



August 2017

Companion Document to the:  
**Appendix: Labor Market Information  
(LMI) Review**

Delaware Department of Education

## **Labor Market Information (LMI) Instructions & Guidance**

Delaware CTE Program of Study Application

### **The Career Clusters Framework® and Career and Technical Education (CTE) Programs of Study:**

Developing and delivering education and training programs that meet workforce demands has been a nationwide challenge for educators. Employment in a related or narrowly defined occupation is difficult to predict due to changes in student career choices, interest, and course-taking patterns as well as uncertainties in the job market. As a result, a student's career preparation is more likely to result in job placement in a broader context for occupational skills. To help classify these skills, the *Career Clusters Framework®* is used to ensure alignment between CTE *programs of study* and employment opportunities.

The *Career Clusters Framework®* is an occupational coding structure that classifies CTE programs of study under a hierarchy of related career areas called *Career Clusters* and more specific occupational groupings called *Career Pathways*. The framework groups similar occupations into sixteen (16) related areas that represent a segment of the economy and define the technical and academic skills required for career success. These expectations help to group occupation specific education and training programs or *Career Pathways* and assist states and LEAs to work with partnering institutions of higher education to develop *programs of study* or aligned educational programs that bridge secondary and post-secondary instruction. *Programs of study* help students to discover their career interests and choose an educational path that leads to success in high school, opportunities for post-secondary education, and employment. For the list of all *Career Clusters* and their related *Career Pathways* please visit: [www.careertech.org](http://www.careertech.org)

The Carl D. Perkins Career and Technical Education Improvement Act of 2006 calls upon states to create programs of study as sequences of academic and technical coursework that help all students attain a post-secondary degree and/or an industry recognized certificate, credential, or licensure. The title and codes for each *Career Cluster* and *Career Pathway* as it relates to a Delaware program of study can be found in the *Career Clusters Framework - Delaware Program of Study Crosswalk* on the DOE CTE website at: <http://www.doe.k12.de.us/domain/384>.

### **Labor Market Information (LMI) and CTE Programs of Study:**

Career and Technical Education (CTE) programs of study are linked to early career and employment opportunities. Since the economic data system is dynamic, the demands for jobs in specific industry sectors can expand or contract. Changes in the economy which impact state and regional employment opportunities require a continuous re-evaluation of the effectiveness of CTE programs of study for placement of students in gainful employment and post-secondary education. Therefore, labor market supply and demand factors must be analyzed to ensure that CTE programs of study are responsive to the changing workforce needs.

Labor Market Information (LMI) refers to data regarding labor demand and supply, occupational growth, wage projections, regional employment statistics, and short-term employment trends based on job postings. An important component of LMI is the long-term (typically 10-year) employment projections for occupations and industries. Such data help educators make timely changes to their program offerings in order to match changes in regional employment demand and supply. LMI can help students answer questions such as "In which geographic locations can I expect to find employment in my career area?", "What starting wage can I expect to earn?", and "Is my career area within a growing industry?"

**Completing the Labor Market Information (LMI) Review as part of a Program of Study Application:**

This guidance document provides local education agencies (LEAs) with assistance in completing a companion document (*Labor Market Information (LMI) Review*) that is required to be submitted as an appendix to each application for a state-model CTE program of study or a locally developed program of study. The following instructions will reference how to complete each related table in the LMI review tool as well as the suggested methodology that can be applied as LEA staff complete their analysis and responses to the corresponding questions.

**Table 1: LEA Information (Instructions)**

- Use the *Delaware Program of Study Crosswalk* to define the name of the Career Cluster, the related Career Pathway, and the Program of Study title <http://www.doe.k12.de.us/domain/384> and enter the required information;
- Enter the name of the school and LEA; and
- Enter the name of the county.

**Table 1: LEA Information (Example)**

Career Cluster:	Information Technology
Career Pathway:	Programming and Software Development
CTE Program of Study:	Computer Science
High School and LEA Name:	Employment High School, Career Ready School District
County:	Kent County

**Table 2: Labor Market Information (LMI) Benchmarks by Geographic Region (Instructions)**

This data can be found on the Delaware Labor Market Data section of the EDEPS website at <http://edeps.org/CppDeCluster.aspx>.

- There is no additional work that needs to be completed by the LEA; and
- Please review the information below. This background information will assist LEAs in developing responses to questions found under *Table 3: LMI by Career Cluster & Pathway* as well as *Table 4: LMI by Standard Occupation Code (SOC)* within the LMI review tool for programs of study.

**Table 2: LMI Benchmarks by Geographic Region (Example)**

Region	Employment 2015	Employment Change 2014-24	Employment Growth 2014-24	Avg. Wage 2015
United States	137,896,660	9,788,900	6.5%	\$48,320
Delaware	433,840	37,150	8.1%	\$50,300
District of Columbia	676,060	46,040	6.0%	\$80,150
Maryland	2,596,630	504,540	18.2%	\$54,630
New Jersey	3,906,800	275,310	6.5%	\$54,950
Pennsylvania	5,709,480	345,920	5.7%	\$46,550
Virginia	3,682,450	368,050	9.3%	\$51,670

**Table 2: LMI Benchmarks by Geographic Region (Background for LEA Analysis)**

Several high level LMI benchmarks are useful for comparing occupational trends for select occupations. If we know, for example, that the 10-year employment growth rate for the state is 9.4 percent, then we can say that a 14.5 percent employment growth rate is well above average. In order to keep this percentage in perspective, we also need to know the absolute number of projected job openings. This projection indicates whether the existing job opportunities are robust enough to provide a sustainable job growth rate.

Smaller geographic areas tend to have a greater fluctuation in growth rates due to short-term trends. For example, employment growth accelerated in South Dakota due to a boom in the oil fracking industry. Such high growth rates are unlikely to be sustained over a long period. Therefore, employment growth rates over the long-term and for larger geographical entities are more reliable as benchmarks. Comparing Delaware’s growth rate of 9.4 percent with that of a larger entity such as the United States (U.S.) or the Mid-Atlantic indicates that Delaware’s growth rate appears to be sustainable in the long term. Finally, the average wage for the state population helps evaluate regional demand for specific occupations and is a good benchmark for the cost of living in that region and for average wages of specific career clusters.

Other LMI benchmarks for standard geographic regions (country/state/county) are useful for capturing regional variations in employment trends. For example, it is useful to know how Delaware's job growth rate compares with the national rate or with the growth rates of neighboring states. The U.S. and Mid-Atlantic States data provides employment growth and average wages by state. Higher average wages may be a factor of urbanization or cost of living, since urban areas are more likely than predominantly rural areas to have a higher percentage of high-wage occupations. Additionally, at the career pathway level, higher wages in one state or county may be related to the higher cost of living in that region which may increase wages in one area when compared to another. However, all things being equal regional (Mid-Atlantic) comparisons of employment growth rates and wages provide a good starting point to establish state benchmarks for these measures.

**Table 3: LMI by Career Cluster & Pathway (Instructions)**

This data can be found on the Delaware Labor Market Data section of the EDEPS website at (<http://edeps.org/CppDeCluster.aspx>) in the corresponding *Summary Data by Career Clusters* and the *Pathways by Career Cluster* tables:

- Use the *Delaware Program of Study Crosswalk* <http://www.doe.k12.de.us/domain/384> to enter the Cluster Code and Title;
- Use the *Summary Data by Career Clusters* table on the EDEPS website to enter the HS, HW, HD notation and the related LMI at the cluster level;
- Sort the values within the *Summary Data by Career Clusters* table on the EDEPS website and enter the rank of the identified career cluster by related LMI at the cluster level;
- Use the *Delaware Program of Study Crosswalk* <http://www.doe.k12.de.us/domain/384> to enter the Pathway Code and Title;
- Use the *Pathways by Career Cluster* table on the EDEPS website to enter the HS, HW, HD notation and the related LMI for the identified pathway;
- Sort the values within the *Pathways by Career Clusters* table on the EDEPS website and enter the rank of the identified pathway by related LMI at the pathway level;
- Use the *Pathways by Geographic Region* table on the EDEPS website to enter the HS, HW, HD notation and the related LMI for the identified pathway in the Mid-Atlantic region and the United States;
- Use the *Delaware Program of Study Crosswalk* <http://www.doe.k12.de.us/domain/384> to enter the Pathway Code and Title for all pathways found in the cluster;
- Use the *Pathways by Career Cluster* table on the EDEPS website to enter the HS, HW, HD notation and the related LMI for all pathways in the cluster; and
- Please review the information below. This background information will assist LEAs in developing responses to questions found under *Table 3: LMI by Career Cluster & Pathway* within the LMI review tool for programs of study.

**Table 3: LMI by Career Cluster & Pathway (Example)**

(see instructions on page 4, LMI Instructions & Guidance Document)

						2014-2024			
Cluster Code	Cluster/Pathway Title	Middle Skill	High Skill	High Wage	High Demand	Employment 2015	Employment Change 2014-2024	Employment Growth 2014-2024	Average Wage 2015
11	Information Technology Career Cluster		•	•	•	13,262	2,073	15.5%	\$86,953
	Rank Select Career Cluster by the Following Categories ->					(12 of 16)	(8 of 16)	(3 of 16)	(2 of 16)

11.4	Programming and Software Development Pathway – Delaware		•	•	•	8,331	1,279	16.0%	\$94,109
	Rank Select Career Pathway by the Following Categories ->					(1 of 4)	(1 of 4)	(3 of 4)	(1 of 4)
	Programming and Software Development Pathway – Mid-Atlantic States		•	•	•	309,750	66,709	21.7%	\$95,676
	Programming and Software Development Pathway – United States		•	•	•	1,899,340	378,900	20.1%	\$94,767
11.1	Network Systems		•	•	•	2,942	386	12.8%	\$82,613
11.2	Information Support and Services	•		•	•	1,481	344	17.0%	\$57,206
11.3	Web and Digital Communications	•	•	•	•	508	64	18.2%	\$81,440

**Table 3: LMI by Career Cluster & Pathway (Background for LEA Analysis)**

Ten-year employment projections by Career Cluster and Pathway are essential for developing career-driven education and training programs. Specifically, the Federal Bureau of Labor Statistics (BLS) and the Delaware Department of Labor (DDOL) produce industry and occupation forecasts every two years. These long-term trends (labor demand) can be used by industry and educators/trainers to develop effective long-term plans for employment and training programs (labor supply). The employment projections use a base year for which people employed in specific occupations were counted. While the 10-year projections are made every two years, the employment numbers and wage data for the base year is updated annually. As a result, in the non-projection release years, the base year is one year in advance of the base year for the projections.

Career cluster and pathway LMI data can be compared with similar labor market summary data for the U.S. and the Mid-Atlantic Region. Since geographically Delaware is a relatively small state, it is useful to know if the cluster/pathway level employment projections at the regional or national economy vary significantly from that of Delaware. Further, pathway data is useful to compare employment growth in the career cluster with employment growth in the pathway. If employment growth in the pathway of interest is weaker than in the rest of the cluster, the State or LEA may need to document how the program of study can also assist CTE program of study completers in finding employment in occupations related to other pathways within the same cluster. The data in the table can serve as benchmarks for the career cluster and pathway of interest or can be used to support the continuation or expansion of a program of study.

The Delaware labor market data tables on the EDEPS website include columns with the headings "HS", "HW", and "HD". These columns provide data on "High Skill", "High Wage", or "High Demand" occupations. The federal Carl D. Perkins Career and Technical Education Improvement Act of

2006 indicates a preference for education programs leading to “High Skill”, “High Wage”, or “High Demand” occupations. These designations of occupations help direct investment into programs that have the potential to be the most effective for student outcomes. Since program completers are likely to find employment in a wide range of related occupations under a career cluster or pathway an attempt has been made to designate career clusters and pathways as “High Skill”, “High Wage”, and “High Demand” using weighted means for occupations within the cluster and pathway. This framework provides a high-level indicator of the cluster and pathway that are most likely to provide a desirable employment outcome. It also forms the basis for linking program completion with job placement data to evaluate the effectiveness of CTE programs. The Delaware Department of Education in collaboration with Delaware Department of Labor has developed definitions for "High Skill", “High Wage”, and “High Demand" occupations which are as follows:

- **Middle Skill:** Occupations requiring some type of post-secondary education (such as an apprenticeship, certification, or an Associate’s degree) but not a Bachelor’s degree; or High School education with some work experience or at least one month on-the-job training or credential attainment.
- **High Skill Criteria:** Occupations with an entry-level educational requirement of at least post-secondary education (“vocational” training or Associates Degree) or more than 12 months on-the-job training.
- **High Wage Criteria:** Occupations paying more than the Delaware all-industry statewide median wage (\$37,750 in 2015).
- **High Demand Criteria:** Occupations with at least 4 annual job openings due to growth in Delaware.

**Table 4: LMI by Standard Occupation Code (SOC) (Instructions)**

This data can be found on the Delaware Labor Market Data section of the EDEPS website at (<http://edeps.org/CppDeCluster.aspx>) in the *Occupations by Career Pathway* data table and the corresponding *Unit of Analysis*. This data can also be found on Delaware “High Skill”, “High Wage”, and “High Demand” Occupations section of the EDEPS website at (<http://www.edeps.org/HSWD/HighSkillWageDemandDE.aspx>) which lists all SOCs by title.

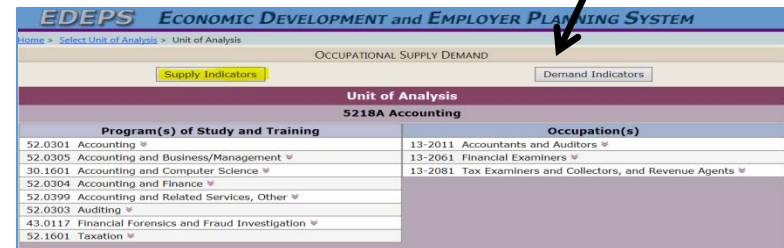
- Click on the name of the identified pathway in the *Pathways by Career Cluster* table on the EDEPS website;
- Review the *Occupations by Career Pathway* table to identify the occupation title(s);

Career Cluster & Pathway: Accounting (Finance)							
Career Cluster and Pathway	HS	HW	HD	Employment 2013	Employment Change 2012-22	Employment Growth 2012-22	Avg. Wage 2013
Finance	•	•	•	20,980	2,570	10.6%	\$74,621
Accounting	•	•	•	4,420	452	9.7%	\$73,757

Occupations by Career Pathway: Accounting (Finance)								
Occupation	HS	HW	HD	Employment 2013	Employment Change 2012-22	Employment Growth 2012-22	Avg. Wage 2013	Unit of Analysis
Accountants and Auditors	•	•	•	4,420	452	9.7%	\$73,757	Accounting

- Review the related *Unit of Analysis* link(s) to identify the SOC code(s) – please note that additional occupations may populate using the *Unit of Analysis* link which groups related occupations and structured training programs for approximate occupational labor markets;
- The *Demand Indicators* link will provide additional information on the occupation including the title, SOC code, HS, HW, HD and related LMI;
- Enter the SOC code, occupation title, HS, HW, HD notation, and the related LMI for the identified occupation (repeat as necessary);
- PLEASE NOTE – not all programs of study will have a direct link to a desired occupation as the occupation may not fall within the cluster and pathway flowchart. Every effort should be made to identify occupations and related SOC codes that link to the identified program of study. As such, the LEA may choose to review the list of SOC codes found on the EDEPS site to identify and report related occupational data versus using the cluster to pathway to occupation flowchart. This is especially true in occupations where LMI has been suppressed as part of the BLS or DOL industry projections; and
- Please review the information below. This background information will assist LEAs in developing responses to questions found under *Table 4: LMI by Standard Occupation Code (SOC)* within the LMI review tool for programs of study.



**Table 4: LMI by SOC (Example)**

(see instructions on page 6, LMI Instructions & Guidance Document)

SOC Code	Occupation Title	Middle Skill	High Skill	High Wage	High Demand	2014-2024			
						Employment 2014	Employment Change 2012-2022	Employment Growth 2012-2022	Average Wage 2014
15-1121	Computer Systems Analysts		•	•	•	3,260	629	22.3%	\$89,410
15-1132	Software Developers, Applications		•	•	•	2,575	431	18.0%	\$97,520
15-1133	Software Developers, Systems Software		•	•	•	1,229	150	12.6%	\$107,220
15-1131	Computer Programmers		•	•		1,267	69	4.4%	\$86,550

**Table 4: LMI by SOC (Background for LEA Analysis)**

Since the focus of many education programs is the projected number of job openings, sorting the *Occupations by Career Pathway* table by employment growth will bring the occupations with the highest projected employment to the top. In addition, the table can be sorted to list the occupations that are “High Skill”, “High Wage”, and “High Demand”. There should be a clear connection between the desired program of study and



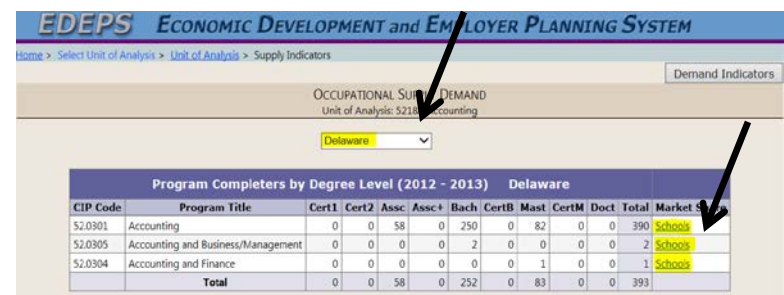
the types of careers available to those students who complete the program. Each SOC has information on the types of education and training programs available as well as descriptions of the occupation itself. Additionally, the Bureau of Labor & Statistics (BLS) provides more detailed information by SOC which includes a summary of the occupation, job duties, work environment, path to the occupation, pay, job outlook, and related information. For more information on a specific SOC, please visit the BLS website at (<http://www.bls.gov/home.htm>).

As stated above, not all programs of study will have a direct link to a desired occupation as the occupation may not fall within the cluster and pathway flowchart. The LEA may need to engage in a more rigorous process to identify and report related occupations and SOC codes that link to the identified program of study. One such method will be for the LEA to review the Delaware “High Skill”, “High Wage”, and “High Demand” Occupations section of the EDEPS website at (<http://www.edeps.org/HSWD/HighSkillWageDemandDE.aspx>) which lists all SOCs by title. This is especially true in occupations where LMI has been suppressed as part of the BLS or DOL industry projections.

**Table 5: LMI Supply Indicators by Secondary & Post-Secondary Levels (Instructions)**

This data can be found on the Delaware Labor Market Data section of the EDEPS website at (<http://edeps.org/CppDeCluster.aspx>) using the *Unit of Analysis* and corresponding *Supply Indicators*.

- The corresponding page will list both Supply and Demand indicators for the occupation;
- Clicking on the *Supply Indicators* link to see the list of program completers at the state level – please note that data for each state and nationally can also be pulled down;
- School-level program completion data can be obtained by clicking on the *Delaware* location, and the *Schools* link to the right of each program listing;
- Enter the program completion data for Delaware secondary and post-secondary programs; and
- Please review the information below. This background information will assist LEAs in developing responses to questions found under *Table 5: LMI Supply Indicators by Secondary & Post-Secondary Levels* within the LMI review tool for programs of study.





**Table 5: LMI Supply Indicators by Secondary & Post-Secondary Levels (Example)**

*(see instructions on page 8, LMI Instructions & Guidance Document)*

			Program Completion/Enrollment	
Program Code (CIP)	Program (CIP) Title	School	2013-14	2014-15
<b>Total Secondary Programs of Study</b>				
11.04601	Computer Science	NA	Program of study to begin in 2015-16 school year.	
<b>Total Post-Secondary Programs of Study</b>				
11.0101	Computer and Information Sciences, General – AA Degree	Delaware Technical Community College-Owens, Terry, & Stanton/Wilmington	15	20
11.0101	Computer and Information Sciences, General – BA Degree	University of Delaware	48	64
11.1003	Computer and Information Systems Security/Information Assurance	Wilmington University	69	117

**Table 5: LMI Supply Indicators by Secondary & Post-Secondary Levels (Background for LEA Analysis)**

In addition to employment opportunities, the supply of labor is also important when planning to introduce a new program of study. New entrants into a sector of the economy may be the result of several factors such as attractive wage growth, regional development, population growth, job migration, or the availability of more training programs. The last factor (capacity of related training programs) plays a key role in regional economic planning; however program completer data should be used primarily as an indicator of skill surplus, not of skill shortage because it cannot be viewed separately from the demand generated by projected employment growth in an industry.

Units of Analysis are groups of related occupations and structured training programs that approximate occupational labor markets. The grouping of occupations, their job openings, related training programs and their graduates (completers) allows demand data to be compared to institutional supply information from education and training programs. This framework compares the projected total annual job openings for an occupation with the recent output of program completers from related, structured training programs (of at least 300 class hours) at the sub-baccalaureate level for states, and at the baccalaureate level and above for the nation. There are three different types of units of analysis, identified by codes ending with the letter A, B, or C at the end of the unit code number:

- “A” units are those that are most valid for supply/demand analysis, as the occupations for the most part require formal educational training in one of the related programs.
- “B” units are those where the related programs train for the occupations in the cluster, but formal educational preparation is not required for entry into the occupations, and may not be the most common source of potential supply.

- “C” units contain only programs alone, or occupations alone, and do not have any supply/demand matching.

For CTE programs of study, secondary completion data is collected as not all jobs require post-secondary education. Several CTE programs of study at the secondary level provide the skills and certifications for completers to enter directly into related full-time occupations. Where available, this data should be added. This table provides information not only on program completion, but also on enrollment for students in three levels of the programs. This data can be used along with post-secondary program completion data to estimate trends in skill supply for the occupations related to the program of study.

**Table 6: Other LMI Data Including Real-Time LMI (Instructions)**

As necessary, the LEA should collect other available LMI that can be used to support the application for a CTE program of study. The availability of this information and the type of LMI the LEA chooses to use in support of the application for a program of study will be determined by the LEA. Several suggestions are provided below which include the use of real-time LMI as well as projected employment growth in an industry.

For each state-model program of study a real-time LMI report, which includes geography, job titles, education levels, skill sets, and/or industries will be generated and should be used by the LEA to engage their program advisory committee and as background information for the instructor to better understand employment and the prospective job market. Each real-time LMI report will be generated by the Center for Industry Research and Workforce Alignment (CIRWA) at Delaware Technical Community College as an appendix to the LMI review tool. In addition, CIRWA will provide recurring reports that identify high-level changes in job-posting trends over time. These reports will provide a generalized view of online posting characteristics that can be used to identify industry trends or changes in occupational intensity. In accordance with the Delaware Department of Education needs, recurring reports will track longitudinal data points such as:

- Employers with the highest intensity of postings;
- Most frequently posted job titles or occupations;
- Industries with the highest intensity of postings;
- Most in demand baseline, specialty, and software skills;
- Most in-demand certifications required for employment; and
- Geographies with the highest intensity of job postings.

**Table 6: Other LMI Data Including Real-Time LMI (Background for LEA Analysis)**

Real-time LMI consists of trends and analysis of online job postings throughout the region. Many real-time LMI reports use a job-spidering tool that accesses and aggregates online job posting data from job boards, newspapers, employer websites, and other online sources. In many instances, the

tool allows the user to customize search parameters such as specific time periods, locations, industries, employers, and keywords. The information that can be derived from job postings specific to an occupation or group of occupations includes:

- Top employers in the region based on the intensity of current job postings;
- Top skills classified into baseline, specialty and software skills categories;
- Educational/certification requirements specified for hire;
- Top job titles, which may differ from traditional BLS-defined occupation titles (SOC codes);
- Top geographical locations based on the intensity of job postings;
- Occupational cluster analysis, for clusters pre-defined by Burning Glass; and
- Wage and salary information for occupation(s) of focus.

Real-time LMI is not an appropriate tool for determining actual current job-demand for specific occupations or geographies. It should also not be used as a primary data source for long-range strategic planning. However, real-time LMI is valuable data for assisting in the identification of baseline trends, specialty and/or software skills, educational preferences, related experience, and industry certifications needed for hire. In addition, the data may also help to identify or corroborate regional differences in hiring requirements as well as preferences and characteristics for a specified occupation or group of occupations.

Other LMI that may be useful for an LEA includes projected employment growth in an industry. At times it may appear that a program-related occupation has a below-average growth rate, but the employment projection for the industry in which that occupation is situated may have above average growth prospects. For example, Delaware does not have employment projection data on plumbers (under the Construction Career Pathway). However, ten-year employment growth for the Construction pathway is a robust 25 percent. In addition, nation-wide employment data on plumbers also indicate that this occupation is growing at a faster-than-average pace. Industry projections provide data for the projected growth rate in addition to the number of jobs that are vertically integrated in a sector of the economy. An average wage for an industry is not computed since occupations in an industry span a broad spectrum of employment, e.g. entry-level workers to CEOs of companies. Such a measure is not useful for analytical purposes.

**Sources:**

Delaware Department of Labor. (2014). *Delaware 2022: Occupation and Industry Projections*.

Economic Development and Employer Planning System (EDEPS). (2015). Website URL: [www.edeps.org](http://www.edeps.org)