

# ENERGY SECTOR GUIDE



2020

North Central Workforce Development Area

*Funded by Workforce Solutions for North Central Pennsylvania and the PA Department of Labor and Industry.*

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## *Introduction to the Sector Guide*

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The Career Pathways Sector Guides are designed to provide information about career pathways in the North Central Workforce Development Area in Pennsylvania. Each guide presents information that will benefit workforce development professionals, businesses, and job seekers.

### **Introduction to Career Pathways**

This section of the Sector Guide introduces you to career pathways. The information in this section will inform you about why career pathways are important and how the concept can be beneficial to businesses and job seekers. Information in this section can be shared with clients to help them get a better understanding of why we promote pathways.

### **Sector Description**

The sector descriptions provide a brief overview of the sector that the guide presents. Sector descriptions include information from Pennsylvania's Center for Workforce Information and Analysis <https://www.workstats.dli.pa.gov/Pages/default.aspx> that helps to give a snapshot of the sector as well as general information about education and experience levels associated with jobs in the sector and the types of businesses that employ in the sector.

Use the information in this section of the guide to share general information with job seekers, as more detailed information is provided throughout the guide.

### **Career Pathways Maps**

The jobs illustrated on the career pathway maps were identified using the North Central High Priority Occupations list. Information about the jobs was gathered through research using multiple sources to identify the salary, education required, and related occupations. Additionally, industry specific websites that contain career maps were used to inform the career map development. Most of the maps start with an entry-level job that requires less than a 2-year degree and demonstrate the ability to move up

the pathway by on the job training and work experience or through additional formal education and training.

Some occupations occur in multiple sectors and therefore may create a slightly different map for each sector. For example, janitors and cleaners are in manufacturing, healthcare, education, and hospitality. A worker who starts as a janitor and cleaner in education may move into maintenance and may possess the skills to move into a technical teaching role or departmental supervisory role within a school district or university. A janitor in manufacturing might be less likely to leave the sector to move into education and training of maintenance personnel. Technology and transportation related occupations are others that cross over many sectors and may look a little different.

Notice that some pathways seem to start at a higher “entry-level” than others. These would be appropriate for individuals that may have had some technical training while in high school or chose to do training before entering or reentering the workforce. These maps are also appropriate for places of employment that bring everyone in as a “general worker”, and in order to move up, an individual has to get a specialized training and compare multiple options/maps to make that decision.

These maps can be used with job seekers who are currently employed or choosing a career path. While these maps are general for the sector, they provide information about expected training, experience, and skills needed to move along a career path. This example illustrates the information that you will find about each job on every map.

**Occupation:** First-Line Supervisors of Mechanics, Installers, and Repairers (49-1011)

**Education:** postsecondary certificate and/or associate’s degree

**Training:** postsecondary education

**Skills:** understands process and product or service, demonstrates self-management strategies, lifelong learning

**Salary Range:** \$25.50-46/hour

Use this information to assist job seekers with career exploration, career planning, and goal setting. It is important to review each map carefully to understand the requirements needed on all steps of the

career path. Each map shows potential opportunities for advancement that may be achieved through additional education and training and experience on-the-job. Additional ways to use career pathways maps can be found at *20 Ways to Use Career Pathways Maps* at <http://www.paadultedresources.org/wp-content/uploads/2017/02/20-ways-to-use-career-pathway-maps-12-18-17.pdf>.

## **Job Descriptions**

The job descriptions in the guide provide details of every job that is mentioned in each of the career pathways maps. Information from O\*NET Online <https://www.onetonline.org/> was used to inform the descriptions. Another key component of the job descriptions is the *Sample of reported job titles*. These job titles are important because they are examples that employers might use for the same job. For example, an *energy auditor* at ABC Company might have the job title of *Building Performance Specialist* at DEF Company even though they do essentially the same kind of work.

Job descriptions are helpful for job seekers to get a clearer understanding of the jobs in isolation. More importantly, the descriptions help to provide clarity on how a career pathway builds on the skills and knowledge, and abilities of the jobs on the pathways. Use the information in this section to discuss the general qualifications of the job and the alternative names associated with the work that the job requires. Each job's description includes a citation and reference in the bibliography that can easily be accessed to provide additional information about the job. Use the references to assist job seekers in further career exploration when making decisions about any career path.

## **Foundation Skills Framework**

Selected jobs in this section of the guide are aligned to specific workforce preparation skills detailed in the Foundation Skills Framework (FSF). The FSF is a tool developed by workforce development professionals that identifies skills, competencies, and tasks that individuals need to master to get a job, keep a job, and advance in a job.

The jobs in this section are primarily the entry level jobs identified on each map in the guide. Top *skills* for each job that are identified on O\*NET Online were aligned to the FSF and can be used to help job seekers get an understanding of the workforce preparation skills that they will need for a particular job.

While this section provides examples of the workforce preparation skills for some of the jobs in the sector, additional research can be completed for any of the jobs on the pathways. Encourage job seekers to review the skills needed for their jobs of interest and compare them to the FSF. Additional FSF resources, including an assessment and competency lists can be found at <https://www.paadultedresources.org/foundation-skills-framework/>.

## **Bibliography**

This final section of the guide is the bibliography. The bibliography provides a listing of all of the resources that were used to research the information in the guide and can be used to conduct further research on the sector or career pathways.

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## *Introduction to Career Pathways*

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The Workforce Innovation and Opportunity Act (WIOA) moved career pathways from just a good idea to a mandatory component of workforce development programming. While providing a comprehensive definition of and for career pathways, WIOA does little to describe the “how to” for this strategy. From the development of customized mapping tools for employers to integrated education and training programs for customers who are determined basic skills deficient, career pathways strategies are customized to the local labor market.

At a minimum, career pathways strategies for job seekers need to include opportunities to explore careers and occupations that fall within high priority occupation sectors, develop a career pathway plan that includes charting specific and realistic goals, and learn about and practice key employability skills. A concrete plan with established goals and steps to follow can offer guidance and structure to job seekers’ employment goals. This plan may include, for example, obtaining work while exploring careers, identifying and enrolling in educational or training opportunities, identifying, researching, and preparing for occupations so that they may be ready to begin the job search process immediately.

Workforce development professionals can use the information associated with career pathways to further develop opportunities for job seekers to enter a career path rather than just getting a job. To do this; however, career pathways strategies need to be recognized and embraced by workforce development professionals in order to coordinate service delivery so that individuals can become aware of opportunities and have access to what they need to move along a pathway.

While this guide presents the “nuts and bolts” of career pathways, professionals will need to work together to develop strategies to assist job seekers to move along these paths. Which of the illustrated pathways are most essential to the region? How can workforce development professionals work together to promote these essential pathways? What can we do to include postsecondary education and training partners to assist in these career pathways strategies? How can we include Title II adult education into our strategies? There are answers to all these questions when we work together with career pathways innovations.

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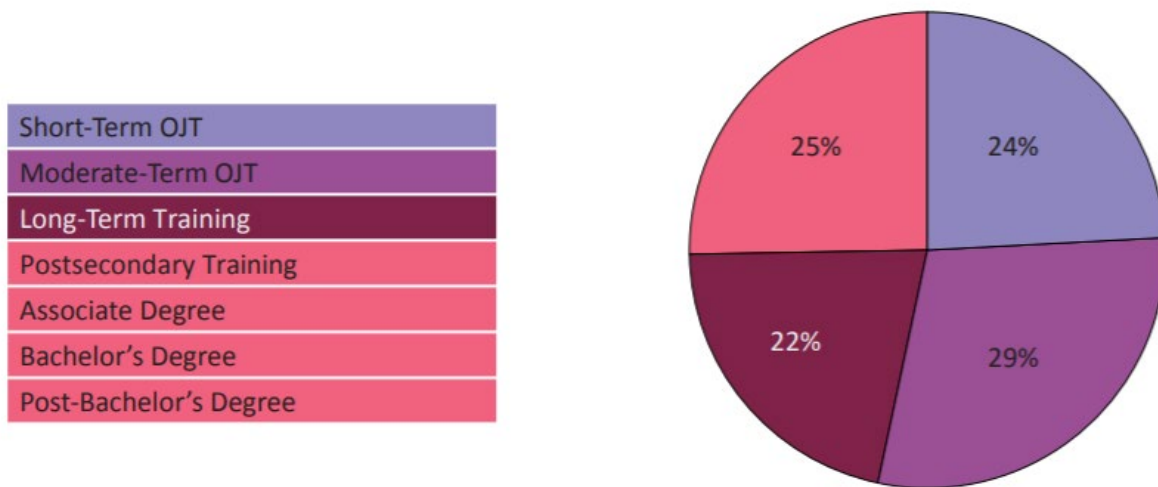
### *Sector Description*

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The Center for Workforce Information and Analysis states:

The Energy (ENGY) cluster includes industries associated with the production and distribution of energy, as well as the waste disposal industries associated with the remediation and environmental cleanup related to energy production. In the cluster you will find a wide variety of industries, from petroleum refineries to battery manufacturing to generator manufacturing.

This graph illustrates the minimum educational attainment levels for jobs found in this cluster's various industries. Only 25 percent of ENGY jobs require formal postsecondary training of any kind. Partnered with high average wages, this is an industry cluster that offers high rewards to those willing to work hard and learn on the job.





Additionally, The Center for Workforce Information and Analysis identifies the following top industries:

#### Top Industries Based on Employment

- Electric Power Distribution
- Support Activities for Oil & Gas Operations
- Oil & Gas Pipeline Construction
- Solid Waste Collection
- Water Supply & Irrigation Systems
- Primary Battery Manufacturing
- Power & Communication System Construction
- Natural Gas Distribution
- Fuel Dealers
- Current-Carrying Wiring Device Manufacturing
- Air, Water & Waste Program Administration
- Sewage Treatment Facilities
- Natural Gas Extraction
- Recyclable Material Merchant Wholesalers
- Nuclear Electric Power Generation
- Bituminous Coal Underground Mining
- Environment & Conservation Organizations
- Fossil Fuel Electric Power Generation
- Other Petroleum Merchant Wholesalers
- Petroleum Refineries

Within the energy sector, careers in the oil and gas industry continue to thrive in Pennsylvania. According to the ShaleNet Career Guide, this industry’s credentialing and education requirements for occupations overlap with the following industry clusters: building and construction, logistics and transportation, and advance manufacturing. The North Central Workforce Development Board continues to work with leaders in the industry, training providers, and workforce development system staff to meet the training and certification needs of the oil and gas industry.

The North Central Multi-year Regional Plan describes one example of their response to support the energy industry through the On-the-Job Training Program or OJT:

The North Central Workforce Development Board in partnership with Penn College of Technology and the ShaleNET Community Based Job Training grant implemented the first floorhand training in the North Central region. All participants entered into employment at the end of the training program

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## *Career Pathways Maps*

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# Energy-

## Electrical Power-Line Installers and Repairers

Additional training and education



**Occupation:** Electrical and Electronics Repairers, Powerhouse, Substation, and Relay (49-2095)

**Education:** some postsecondary education and/or associate's degree

**Training:** long-term on-the-job training and/or vocational training

**Skills:** reads with understanding, solves problems, demonstrates self-management strategies

**Salary Range:** \$26-35/hour

**Occupation:** Supervisors-Mechanics, Installers, and Repairers (49-1011)

**Education:** some postsecondary education and/or associate's degree

**Training:** long-term on-the-job training and/or vocational training

**Skills:** demonstrates effective interpersonal relations, makes decisions, demonstrates quality consciousness

**Salary Range:** \$20.75-32.50/hour

**Occupation:** Electrical Power-Line Installers and Repairers (49-9051)

**Education:** high school diploma or equivalent and/or some postsecondary education and/or apprenticeship

**Training:** vocational training and/or specialty certificates

**Skills:** observes critically, listens with understanding, solves problems

**Salary Range:** \$25-40/hour

**Occupation:** Maintenance and Repair Workers (49-9071)

**Education:** high school diploma or equivalent and/or some postsecondary education

**Training:** vocational training and/or specialty certificates

**Skills:** observes critically, demonstrates quality consciousness, applies mathematical concepts and operations

**Salary Range:** \$10.75-18.50/hour

2019 HPO list retrieved from <https://www.workstats.dli.pa.gov/Products/HPOs/Pages/default.aspx>

ShaleNET. (2013). *A guide to careers in the oil and natural gas industry*. Retrieved from <http://careerguide.shalenet.org/Content/guides/CareerGuide2013.pdf>

U.S. Department of Labor, Employment and Training Administration. (2019). O\*NET Online. National Center for O\*NET Development. Retrieved from <https://www.onetonline.org/>

# Energy-

## Heating and Air Conditioning Mechanics and Installers

Additional training and education



**Occupation:** First-Line Supervisors of Mechanics, Installers, and Repairers (49-1011)

**Education:** postsecondary certificate and/or associate's degree

**Training:** postsecondary education

**Skills:** understands process and product or service, demonstrates self-management strategies, lifelong learning

**Salary Range:** \$25.50-46/hour

**Occupation:** Refrigeration Mechanics and Installers (49-9021.02)

**Education:** postsecondary certificate and/or some college

**Training:** long-term on-the-job training and/or postsecondary education

**Skills:** solves problems, applies health and safety concepts, demonstrates quality consciousness

**Salary Range:** \$15-24/hour

**Occupation:** Heating and Air Conditioning Mechanics and Installers (49-9021)

**Education:** postsecondary education and/or associate's degree

**Training:** vocational training and/or specialty certificates

**Skills:** makes decisions, solves problems, listens with understanding

**Salary Range:** \$15-24/hour

**Occupation:** Maintenance and Repair Workers (49-9071)

**Education:** postsecondary education and/or associate's degree

**Training:** vocational training and/or specialty certificates

**Skills:** observes critically, demonstrates quality consciousness, applies mathematical concepts and operations

**Salary Range:** \$10.75-18.50/hour

2019 HPO list retrieved from <https://www.workstats.dli.pa.gov/Products/HPOs/Pages/default.aspx>

ShaleNET. (2013). *A guide to careers in the oil and natural gas industry*. Retrieved from <http://careerguide.shalenet.org/Content/guides/CareerGuide2013.pdf>

U.S. Department of Labor, Employment and Training Administration. (2019). O\*NET OnLine. National Center for O\*NET Development. Retrieved from

<https://www.onetonline.org/>

# Energy-

## Helpers, Production Workers

Additional training and education



**Occupation:** First-Line Supervisors of Production and Operating Workers (51-1011)  
**Education:** high school diploma or equivalent and/or bachelor's degree  
**Training:** long-term on-the-job training, postsecondary, and/or apprenticeship  
**Skills:** demonstrates effective interpersonal relations, understands process or product and service, makes decisions  
**Salary Range:** \$18-29/hour

**Occupation:** Industrial Machinery Mechanics (49-9041)  
**Education:** high school diploma or equivalent and postsecondary certificate  
**Training:** vocational and on-the-job training and/or apprenticeship  
**Skills:** solves problems, makes decisions, listens with understanding  
**Salary Range:** \$16.50-24.75/hour

**Occupation:** Plating and Coating Machine Setters, Operators, and Tenders, Metal and Plastic (51-4193)  
**Education:** high school diploma  
**Training:** vocational and on-the-job training and/or apprenticeship  
**Skills:** solves problems, makes decisions, applies health and safety concepts  
**Salary Range:** \$11-17.25/hour

**Occupation:** Helpers, Production Workers (51-9198)  
**Education:** high school diploma or equivalent  
**Training:** short-term on-the-job training  
**Skills:** uses technology, applies health and safety concepts, demonstrates self-management strategies  
**Salary Range:** \$9.25-13.75/hour

2019 HPO list retrieved from <https://www.workstats.dli.pa.gov/Products/HPOs/Pages/default.aspx>

ShaleNET. (2013). *A guide to careers in the oil and natural gas industry*. Retrieved from <http://careerguide.shalenet.org/Content/guides/CareerGuide2013.pdf>

U.S. Department of Labor, Employment and Training Administration. (2019). O\*NET OnLine. National Center for O\*NET Development. Retrieved from <https://www.onetonline.org/>

# Energy-

## Industrial Truck and Tractor Operators

Additional training and education

**Occupation:** First-Line Supervisors of Transportation and Material-Moving Machine and Vehicle Operators (53-1031)

**Education:** high school diploma or equivalent

**Training:** long-term on-the-job training

**Skills:** solves problems, listens with understanding, makes decisions

**Salary Range:** \$16.75-28/hour

**Occupation:** Heavy & Tractor Trailer Truck Drivers (53-3032)

**Education:** high school diploma or equivalent and/or some postsecondary education

**Training:** commercial driver's license and additional endorsements

**Skills:** observes critically, demonstrates self-management strategies, uses technology

**Salary Range:** \$15-21.75/hour

**Occupation:** Paving, Surfacing, and Tamping Equipment Operators (47-2071)

**Education:** high school diploma or equivalent

**Training:** on-the-job training and construction materials certifications

**Skills:** observes critically, makes decisions, uses technology

**Salary Range:** \$13.50-19.75/hour

**Occupation:** Industrial Truck and Tractor Operators (53-7051)

**Education:** high school diploma or equivalent

**Training:** short-term on-the-job training

**Skills:** observes critically, uses technology, applies health and safety concepts

**Salary Range:** \$13-17/hour



# Energy-

## Inspectors, Testers, Sorters, Samplers, and Weighers

Additional training and education



**Occupation:** First-Line Supervisors of Production and Operating Workers (51-1011)

**Education:** high school diploma or equivalent and/or bachelor's degree

**Training:** long-term on-the-job training, postsecondary, and/or apprenticeship

**Skills:** demonstrates effective interpersonal relations, understands process or product and service, makes decisions

**Salary Range:** \$18-29/hour

**Occupation:** Manufacturing Production Technicians (17-3029.09)

**Education:** high school diploma or equivalent and/or associate's degree

**Training:** postsecondary training or apprenticeship

**Skills:** listens with understanding, speaks clearly and concisely, demonstrates quality consciousness

**Salary Range:** \$16-25.75/hour

**Occupation:** Machinists (51-4041)

**Education:** high school diploma or equivalent and postsecondary education

**Training:** vocational training and/or apprenticeship

**Skills:** listens with understanding, solves problems, observes critically

**Salary Range:** \$13.75-21/hour

**Occupation:** Inspectors, Testers, Sorters, Samplers, and Weighers (51-9061)

**Education:** high school diploma or equivalent

**Training:** short-term on-the-job training

**Skills:** observes critically, speaks clearly and concisely, reads with understanding

**Salary Range:** \$11.75-19/hour

2019 HPO list retrieved from <https://www.workstats.dli.pa.gov/Products/HPOs/Pages/default.aspx>

ShaleNET. (2013). *A guide to careers in the oil and natural gas industry*. Retrieved from <http://careerguide.shalenet.org/Content/guides/CareerGuide2013.pdf>

U.S. Department of Labor, Employment and Training Administration. (2019). O\*NET OnLine. National Center for O\*NET Development. Retrieved from <https://www.onetonline.org/>

# Energy-

## Weatherization Installers and Technicians

Additional training and education

**Occupation:** First-Line Supervisors of Mechanics, Installers, and Repairers (49-1011)

**Education:** postsecondary certificate and/or associate's degree

**Training:** postsecondary education

**Skills:** understands process and product or service, demonstrates self-management strategies, lifelong learning

**Salary Range:** \$25.50-46/hour

**Occupation:** Energy Auditors (13-1199.01)

**Education:** high school diploma or equivalent and some postsecondary

**Training:** short-term on-the-job training and certifications

**Skills:** reads with understanding, applies mathematical concepts and operations, makes decisions

**Salary Range:** \$22-36.75/hour

**Occupation:** Solar Thermal Installers and Technicians (47-4099.02)

**Education:** high school diploma or equivalent and some postsecondary

**Training:** short-term on-the-job training

**Skills:** reads with understanding, solves problems, demonstrates quality consciousness

**Salary Range:** \$12-17.75/hour

**Occupation:** Weatherization Installers and Technicians (47-4099.03)

**Education:** high school diploma or equivalent

**Training:** short-term on-the-job training

**Skills:** listens with understanding, speaks clearly and concisely, makes decisions

**Salary Range:** \$12-17.75/hour



2019 HPO list retrieved from <https://www.workstats.dli.pa.gov/Products/HPOs/Pages/default.aspx>

ShaleNET. (2013). *A guide to careers in the oil and natural gas industry*. Retrieved from <http://careerguide.shalenet.org/Content/guides/CareerGuide2013.pdf>

U.S. Department of Labor, Employment and Training Administration. (2019). O\*NET OnLine. National Center for O\*NET Development. Retrieved from

<https://www.onetonline.org/>



### **Electrical and Electronics Repairers, Powerhouse, Substation, and Relay**

Inspect, test, repair, or maintain electrical equipment in generating stations, substations, and in-service relays.

*Sample of reported job titles:* Electrical and Instrumentation Technician (E & I Technician), Electrical Technician, Instrument and Control Technician (I & C Technician), Instrumentation and Control Technician (I&C Technician), Relay Technician, Substation Electrician, Substation Mechanic, Substation Technician, Substation Wireman, Wireman (U.S. Department of Labor, O\*NET, Electrical and Electronics Repairers, Powerhouse, Substation, and Relay, 2020a)

### **Electrical Power-Line Installers and Repairers**

Install or repair cables or wires used in electrical power or distribution systems. May erect poles and light or heavy duty transmission towers.

*Sample of reported job titles:* A Class Lineman, Apprentice Lineman Third Step, Class A Lineman, Electric Lineman, Electrical Lineman (Power), Electrical Lineworker, Journeyman Lineman, Lineman, Lineworker, Power Lineman (U.S. Department of Labor, O\*NET, Electrical Power-Line Installers and Repairer, 2020b)

### **Energy Auditors**

Conduct energy audits of buildings, building systems, or process systems. May also conduct investment grade audits of buildings or systems.

*Sample of reported job titles:* Building Energy Consultant, Building Performance Consultant, Building Performance Specialist, Energy Auditor, Energy Consultant, Energy Rater, Home Energy Rater, Home Performance Consultant, Quality Assurance Supervisor, Residential Energy Auditor (U.S. Department of Labor, O\*NET, Energy Auditors, 2020c)

### **First-Line Supervisors of Mechanics, Installers, and Repairers**

Directly supervise and coordinate the activities of mechanics, installers, and repairers.

*Sample of reported job titles:* Crew Leader, Electrical Foreman, Facilities Manager, Facility Maintenance Supervisor, Maintenance Foreman, Maintenance Manager, Maintenance Planner,

Maintenance Supervisor, Production Crew Supervisor, Superintendent (U.S. Department of Labor, O\*NET, First-Line Supervisors of mechanics, Installers, and Repairers, 2020d)

### **First-Line Supervisors of Production and Operating Workers**

Directly supervise and coordinate the activities of production and operating workers, such as inspectors, precision workers, machine setters and operators, assemblers, fabricators, and plant and system operators.

*Sample of reported job titles:* Assembly Supervisor, Department Manager, Manufacturing Supervisor, Molding Supervisor, Production Manager, Production Supervisor, Quality Assurance Supervisor (QA Supervisor), Shift Supervisor, Supervisor, Team Leader (U.S. Department of Labor, O\*NET, First-Line Supervisors of Production and Operating Workers, 2020e)

### **First-Line Supervisors of Transportation and Material-Moving Machine and Vehicle Operators**

Directly supervise and coordinate activities of transportation and material-moving machine and vehicle operators and helpers.

*Sample of reported job titles:* Dock Supervisor, Driver Manager, Fleet Manager, On Car Supervisor, Operations Supervisor, Street Supervisor, Supervisor, Trainmaster, Transportation Supervisor, Warehouse Supervisor (U.S. Department of Labor, O\*NET, First-Line Supervisors of Transportation and Material-Moving Machine and Vehicle Operators, 2020f)

### **Heating and Air Conditioning Mechanics and Installers**

Install, service, or repair heating and air conditioning systems in residences or commercial establishments.

*Sample of reported job titles:* A/C Tech (Air Conditioning Technician); HVAC Installer (Heating, Ventilation, Air Conditioning Installer); HVAC Mechanic (Heating, Ventilation, Air Conditioning Mechanic); HVAC Service Tech (Heating, Ventilation, Air Conditioning Service Technician); HVAC Specialist (Heating, Ventilation, and Air Conditioning Specialist); HVAC Tech (Heating, Ventilation, Air Conditioning Technician); HVAC Technician (Heating, Ventilation, and Air Conditioning Technician); Service Technician; Systems Mechanic (U.S. Department of Labor, O\*NET, Heating and Air Conditioning Mechanics and Installers, 2020g)

## **Heavy & Tractor Trailer Truck Drivers**

Drive a tractor-trailer combination or a truck with a capacity of at least 26,000 pounds Gross Vehicle Weight (GVW). May be required to unload truck. Requires commercial drivers' license.

*Sample of reported job titles:* Delivery Driver, Driver, Line Haul Driver, Log Truck Driver, Over the Road Driver (OTR Driver), Production Truck Driver, Road Driver, Semi Truck Driver, Tractor Trailer Operator, Truck Driver (U.S. Department of Labor, O\*NET, Heavy & Tractor Trailer Truck Driver, 2020h)

## **Helpers, Production Workers**

Help production workers by performing duties requiring less skill. Duties include supplying or holding materials or tools, and cleaning work area and equipment.

*Sample of reported job titles:* Assistant Operator, Helper, Laborer, Machine Operator, Material Handler, Press Helper, Production Worker, Service Person, Support Team Member, Utility Worker (U.S. Department of Labor, O\*NET, Helpers, Production Workers, 2020i)

## **Industrial Machinery Mechanics**

Repair, install, adjust, or maintain industrial production and processing machinery or refinery and pipeline distribution systems.

*Sample of reported job titles:* Fixer, Industrial Machinery Mechanic, Industrial Mechanic, Loom Fixer, Machine Adjuster, Maintenance Mechanic, Maintenance Technician, Master Mechanic, Mechanic, Overhauler (U.S. Department of Labor, O\*NET, Industrial Machinery Mechanics, 2020j)

## **Industrial Truck and Tractor Operators**

Operate industrial trucks or tractors equipped to move materials around a warehouse, storage yard, factory, construction site, or similar location.

*Sample of reported job titles:* Checker Loader, Fork Lift Technician, Fork Truck Driver, Forklift Driver, Forklift Operator, Lift Truck Operator, Shag Truck Driver, Spotter Driver, Tow Motor Operator, Truck Driver (U.S. Department of Labor, O\*NET, Industrial Truck and Tractor Operators, 2020k)

## **Inspectors, Testers, Sorters, Samplers, and Weighers**

Inspect, test, sort, sample, or weigh nonagricultural raw materials or processed, machined, fabricated, or assembled parts or products for defects, wear, and deviations from specifications. May use precision measuring instruments and complex test equipment.

*Sample of reported job titles:* Inspector, Picker / Packer, Quality Assurance Auditor, Quality Assurance Inspector (QA Inspector), Quality Assurance Technician, Quality Auditor, Quality Control Inspector (QC Inspector), Quality Control Technician (QC Technician), Quality Inspector, Quality Technician (U.S. Department of Labor, O\*NET, Inspectors, Testers, Sorters, Samplers, and Weighers, 2020l)

## **Machinists**

Set up and operate a variety of machine tools to produce precision parts and instruments. Includes precision instrument makers who fabricate, modify, or repair mechanical instruments. May also fabricate and modify parts to make or repair machine tools or maintain industrial machines, applying knowledge of mechanics, mathematics, metal properties, layout, and machining procedures.

*Sample of reported job titles:* Gear Machinist, Journeyman Machinist, Machine Operator, Machine Repair Person, Machinist, Maintenance Machinist, Maintenance Specialist, Production Machinist, Set-Up Machinist, Tool Room Machinist (U.S. Department of Labor, O\*NET, Machinists, 2020m)

## **Maintenance and Repair Workers**

Perform work involving the skills of two or more maintenance or craft occupations to keep machines, mechanical equipment, or the structure of an establishment in repair. Duties may involve pipe fitting; boiler making; insulating; welding; machining; carpentry; repairing electrical or mechanical equipment; installing, aligning, and balancing new equipment; and repairing buildings, floors, or stairs.

*Sample of reported job titles:* Building Maintenance Mechanic, Building Mechanic, Equipment Engineering Technician, Facilities Manager, Maintenance Engineer, Maintenance Man, Maintenance Mechanic, Maintenance Supervisor, Maintenance Technician, Maintenance Worker (U.S. Department of Labor, O\*NET, Maintenance and Repair Workers, 2020n)

## **Manufacturing Production Technicians**

Set up, test, and adjust manufacturing machinery or equipment, using any combination of electrical, electronic, mechanical, hydraulic, pneumatic, or computer technologies.

*Sample of reported job titles:* Engineering Technician, Experimental Machining Lab Manager, Final Operations Technician, Metallurgical Lab Technician, Quality Assurance Technician, Quality Technician, Service Technician, Support Technician, Tool Room Supervisor, Value Stream Manager (U.S. Department of Labor, O\*NET, Manufacturing Production Technicians, 2020o)

## **Paving, Surfacing, and Tamping Equipment Operators**

Operate equipment used for applying concrete, asphalt, or other materials to road beds, parking lots, or airport runways and taxiways, or equipment used for tamping gravel, dirt, or other materials. Includes concrete and asphalt paving machine operators, form tampers, tamping machine operators, and stone spreader operators.

*Sample of reported job titles:* Asphalt Paver Operator, Asphalt Raker, Equipment Operator (EO), Maintenance Equipment Operator (MEO), Operator, Paver Operator, Roller Operator, Screed Operator, Truck Driver (U.S. Department of Labor, O\*NET, Paving, Surfacing, and Tamping Equipment Operators, 2020p)

## **Plating and Coating Machine Setters, Operators, and Tenders, Metal and Plastic**

Set up, operate, or tend plating or coating machines to coat metal or plastic products with chromium, zinc, copper, cadmium, nickel, or other metal to protect or decorate surfaces. Includes electrolytic processes.

*Sample of reported job titles:* Anodizer, Anodizing Line Operator, Chrome Plater, Coater Associate, Coater Operator, Electro Plater, Galvanizer, Line Operator, Machine Operator, Plater (U.S. Department of Labor, O\*NET, Plating and Coating Machine Setters, Operators, and Tenders, Metal and Plastic, 2020q)

## **Refrigeration Mechanics and Installers**

Install and repair industrial and commercial refrigerating systems.

*Sample of reported job titles:* HVAC / R Technician (Heating, Ventilation, Air Conditioning / Refrigeration Technician); HVAC Tech (Heating, Ventilation, Air Conditioning Service

Technician); HVAC Technician (Heating, Ventilation, Air Conditioning Technician); HVAC/R Service Technician (Heating, Ventilation, and Air Conditioning/Refrigeration Service Technician); Refrigeration Mechanic; Refrigeration Operator; Refrigeration Technician (Refrigeration Tech); Service Technician (Service Tech); Transportation Refrigeration Technician (U.S. Department of Labor, O\*NET, Refrigeration Mechanics and Installers, 2020r)

### **Solar Thermal Installers and Technicians**

Install or repair solar energy systems designed to collect, store, and circulate solar-heated water for residential, commercial or industrial use.

*Sample of reported job titles:* Installer, Maintenance Technician, Service Technician, Solar Energy Technician, Solar Hot Water Installer (SHW Installer), Solar Installer, Solar Maintenance Technician, Solar System Installer, Solar Technician, Solar Thermal Installer (U.S. Department of Labor, O\*NET, Solar Thermal Installers and Technicians, 2020s)

### **Supervisors-Mechanics, Installers, and Repairers**

Directly supervise and coordinate the activities of mechanics, installers, and repairers.

*Sample of reported job titles:* Crew Leader, Electrical Foreman, Facilities Manager, Facility Maintenance Supervisor, Maintenance Foreman, Maintenance Manager, Maintenance Planner, Maintenance Supervisor, Production Crew Supervisor, Superintendent (U.S. Department of Labor, O\*NET, Supervisors-Mechanics, Installers, and Repairers, 2020t)

### **Weatherization Installers and Technicians**

Perform a variety of activities to weatherize homes and make them more energy efficient.

Duties include repairing windows, insulating ducts, and performing heating, ventilating, and air-conditioning (HVAC) work. May perform energy audits and advise clients on energy conservation measures.

*Sample of reported job titles:* Building Analyst/Supervisor, Director of Housing and Energy Services, Energy Administrator, Energy Assistant, Energy Auditor, Energy Conservation Director, Housing Director, Lead Weatherization Installer-Technician, Weatherization Director, Weatherization Installer (U.S. Department of Labor, O\*NET, Weatherization Installers and Technicians, 2020u)

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## Top Foundation Skills Required for Jobs in the Energy Sector

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Using information from O\*NET job summaries, the following skills from the Foundation Skills Framework were identified as important skills for jobs in the energy sector.

### ***Maintenance and Repair Workers***

#### ***Observes Critically***

Critical and reflective thinking and discrimination skills needed to notice, analyze, and respond to visual information, especially in irregular or unusual situations

#### ***Lifelong Learning***

Core foundation skills that enable one to reach realistic learning and employment goals through lifelong learning opportunities; includes knowing how to learn, applying skills in new contexts, and anticipating and adapting to changes in the workplace

#### ***Makes Decisions***

Critical, creative, and reflective thinking skills needed to consider relevant facts and opinions, evaluate potential risks and benefits of various decisions, make a decision, and analyze its outcome

#### ***Solves Problems***

Critical, creative, and reflective thinking skills needed to identify problems, analyze and evaluate various solutions, implement solutions and monitor their effectiveness

#### ***Reads with Understanding***

Skills needed to read and understand written work-related information, such as reading for various purposes - reading to complete a task, locate specific information, or critically analyze information

### ***Inspectors, Testers, Sorters, Samplers, and Weighers***

#### ***Observes Critically***

Critical and reflective thinking and discrimination skills needed to notice, analyze, and respond to visual information, especially in irregular or unusual situations

#### ***Listens with Understanding***

Skills needed to comprehend, analyze, and interpret orally presented communications and directions on familiar and unfamiliar topics

#### ***Makes Decisions***

Critical, creative, and reflective thinking skills needed to consider relevant facts and opinions, evaluate potential risks and benefits of various decisions, make a decision, and analyze its outcome

#### ***Reads with Understanding***

Skills needed to read and understand written work-related information, such as reading for various purposes - reading to complete a task, locate specific information, or critically analyze information

#### ***Speaks Clearly and Concisely***

Skills needed to express ideas and information orally in a clear and understandable manner while sustaining interest and attention

### ***Industrial Truck and Tractor Operators***

#### ***Observes Critically***

Critical and reflective thinking and discrimination skills needed to notice, analyze, and respond to visual information, especially in irregular or unusual situations

#### ***Demonstrates Self-Management Strategies***

Skills and knowledge needed to understand how personal factors contribute to employability and how to manage time and tasks effectively

### ***Weatherization Installers and Technicians***

#### ***Observes Critically***

Critical and reflective thinking and discrimination skills needed to notice, analyze, and respond to visual information, especially in irregular or unusual situations



*Listens with Understanding*

Skills needed to comprehend, analyze, and interpret orally presented communications and directions on familiar and unfamiliar topics

*Makes Decisions*

Critical, creative, and reflective thinking skills needed to consider relevant facts and opinions, evaluate potential risks and benefits of various decisions, make a decision, and analyze its outcome

*Speaks Clearly and Concisely*

Skills needed to express ideas and information orally in a clear and understandable manner while sustaining interest and attention

*Reads with Understanding*

Skills needed to read and understand written work-related information, such as reading for various purposes - reading to complete a task, locate specific information, or critically analyze information

*NOTE: All the information on pages 23-25 of this guide is taken verbatim from the Foundation Skills Framework Competency Lists (2016) accessed at [http://www.paadultresources.org/wp-content/uploads/2016/05/FSF-competency\\_list-12-18-17.pdf](http://www.paadultresources.org/wp-content/uploads/2016/05/FSF-competency_list-12-18-17.pdf)*

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