrical infrastructure of an operating system. The new generation of maintenance mechanics and installers must be able to understand the traditional layers as well as the new technological layer that enables these systems to interface with one another and speak a common language. Because of the added technological aspects of these systems, troubleshooting for solutions to complex issues has become critical for companies that
cannot afford to shut down operations for a significant period of time. It is imperative that technicians and mechanics understand not just the functionality of these systems, but also the conceptual framework so they are able to quickly identify and resolve a variety of operational issues.

- **Workers and training providers should recognize and address the growing need for continuing education and certifications in specialty areas of this industry.**
  
  A significant opportunity exists for training providers and workers to fill the demand for specialty skills and credentials within the energy efficiency industry. As technology becomes more and more computer automated, there is a growing need for individuals with the ability to navigate, operate, repair, and maintain these systems. These skills may be gained through specialized 2- to 3-day training programs offered through community colleges and for-profit training providers or they may require more extensive education such as a certification to perform specific duties. Regardless, these skill sets are a critical need for energy services and supply chain companies dedicated to offering their customers a "one-stop shop" of services and expertise. Some Delaware training providers, such as Delaware Tech, have already taken steps to offer these types of programs to businesses and new graduates and ensure alignment of their curriculum with certifications by engaging industry-led advisory boards for each of their programs.

- **Students should be prepared to effectively demonstrate their value, skills, and abilities to potential employers when entering the job market.**
  
  Given the small degree of awareness of the value of an associate’s degree within this industry, students will have to be prepared to "sell themselves" to potential employers during the job seeking process. This includes a number of critical factors such as:
  
  o Demonstrating practical application of energy efficiency principles;
  
  o Demonstrating and communicating how application of those energy efficiency principles translates to cost savings for the customer;
  
  o Effectively communicating what a student's skills and abilities can provide the employer that other job seekers cannot;
  
  o Recognizing the value of the hands-on experience students gain by choosing to attend an associate's degree program over a bachelor's degree program;
  
  o Providing evidence of previous relevant work experience and examples of work completed;
  
  o Demonstrating the ability to think critically about complex problems and identify cost-effective, practical solutions; and
  
  o Effectively communicating relevant soft skills, technical skills and abilities on résumés and job applications and how to adapt résumés and applications to meet the needs of a variety of employers.
Organization and collaboration around Delaware’s energy industry has lagged, but may be headed in the right direction.

Dissimilar to the health care or manufacturing industries, the energy sector in Delaware has been slow to develop a visible organizing structure and strategy. While there are a number of associations and charters such as ASHRAE (American Society of Heating, Refrigerating and Air-Conditioning Engineers), BOMA (Building Operations Managers Association), and the IFMA (International Facilities Management Association) located in Delaware, these groups have been segmented into industry specialties such as HVAC, Building Operation, Construction, or Solar Energy. Many of the researchers, government, and industry leaders we talked with felt that this lack of organization acts as a barrier to industry-wide collaboration and advocacy around critical legislative, economic, and workforce developments within the region. Recently, however, industry
leaders have taken steps to establish a Delaware chapter of the Energy Services Coalition (ESC), which Delaware Tech is a member of. The ESC is a nationally recognized chapter-based organization that brings together energy services companies, supply chain companies, utilities, end users, training providers, and many others to discuss common challenges, organize public forums, identify economic development opportunities, and strategize how to increase public awareness about the energy industry.

- **This industry is facing some of the same challenges as other industries such as an aging workforce and a lack of general employability skills (soft skills).**

Like so many other technology and trade-based industry sectors, general employability skills are severely lacking within Delaware’s energy efficiency labor market. Aside from successfully passing pre-employment drug screening and a background clearances, these skills include problem solving, critical thinking, conflict management, effective verbal and written communication, punctuality, chain of command, work ethic, and appropriate workplace attire. Businesses cannot emphasize enough how critical these “soft” skills are to providing effective customer service, establishing relationships and trust, and ensuring a safe and productive work environment for all of their employees. One employer stated, “I can have the most talented technician out there, but if he/she can’t write an effective audit report or communicate professionally with the customer, I can’t send them out into the field.” Without the ability to trust personnel to conduct themselves professionally over the phone and in-person and effectively deal with everyday issues that arise, employers find themselves forced to spend more money on hiring and training and unable to grow and expand their bottom line.

Over the next 5-10 years, businesses will continue to experience an exodus of baby-boomers retiring after decades on the job. Delaware is known for being a state that, traditionally, has a very stable workforce where it is not uncommon for workers to spend 25-30 years with the same company. This is particularly true in the utilities and general repair/maintenance sectors of the energy industry. The knowledge and experience of these individuals is irreplaceable despite the industry’s best effort to implement succession planning and other strategies for ensuring a well-prepared workforce to fill the growing gap. Many companies fear that without the skilled workforce to meet their needs, they will need to expand their net for seeking qualified applicants and increase base-pay to attract a wider range of applicants. This would ultimately result in higher costs to consumers for receiving essential services.
Recommendations for Delaware Tech

1. Explore expansion and reorganization of mechanical and electrical engineering technologies programs to better reflect current and future market needs.
   a. Identify opportunities to connect Mechanical Engineering Technology to a nearby 4-year institution.
      Lack of articulation to a 4-year program for mechanical engineering technology is significantly impacting Delaware Tech's ability to recruit talented students, create an educational pathway, and meet the workforce needs of local businesses.

   b. Further investigate specific skill needs for mechanical and electrical engineering technologists in this market.
      o Investigate, on a deeper level, the changing skill needs for businesses that have hired engineering technologists in the past.
      o Identify how changes occurring within the industry will impact future skill needs for this occupation.
      o Identify the variety of industry sectors and subsectors in which these graduates find work in order to ensure a comprehensive review of industry needs.

   c. Explore how other community colleges have adapted their electrical/mechanical engineering technology programs to include increased focus on IT networking and programmable logic controls.
      Identify and connect with other community colleges that have recently reorganized and/or expanded their electrical or mechanical engineering technology programs in an effort to locate successful models and inquire about best practices and lessons learned.

2. Develop a marketing capability for the energy and engineering technologies programs that includes the following key components:
   a. Outreach to industry
      o Organize a strategy for gathering and sharing success stories and best practices to inform employers about the skills and abilities of graduates and demonstrate the capabilities and value of these individuals.
      o Provide employers with strategies for utilizing an associate's degree graduate to supplement and strengthen their already existing workforce.
        ▪ Identify opportunities for cost savings, increased productivity, and business expansion.
        ▪ Identify the “pros” of 2-year graduates versus 4-year graduates such as hands-on practical experience and knowledge of industry-specific equipment, concepts, and principles.

   b. Collaborate with national energy education leaders and business/industry associations to determine a strategy for “growing the market” for 2-year graduates in Delaware’s energy economy.
Delaware is in the beginning stages of establishing an organizational movement that cuts across industry segments and aims to develop an industry-wide strategy for growing the energy market and advancing technology and government policy. Efforts to bring together energy-related businesses, services providers, equipment manufacturers, educators, and supply chain vendors throughout the region are underway. Where possible, Delaware Tech faculty and other education and training providers in the energy field should become involved in the effort to develop and expand this collaborative. These partnerships should seek to identify strategies to grow the market for highly-skilled 2-year graduates by highlighting successful practices and demonstrating the value of these workers to fellow employers. In addition, by combining efforts and ideas in these key areas, the industry is more likely to develop widely-recognized training standards, clear and defined career pathways, and entrepreneurial opportunities for Delaware residents. Delaware Tech is a member of the Energy Services Coalition (ESC) and the Association of Community College Energy and Water Educators (ACCEWE), which are both working to improve awareness.

3. **Focus on meeting the workforce needs related to commercial HVAC as well as specializations such as facility operations and building automation controls.**

Currently Delaware Tech does not offer generalized HVAC education in the commercial segment of the market. In addition, nearly all of the businesses interviewed supported the growing need for short-term training specific to building automation, digital controls, and building operations. CIRWA suggests the following in an effort to address this recommendation:

- Conduct more in-depth research with businesses and services providers in need of commercial HVAC expertise to discuss their current and future workforce needs and industry trends.
- Investigate existing commercial HVAC training programs to gather information related to operating costs, equipment costs, curriculum design, etc.
- Evaluate the college’s ability to either add a commercial HVAC program to course offerings or integrate specific components of commercial systems into Delaware Tech’s already existing HVAC program.
- Increase curriculum focused on controls, networks, and building automation systems and simulation in HVAC, engineering technician, and energy management programs.
- Investigate the possibility of offering non-credit courses focused on mastering these specialized skills. Employers have demonstrated an interest in sending incumbent workers through such a course.
- Make Delaware Tech’s STEM initiatives a priority and ensure that students understand the application and value of these skills in today’s energy labor market.

4. **Increase focus on improving student readiness for entry into the workforce by concentrating on the following key components:**

   a. **Preparing students to effectively market themselves.**

   - Educate students on how to effectively communicate their unique skills.
   - Focus on what information should and should not go on a résumé or a job application relative to specific types of job listings.
o Ensure students understand the wide range and value of their skill set and how those skills can affect a company’s bottom line.

b. Increase emphasis on internships, co-ops, and other workplace experiences while students are completing coursework.
Since internships or co-ops are already a requirement for the energy programs at Delaware Tech, focus should be on ensuring that:
  o Students grasp the importance of fully-applying themselves in these positions in an effort to gain as much knowledge as possible;
  o Students take advantage of every opportunity to network and build relationships while completing their internship/co-op;
  o Students place equal importance on the internship/co-op experience and classroom experience; and
  o Students are able to effectively communicate and evaluate the skills, abilities, and lessons learned throughout their internship/co-op experience.

c. Ensure all programs and coursework are aligned with relevant certifications and credentialing requirements.
Delaware Tech should continue to ensure that program components connect to and align with industry-recognized credentials. Conversations with both small and large business leaders revealed that they favor job seekers with the following:
  o Ability to demonstrate that they meet all or some of the eligibility requirements for industry recognized certifications and continuing education programs;
  o Desire to take certification or licensure exams upon hire or upon completing eligibility requirements; and
  o Demonstrate a commitment to advancing their skill set and becoming a more productive worker throughout their time with the company.

d. Increase access to and availability of certification testing on campus.
In an effort to increase visibility and access to the certifications mentioned throughout this report, where possible, Delaware Tech should investigate the possibility of becoming a recognized provider. This recommendation will require more research and information to identify what opportunities exist for the college and what the provider requirements are.

e. Develop a strategy for better connecting/aligning with primary and secondary education to build and strengthen students’ STEM skills at an early age.
  o Explore efforts to align STEM education along the entire educational pipeline to ensure all strategies are complimentary and supportive of one another.
  o Increase marketing and awareness of Delaware Tech STEM camp offerings and how they can enhance student learning outcomes from primary school through post-secondary education.
Appendix A

CIRWA recognizes and appreciates the following individuals and businesses that contributed to the successful completion of this study:

<table>
<thead>
<tr>
<th>Interviewee</th>
<th>Business/Organization</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bill Andrew</td>
<td>Delaware Electric Cooperative</td>
</tr>
<tr>
<td>Mike Bowman</td>
<td>Delaware Technology Park</td>
</tr>
<tr>
<td>Craig Burton</td>
<td>Motech Americas</td>
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<tr>
<td>Sally Buttner</td>
<td>Energy Transitions Consulting</td>
</tr>
<tr>
<td>John Byrne</td>
<td>University of Delaware - Center for Energy and Environmental Policy</td>
</tr>
<tr>
<td>Phil Cherry</td>
<td>DNREC - Office of Energy &amp; Climate</td>
</tr>
<tr>
<td>Dale Davis</td>
<td>CMI Solar Electric</td>
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<tr>
<td>Tony DePrima</td>
<td>Sustainable Energy Utility</td>
</tr>
<tr>
<td>Shawn Doherty</td>
<td>Seiberlich Trane Energy Services</td>
</tr>
<tr>
<td>Larry Doyle</td>
<td>Honeywell Building Solutions</td>
</tr>
<tr>
<td>Charlie Driggs</td>
<td>Delmarva Power/Pepco Holdings, Inc.</td>
</tr>
<tr>
<td>Roger Ebbing</td>
<td>Lane Community College</td>
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<tr>
<td>Doug Emery</td>
<td>Seiberlich Trane Energy Services</td>
</tr>
<tr>
<td>Keith Goossen</td>
<td>University of Delaware's Industrial Assessment Center</td>
</tr>
<tr>
<td>Don Hall</td>
<td>Delmarva Power/Pepco Holdings, Inc.</td>
</tr>
<tr>
<td>Doug Hicks</td>
<td>Delaware Tech, Owens Campus - Mechanical Engineering Program &amp; Statewide STEM Council representative</td>
</tr>
<tr>
<td>Dave Holleran</td>
<td>Motech Americas</td>
</tr>
<tr>
<td>Gwendolyn Jones</td>
<td>Delaware Workforce Investment Board</td>
</tr>
<tr>
<td>Jerry Kaufman</td>
<td>University of Delaware's Water Resources Agency</td>
</tr>
<tr>
<td>Secretary Ed Kee</td>
<td>Delaware Department of Agriculture</td>
</tr>
<tr>
<td>Wes Killebrew</td>
<td>Honeywell Building Solutions</td>
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<tr>
<td>Mike Klein</td>
<td>University of Delaware's Energy Institute</td>
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<tr>
<td>Howard Krinsky</td>
<td>Delaware Engineering &amp; Design Corporation</td>
</tr>
<tr>
<td>Wayne Leahy</td>
<td>Pepco Energy Services</td>
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<tr>
<td>Secretary Alan Levin</td>
<td>Delaware Office of Economic Development</td>
</tr>
<tr>
<td>George McDowell</td>
<td>Red Clay School District</td>
</tr>
<tr>
<td>Secretary John McMahon</td>
<td>Delaware Department of Labor</td>
</tr>
<tr>
<td>Mark Nielson</td>
<td>Delaware Electric Cooperative</td>
</tr>
<tr>
<td>Ralph Nigro</td>
<td>Applied Energy Group</td>
</tr>
<tr>
<td>Secretary Collin O'Mara</td>
<td>Delaware Department of Natural Resources and Environmental Conservation</td>
</tr>
<tr>
<td>Owens Campus Energy Technologies Advisory Committee, Representing:</td>
<td>Flexara, DE Electric Cooperative, Nanticoke Health Services, M&amp;M Refrigeration, Bay Health, Seaford School District</td>
</tr>
<tr>
<td>Julie Rivest</td>
<td>Pepco Energy Services</td>
</tr>
<tr>
<td>John Roach</td>
<td>Delaware Tech, Owens Campus Energy Programs</td>
</tr>
<tr>
<td>George Sharpley</td>
<td>Delaware Department of Labor - Office of Labor Market Information</td>
</tr>
<tr>
<td>Carolyn Snyder</td>
<td>Formerly of the Delaware Department of Natural Resources and Environmental Conservation, Division of Energy and Climate</td>
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<tr>
<td>Stanton Campus Energy Technologies Advisory Committee, Representing:</td>
<td>Motech Americas, Solar Electric Power Association, Energy Transition Counseling, Seiberlich Trane, Pepco Holdings, Solar Dock, Red Clay School District, Christiana Hospital, Heliothermal</td>
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<tr>
<td>Gary Stockbridge</td>
<td>Delmarva Power</td>
</tr>
<tr>
<td>Terry Campus Energy Technologies Advisory Committee, Representing:</td>
<td>Honeywell, Pepco Energy Services, State of DE, Chesapeake Utilities, Seiberlich Trane</td>
</tr>
<tr>
<td>Steve Thompson</td>
<td>Chesapeake Utilities Corporation</td>
</tr>
<tr>
<td>Jeff Tietbohl</td>
<td>Chesapeake Utilities Corporation</td>
</tr>
<tr>
<td>Jeremy Tucker</td>
<td>Delaware Electric Cooperative</td>
</tr>
<tr>
<td>Hilary Valentine</td>
<td>Delaware Tech, Owens Campus Energy Programs</td>
</tr>
<tr>
<td>Jim Waddington</td>
<td>Kent County Economic Development Office</td>
</tr>
<tr>
<td>David Weir</td>
<td>University of Delaware's Office of Entrepreneurship &amp; Innovative Partnership</td>
</tr>
</tbody>
</table>
Appendix B

Summary of Real-Time Online Job Postings for Delaware’s Energy Efficiency Sector

Using patented technology, Labor Insight/Burning Glass aggregates, extracts, codes, and normalizes job data from more than 17,000 online job boards, newspapers, employers, and other websites. The database provides as accurate a representation as possible of the full scope of advertised labor demand on a local, statewide or national basis.

Real-time labor market data, specific to Delaware, for occupations requiring knowledge of or experience with energy efficiency systems, equipment, or technologies is displayed below. It is important to remember that while this tool provides a snapshot of current job posting metrics, it is not meant to serve as representative of local demand. This data is limited to web-based, self-reported information. There is very a small percentage of duplication due to the same job notice being posted on multiple websites; however, the tool does eliminate a large percentage of this occurrence. For the purposes of this study, job postings requiring a graduate degree were excluded. The data below represents online job postings for Delaware’s three counties and is aggregated for a time period covering Nov. 2011 through Nov. 2012.

**Top 15 Occupations by Job Advertisements for Delaware (Nov 2011 - Nov 2012)**

<table>
<thead>
<tr>
<th>Occupation</th>
<th>Job Postings</th>
<th>Occupation</th>
<th>Job Postings</th>
</tr>
</thead>
<tbody>
<tr>
<td>1) Mechanical Engineers</td>
<td>22</td>
<td>9) Retail Salespersons</td>
<td>5</td>
</tr>
<tr>
<td>2) Electrical Engineers</td>
<td>17</td>
<td>10) Computer Programmers</td>
<td>5</td>
</tr>
<tr>
<td>4) General &amp; Operations Managers</td>
<td>13</td>
<td>12) Software Developers, Applications</td>
<td>5</td>
</tr>
<tr>
<td>5) Administrative Services Managers</td>
<td>12</td>
<td>13) Technical Directors/Managers</td>
<td>4</td>
</tr>
<tr>
<td>6) Information Technology Project Managers</td>
<td>11</td>
<td>14) Business Operations Specialists, All Other</td>
<td>4</td>
</tr>
<tr>
<td>7) First-Line Supervisors of Office &amp; Administrative Support Workers</td>
<td>9</td>
<td>15) Production Workers, All Other</td>
<td>4</td>
</tr>
<tr>
<td>8) Heating &amp; Air Conditioning Mechanics and Installers</td>
<td>8</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Source: Labor Insight/Burning Glass, 2012, Compiled by California Centers of Excellence

The table above represents the most frequently posted job titles over the past year for positions posted online. In alignment with study findings, the highest demand is for 4-year mechanical and electrical engineers with general maintenance & repair, and operations managers following closely behind. It is important to remember that these occupational job titles do not line up directly with program offerings provided by Delaware Tech. However, these tables can be considered an indicator of general hiring trends for the energy efficiency labor market in Delaware.
Top 10 Employers with the Most Job Postings in Delaware (Nov 2011 – Nov 2012)

1) Sargent Lundy, LLC (17)
2) Chesapeake Utilities Corporation (9)
3) General Electric Company (7)
4) Pepco Holdings Incorporated (7)
5) E.I. Du Pont Nemours and Company (6)
6) Tetra Technical Incorporated (6)
7) Sodexo (5)
8) Solarcity (5)
9) Christiana Care (3)
10) ABM Industries Incorporated (3)

The above-listed companies were found to have the highest number of energy efficiency-related job postings for Delaware for the period indicated. Note: Not all companies choose to report their company name when posting a position. Therefore, not all postings are captured in this figure.

Source: Labor Insight/Burning Glass, 2012 - Compiled by California Centers of Excellence

The pie chart above demonstrates minimum educational requirements for 142 jobs in which a level was selected by the company posting the vacancy. This chart underscores the finding that there is unrecognized value for an associate’s degree within this industry, which is primarily comprised of bachelor’s degree graduates.

Skills in Demand for Energy Efficiency Workforce (Nov 2011 – Nov 2012) (# of job posting references)
Certifications in Demand for Energy Efficiency Workforce (Nov 2011 – Nov 2012)
(# of job posting references)

The preceding two charts demonstrate the most widely sought-after skill sets and certifications by companies seeking workers to address energy efficiency with their organizations. Delaware Tech currently offers many of the certifications listed above including LEED certification for building and construction professionals and LEAN manufacturing courses such as the Six Sigma series.

Source: Labor Insight/Burning Glass, 2012 - Compiled by California Centers of Excellence
Delaware Technical Community College established the Center for Industry Research & Workforce Alignment (CIRWA) in October 2011 as part of a U.S. Department of Labor Trade Adjustment Assistance Community College Career Training Grant.

For more information about CIRWA, please visit our website at:

www.dtcc.edu/cirwa

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