

The Green Economy



The National Center for O*NET Development, as part of its efforts to keep up with the changing world of work, investigated the impact of green economy activities and technologies on occupational requirements and the development of New and Emerging (N&E) occupations. Results of the research led to the identification of green economic sectors, green increased demand occupations, green enhanced skills occupations, and green new and emerging (N&E) occupations. These occupations are now reflected in the O*NET-SOC system.

For the National Center for O*NET Development's research on the green economy, read [Greening of the World of Work: Implications for O*NET-SOC and New and Emerging Occupations](#).

Green Sectors

Major work activities of the green economy cover a broad spectrum. To efficiently and effectively determine the potential occupational implications of green technology, workplace activities were categorized under different green economy sectors:

Renewable Energy Generation

This sector covers activities related to developing and using energy sources such as solar, wind, geothermal, and biomass. This sector also includes traditional, non-renewable sources of energy undergoing significant green technological changes (e.g., oil, coal, gas, and nuclear).

Transportation

This sector covers activities related to increasing efficiency and/or reducing environmental impact of various modes of transportation including trucking, mass transit, and freight rail.

Energy Efficiency

This sector covers activities related to increasing energy efficiency (broadly defined), making energy demand response more effective, constructing "smart grids," and other energy efficient activities.

Green Construction

This sector covers activities related to constructing new green buildings, retrofitting residential and commercial buildings, and installing other green construction technology.

Energy Trading

This sector covers financial services related to buying and selling energy as an economic commodity, as well as carbon trading projects.

Energy and Carbon Capture and Storage

This sector covers activities related to capturing and storing energy and/or carbon emissions, as well as technologies related to power plants using the integrated gasification combined cycle (IGCC) technique.

Research, Design, and Consulting Services

This sector encompasses "indirect jobs" to the green economy which includes activities such as energy consulting or research and other related business services.

Environment Protection

This sector covers activities related to environmental remediation, climate change adaptation, and ensuring or enhancing air quality.

Agriculture and Forestry

This sector covers activities related to using natural pesticides, efficient land management or farming, and aquaculture.

Manufacturing

This sector covers activities related to industrial manufacturing of green technology as well as energy efficient manufacturing processes.

Recycling and Waste Reduction

This sector covers activities related to solid waste and wastewater management, treatment, and reduction, as well as processing recyclable materials.

Governmental and Regulatory Administration

This sector covers activities by public and private organizations associated with conservation and pollution prevention, regulation enforcement, and policy analysis and advocacy.

Green Occupations

The following table includes O*NET-SOC occupations classified as **Green Increased Demand**. The impact of green economy activities and technologies is an increase in employment demand of an existing occupation; however, this impact does not entail significant changes in the work and worker requirements of the occupation.

O*NET-SOC Code	O*NET-SOC Title	O*NET-SOC Description
45-2011.00	Agricultural Inspectors	Inspect agricultural commodities, processing equipment, and facilities, and fish and logging operations, to ensure compliance with regulations and laws governing health, quality, and safety.
17-3011.01	Architectural Drafters	Prepare detailed drawings of architectural designs and plans for buildings and structures according to specifications provided by architect.
47-2011.00	Boilermakers	Construct, assemble, maintain, and repair stationary steam boilers and boiler house auxiliaries. Align structures or plate sections to assemble boiler frame tanks or vats, following blueprints. Work involves use of hand and power tools, plumb bobs, levels, wedges, dogs, or turnbuckles. Assist in testing assembled vessels. Direct cleaning of boilers and boiler furnaces. Inspect and repair boiler fittings, such as safety valves, regulators, automatic-control mechanisms, water columns, and auxiliary machines.
53-3021.00	Bus Drivers, Transit and Intercity	Drive bus or motor coach, including regular route operations, charters, and private carriage. May assist passengers with baggage. May collect fares or tickets.
47-2051.00	Cement Masons and Concrete Finishers	Smooth and finish surfaces of poured concrete, such as floors, walks, sidewalks, roads, or curbs using a variety of hand and power tools. Align forms for sidewalks, curbs, or gutters; patch voids; use saws to cut expansion joints.

17-2041.00	Chemical Engineers	Design chemical plant equipment and devise processes for manufacturing chemicals and products, such as gasoline, synthetic rubber, plastics, detergents, cement, paper, and pulp, by applying principles and technology of chemistry, physics, and engineering.
51-9011.00	Chemical Equipment Operators and Tenders	Operate or tend equipment to control chemical changes or reactions in the processing of industrial or consumer products. Equipment used includes devulcanizers, steam-jacketed kettles, and reactor vessels.
51-8091.00	Chemical Plant and System Operators	Control or operate an entire chemical process or system of machines.
19-4031.00	Chemical Technicians	Conduct chemical and physical laboratory tests to assist scientists in making qualitative and quantitative analyses of solids, liquids, and gaseous materials for purposes, such as research and development of new products or processes, quality control, maintenance of environmental standards, and other work involving experimental, theoretical, or practical application of chemistry and related sciences.
19-2031.00	Chemists	Conduct qualitative and quantitative chemical analyses or chemical experiments in laboratories for quality or process control or to develop new products or knowledge.
27-1021.00	Commercial and Industrial Designers	Develop and design manufactured products, such as cars, home appliances, and children's toys. Combine artistic talent with research on product use, marketing, and materials to create the most functional and appealing product design.
15-1032.00	Computer Software Engineers, Systems Software	Research, design, develop, and test operating systems-level software, compilers, and network distribution software for medical, industrial, military, communications, aerospace, business, scientific, and general computing applications. Set operational specifications and formulate and analyze software requirements. Apply principles and techniques of computer science, engineering, and mathematical analysis.
51-4011.00	Computer-Controlled Machine Tool Operators, Metal and Plastic	Operate computer-controlled machines or robots to perform one or more machine functions on metal or plastic work pieces.
47-2031.01	Construction Carpenters	Construct, erect, install, and repair structures and fixtures of wood, plywood, and wallboard, using carpenter's hand tools and power tools.

43-4051.00	Customer Service Representatives	Interact with customers to provide information in response to inquiries about products and services and to handle and resolve complaints.
51-4031.00	Cutting, Punching, and Press Machine Setters, Operators, and Tenders, Metal and Plastic	Set up, operate, or tend machines to saw, cut, shear, slit, punch, crimp, notch, bend, or straighten metal or plastic material.
43-5032.00	Dispatchers, except Police, Fire, and Ambulance	Schedule and dispatch workers, work crews, equipment, or service vehicles for conveyance of materials, freight, or passengers, or for normal installation, service, or emergency repairs rendered outside the place of business. Duties may include using radio, telephone, or computer to transmit assignments and compiling statistics and reports on work progress.
51-4032.00	Drilling and Boring Machine Tool Setters, Operators, and Tenders, Metal and Plastic	Set up, operate, or tend drilling machines to drill, bore, ream, mill, or countersink metal or plastic work pieces.
51-2022.00	Electrical and Electronic Equipment Assemblers	Assemble or modify electrical or electronic equipment, such as computers, test equipment telemetering systems, electric motors, and batteries.
49-2094.00	Electrical and Electronics Repairers, Commercial and Industrial Equipment	Repair, test, adjust, or install electronic equipment, such as industrial controls, transmitters, and antennas.
49-9051.00	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.
47-2111.00	Electricians	Install, maintain, and repair electrical wiring, equipment, and fixtures. Ensure that work is in accordance with relevant codes. May install or service street lights, intercom systems, or electrical control systems.
17-3023.01	Electronics Engineering Technicians	Lay out, build, test, troubleshoot, repair, and modify developmental and production electronic components, parts, equipment, and systems, such as computer equipment, missile control instrumentation, electron tubes, test equipment, and machine tool numerical controls, applying principles and theories of electronics, electrical circuitry, engineering mathematics, electronic and electrical testing, and physics. Usually work under direction of engineering staff.

51-2031.00	Engine and Other Machine Assemblers	Construct, assemble, or rebuild machines, such as engines, turbines, and similar equipment used in such industries as construction, extraction, textiles, and paper manufacturing.
19-2041.00	Environmental Scientists and Specialists, Including Health	Conduct research or perform investigation for the purpose of identifying, abating, or eliminating sources of pollutants or hazards that affect either the environment or the health of the population. Utilizing knowledge of various scientific disciplines may collect, synthesize, study, report, and take action based on data derived from measurements or observations of air, food, soil, water, and other sources.
25-9021.00	Farm and Home Management Advisors	Advise, instruct, and assist individuals and families engaged in agriculture, agricultural-related processes, or home economics activities. Demonstrate procedures and apply research findings to solve problems; instruct and train in product development, sales, and the utilization of machinery and equipment to promote general welfare. Includes county agricultural agents, feed and farm management advisers, home economists, and extension service advisers.
45-1011.07	First-Line Supervisors/Managers of Agricultural Crop and Horticultural Workers	Directly supervise and coordinate activities of agricultural crop or horticultural workers.
45-1011.05	First-Line Supervisors/Managers of Logging Workers	Directly supervise and coordinate activities of logging workers.
49-1011.00	First-Line Supervisors/Managers of Mechanics, Installers, and Repairers	Supervise and coordinate the activities of mechanics, installers, and repairers.
51-1011.00	First-Line Supervisors/Managers of Production and Operating Workers	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.
33-3031.00	Fish and Game Wardens	Patrol assigned area to prevent fish and game law violations. Investigate reports of damage to crops or property by wildlife. Compile biological data.

19-4093.00	Forest and Conservation Technicians	Compile data pertaining to size, content, condition, and other characteristics of forest tracts, under direction of foresters; train and lead forest workers in forest propagation, fire prevention and suppression. May assist conservation scientists in managing, improving, and protecting rangelands and wildlife habitats, and help provide technical assistance regarding the conservation of soil, water, and related natural resources.
45-4011.00	Forest and Conservation Workers	Under supervision, perform manual labor necessary to develop, maintain, or protect forest, forested areas, and woodlands through such activities as raising and transporting tree seedlings; combating insects, pests, and diseases harmful to trees; and building erosion and water control structures and leaching of forest soil. Includes forester aides, seedling pullers, and tree planters.
47-3012.00	Helpers--Carpenters	Help carpenters by performing duties of lesser skill. Duties include using, supplying or holding materials or tools, and cleaning work area and equipment.
49-9098.00	Helpers--Installation, Maintenance, and Repair Workers	Help installation, maintenance, and repair workers in maintenance, parts replacement, and repair of vehicles, industrial machinery, and electrical and electronic equipment. Perform duties, such as furnishing tools, materials, and supplies to other workers; cleaning work area, machines, and tools; and holding materials or tools for other workers.
19-2043.00	Hydrologists	Research the distribution, circulation, and physical properties of underground and surface waters; study the form and intensity of precipitation, its rate of infiltration into the soil, movement through the earth, and its return to the ocean and atmosphere.
17-2112.00	Industrial Engineers	Design, develop, test, and evaluate integrated systems for managing industrial production processes including human work factors, quality control, inventory control, logistics and material flow, cost analysis, and production coordination.
49-9041.00	Industrial Machinery Mechanics	Repair, install, adjust, or maintain industrial production and processing machinery or refinery and pipeline distribution systems.
11-3051.00	Industrial Production Managers	Plan, direct, or coordinate the work activities and resources necessary for manufacturing products in accordance with cost, quality, and quantity specifications.

17-2111.01	Industrial Safety and Health Engineers	Plan, implement, and coordinate safety programs, requiring application of engineering principles and technology, to prevent or correct unsafe environmental working conditions.
53-7051.00	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.
47-2131.00	Insulation Workers, Floor, Ceiling, and Wall	Line and cover structures with insulating materials. May work with batt, roll, or blown insulation materials.
53-7062.00	Laborers and Freight, Stock, and Material Movers, Hand	Manually move freight, stock, or other materials or perform other unskilled general labor. Includes all unskilled manual laborers not elsewhere classified.
53-4011.00	Locomotive Engineers	Drive electric, diesel-electric, steam, or gas-turbine-electric locomotives to transport passengers or freight. Interpret train orders, electronic or manual signals, and railroad rules and regulations.
19-2032.00	Materials Scientists	Research and study the structures and chemical properties of various natural and manmade materials, including metals, alloys, rubber, ceramics, semiconductors, polymers, and glass. Determine ways to strengthen or combine materials or develop new materials with new or specific properties for use in a variety of products and applications.
49-9044.00	Millwrights	Install, dismantle, or move machinery and heavy equipment according to layout plans, blueprints, or other drawings.
51-9023.00	Mixing and Blending Machine Setters, Operators, and Tenders	Set up, operate, or tend machines to mix or blend materials, such as chemicals, tobacco, liquids, color pigments, or explosive ingredients.
11-9121.00	Natural Sciences Managers	Plan, direct, or coordinate activities in such fields as life sciences, physical sciences, mathematics, statistics, and research and development in these fields.
29-9011.00	Occupational Health and Safety Specialists	Review, evaluate, and analyze work environments and design programs and procedures to control, eliminate, and prevent disease or injury caused by chemical, physical, and biological agents or ergonomic factors. May conduct inspections and enforce adherence to laws and regulations governing the health and safety of individuals. May be employed in the public or private sector.

47-2073.00	Operating Engineers and Other Construction Equipment Operators	Operate one or several types of power construction equipment, such as motor graders, bulldozers, scrapers, compressors, pumps, derricks, shovels, tractors, or front-end loaders to excavate, move, and grade earth, erect structures, or pour concrete or other hard surface pavement. May repair and maintain equipment in addition to other duties.
51-8012.00	Power Distributors and Dispatchers	Coordinate, regulate, or distribute electricity or steam.
43-5061.00	Production, Planning, and Expediting Clerks	Coordinate and expedite the flow of work and materials within or between departments of an establishment according to production schedule. Duties include reviewing and distributing production, work, and shipment schedules; conferring with department supervisors to determine progress of work and completion dates; and compiling reports on progress of work, inventory levels, costs, and production problems.
13-1021.00	Purchasing Agents and Buyers, Farm Products	Purchase farm products either for further processing or resale.
47-4061.00	Rail-Track Laying and Maintenance Equipment Operators	Lay, repair, and maintain track for standard or narrow-gauge railroad equipment used in regular railroad service or in plant yards, quarries, sand and gravel pits, and mines. Includes ballast cleaning machine operators and road bed tamping machine operators.
53-4031.00	Railroad Conductors and Yardmasters	Conductors coordinate activities of train crew on passenger or freight train. Coordinate activities of switch-engine crew within yard of railroad, industrial plant, or similar location. Yardmasters coordinate activities of workers engaged in railroad traffic operations, such as the makeup or breakup of trains, yard switching, and review train schedules and switching orders.
49-9021.02	Refrigeration Mechanics and Installers	Install and repair industrial and commercial refrigerating systems.
47-2031.02	Rough Carpenters	Build rough wooden structures, such as concrete forms, scaffolds, tunnel, bridge, or sewer supports, billboard signs, and temporary frame shelters, according to sketches, blueprints, or oral instructions.
51-4121.07	Solderers and Brazers	Braze or solder together components to assemble fabricated metal parts, using soldering iron, torch, or welding machine and flux.

51-8021.00	Stationary Engineers and Boiler Operators	Operate or maintain stationary engines, boilers, or other mechanical equipment to provide utilities for buildings or industrial processes. Operate equipment, such as steam engines, generators, motors, turbines, and steam boilers.
47-2221.00	Structural Iron and Steel Workers	Raise, place, and unite iron or steel girders, columns, and other structural members to form completed structures or structural frameworks. May erect metal storage tanks and assemble prefabricated metal buildings.
51-2041.00	Structural Metal Fabricators and Fitters	Fabricate, lay out, position, align, and fit parts of structural metal products.
51-2092.00	Team Assemblers	Work as part of a team having responsibility for assembling an entire product or component of a product. Team assemblers can perform all tasks conducted by the team in the assembly process and rotate through all or most of them rather than being assigned to a specific task on a permanent basis. May participate in making management decisions affecting the work. Team leaders who work as part of the team should be included.
51-4121.06	Welders, Cutters, and Welder Fitters	Use hand-welding or flame-cutting equipment to weld or join metal components or to fill holes, indentations, or seams of fabricated metal products.
19-1023.00	Zoologists and Wildlife Biologists	Study the origins, behavior, diseases, genetics, and life processes of animals and wildlife. May specialize in wildlife research and management, including the collection and analysis of biological data to determine the environmental effects of present and potential use of land and water areas.

The following table includes O*NET-SOC occupations classified as **Green Enhanced Skills**. The impact of green economy activities and technologies is a significant change to the work and worker requirements of an existing occupation. This impact may or may not result in an increase in employment demand for the occupation.

O*NET-SOC Code	O*NET-SOC Title	O*NET-SOC Description
17-2011.00	Aerospace Engineers	Perform a variety of engineering work in designing, constructing, and testing aircraft, missiles, and spacecraft. May conduct basic and applied research to evaluate adaptability of materials and equipment to aircraft design and manufacture. May recommend improvements in testing equipment and techniques.
19-4011.01	Agricultural Technicians	Set up and maintain laboratory equipment and collect samples from crops or animals. Prepare specimens and record data to assist scientist in biology or related science experiments.
51-2011.00	Aircraft Structure, Surfaces, Rigging, and Systems Assemblers	Assemble, fit, fasten, and install parts of airplanes, space vehicles, or missiles, such as tails, wings, fuselage, bulkheads, stabilizers, landing gear, rigging and control equipment, or heating and ventilating systems.
23-1022.00	Arbitrators, Mediators, and Conciliators	Facilitate negotiation and conflict resolution through dialogue. Resolve conflicts outside of the court system by mutual consent of parties involved.
17-1011.00	Architects, except Landscape and Naval	Plan and design structures, such as private residences, office buildings, theaters, factories, and other structural property.
19-2021.00	Atmospheric and Space Scientists	Investigate atmospheric phenomena and interpret meteorological data gathered by surface and air stations, satellites, and radar to prepare reports and forecasts for public and other uses.
49-3023.02	Automotive Specialty Technicians	Repair only one system or component on a vehicle, such as brakes, suspension, or radiator.

17-2051.00	Civil Engineers	Perform engineering duties in planning, designing, and overseeing construction and maintenance of building structures, and facilities, such as roads, railroads, airports, bridges, harbors, channels, dams, irrigation projects, pipelines, power plants, water and sewage systems, and waste disposal units. Includes architectural, structural, traffic, ocean, and geo-technical engineers.
47-4011.00	Construction and Building Inspectors	Inspect structures using engineering skills to determine structural soundness and compliance with specifications, building codes, and other regulations. Inspections may be general in nature or may be limited to a specific area, such as electrical systems or plumbing.
47-2061.00	Construction Laborers	Perform tasks involving physical labor at building, highway, and heavy construction projects, tunnel and shaft excavations, and demolition sites. May operate hand and power tools of all types: air hammers, earth tampers, cement mixers, small mechanical hoists, surveying and measuring equipment, and a variety of other equipment and instruments. May clean and prepare sites, dig trenches, set braces to support the sides of excavations, erect scaffolding, clean up rubble and debris, and remove asbestos, lead, and other hazardous waste materials. May assist other craft workers.
11-9021.00	Construction Managers	Plan, direct, coordinate, or budget, usually through subordinate supervisory personnel, activities concerned with the construction and maintenance of structures, facilities, and systems. Participate in the conceptual development of a construction project and oversee its organization, scheduling, and implementation.
47-5041.00	Continuous Mining Machine Operators	Operate self-propelled mining machines that rip coal, metal and nonmetal ores, rock, stone, or sand from the face and load it onto conveyors or into shuttle cars in a continuous operation.
17-3023.03	Electrical Engineering Technicians	Apply electrical theory and related knowledge to test and modify developmental or operational electrical machinery and electrical control equipment and circuitry in industrial or commercial plants and laboratories. Usually work under direction of engineering staff.
17-2071.00	Electrical Engineers	Design, develop, test, or supervise the manufacturing and installation of electrical equipment, components, or systems for commercial, industrial, military, or scientific use.

17-3024.00	Electro-Mechanical Technicians	Operate, test, and maintain unmanned, automated, servo-mechanical, or electromechanical equipment. May operate unmanned submarines, aircraft, or other equipment at worksites, such as oil rigs, deep ocean exploration, or hazardous waste removal. May assist engineers in testing and designing robotics equipment.
17-2072.00	Electronics Engineers, except Computer	Research, design, develop, and test electronic components and systems for commercial, industrial, military, or scientific use utilizing knowledge of electronic theory and materials properties. Design electronic circuits and components for use in fields such as telecommunications, aerospace guidance and propulsion control, acoustics, or instruments and controls.
11-9041.00	Engineering Managers	Plan, direct, or coordinate activities in such fields as architecture and engineering or research and development in these fields.
17-3025.00	Environmental Engineering Technicians	Apply theory and principles of environmental engineering to modify, test, and operate equipment and devices used in the prevention, control, and remediation of environmental pollution, including waste treatment and site remediation. May assist in the development of environmental pollution remediation devices under direction of engineer.
17-2081.00	Environmental Engineers	Design, plan, or perform engineering duties in the prevention, control, and remediation of environmental health hazards utilizing various engineering disciplines. Work may include waste treatment, site remediation, or pollution control technology.
19-4091.00	Environmental Science and Protection Technicians, Including Health	Performs laboratory and field tests to monitor the environment and investigate sources of pollution, including those that affect health. Under direction of an environmental scientist or specialist, may collect samples of gases, soil, water, and other materials for testing and take corrective actions as assigned.
11-9012.00	Farmers and Ranchers	On an ownership or rental basis, operate farms, ranches, greenhouses, nurseries, timber tracts, or other agricultural production establishments which produce crops, horticultural specialties, livestock, poultry, finfish, shellfish, or animal specialties. May plant, cultivate, harvest, perform post-harvest activities, and market crops and livestock; may hire, train, and supervise farm workers or supervise a farm labor contractor; may prepare cost, production, and other records. May maintain and operate machinery and perform physical work.

13-2051.00	Financial Analysts	Conduct quantitative analyses of information affecting investment programs of public or private institutions.
11-1021.00	General and Operations Managers	Plan, direct, or coordinate the operations of companies or public and private sector organizations. Duties and responsibilities include formulating policies, managing daily operations, and planning the use of materials and human resources, but are too diverse and general in nature to be classified in any one functional area of management or administration, such as personnel, purchasing, or administrative services. Includes owners and managers who head small business establishments whose duties are primarily managerial.
19-4041.02	Geological Sample Test Technicians	Test and analyze geological samples, crude oil, or petroleum products to detect presence of petroleum, gas, or mineral deposits indicating potential for exploration and production, or to determine physical and chemical properties to ensure that products meet quality standards.
19-4041.01	Geophysical Data Technicians	Measure, record, and evaluate geological data, using sonic, electronic, electrical, seismic, or gravity-measuring instruments to prospect for oil or gas. May collect and evaluate core samples and cuttings.
19-2042.00	Geoscientists, except Hydrologists and Geographers	Study the composition, structure, and other physical aspects of the earth. May use geological, physics, and mathematics knowledge in exploration for oil, gas, minerals, or underground water; or in waste disposal, land reclamation, or other environmental problems. May study the earth's internal composition, atmospheres, oceans, and its magnetic, electrical, and gravitational forces. Includes mineralogists, crystallographers, paleontologists, stratigraphers, geodesists, and seismologists.
47-4041.00	Hazardous Materials Removal Workers	Identify, remove, pack, transport, or dispose of hazardous materials, including asbestos, lead-based paint, waste oil, fuel, transmission fluid, radioactive materials, contaminated soil, etc. Specialized training and certification in hazardous materials handling or a confined entry permit are generally required. May operate earth-moving equipment or trucks.
49-9021.01	Heating and Air Conditioning Mechanics and Installers	Install, service, and repair heating and air conditioning systems in residences and commercial establishments.

17-3026.00	Industrial Engineering Technicians	Apply engineering theory and principles to problems of industrial layout or manufacturing production, usually under the direction of engineering staff. May study and record time, motion, method, and speed involved in performance of production, maintenance, clerical, and other worker operations for such purposes as establishing standard production rates or improving efficiency.
51-9061.00	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.
17-1012.00	Landscape Architects	Plan and design land areas for such projects as parks and other recreational facilities, airports, highways, hospitals, schools, land subdivisions, and commercial, industrial, and residential sites.
51-4041.00	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, shop mathematics, metal properties, layout, and machining procedures.
49-9042.00	Maintenance and Repair Workers, General	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.
11-2021.00	Marketing Managers	Determine the demand for products and services offered by a firm and its competitors and identify potential customers. Develop pricing strategies with the goal of maximizing the firm's profits or share of the market while ensuring the firm's customers are satisfied. Oversee product development or monitor trends that indicate the need for new products and services.
17-2141.00	Mechanical Engineers	Perform engineering duties in planning and designing tools, engines, machines, and other mechanically functioning equipment. Oversee installation, operation, maintenance, and repair of such equipment as centralized heat, gas, water, and steam systems.

17-2161.00	Nuclear Engineers	Conduct research on nuclear engineering problems or apply principles and theory of nuclear science to problems concerned with release, control, and utilization of nuclear energy and nuclear waste disposal.
19-4051.01	Nuclear Equipment Operation Technicians	Operate equipment used for the release, control, and utilization of nuclear energy to assist scientists in laboratory and production activities.
51-8011.00	Nuclear Power Reactor Operators	Control nuclear reactors.
29-9012.00	Occupational Health and Safety Technicians	Collect data on work environments for analysis by occupational health and safety specialists. Implement and conduct evaluation of programs designed to limit chemical, physical, biological, and ergonomic risks to workers.
13-2052.00	Personal Financial Advisors	Advise clients on financial plans utilizing knowledge of tax and investment strategies, securities, insurance, pension plans, and real estate. Duties include assessing clients' assets, liabilities, cash flow, insurance coverage, tax status, and financial objectives to establish investment strategies.
47-2152.01	Pipe Fitters and Steamfitters	Lay out, assemble, install, and maintain pipe systems, pipe supports, and related hydraulic and pneumatic equipment for steam, hot water, heating, cooling, lubricating, sprinkling, and industrial production and processing systems.
47-2152.02	Plumbers	Assemble, install, and repair pipes, fittings, and fixtures of heating, water, and drainage systems, according to specifications and plumbing codes.
51-8013.00	Power Plant Operators	Control, operate, or maintain machinery to generate electric power. Includes auxiliary equipment operators.
27-3031.00	Public Relations Specialists	Engage in promoting or creating good will for individuals, groups, or organizations by writing or selecting favorable publicity material and releasing it through various communications media. May prepare and arrange displays, and make speeches.
53-7081.00	Refuse and Recyclable Material Collectors	Collect and dump refuse or recyclable materials from containers into truck. May drive truck.

27-3022.00	Reporters and Correspondents	Collect and analyze facts about newsworthy events by interview, investigation, or observation. Report and write stories for newspaper, news magazine, radio, or television.
47-2181.00	Roofers	Cover roofs of structures with shingles, slate, asphalt, aluminum, wood, and related materials. May spray roofs, sidings, and walls with material to bind, seal, insulate, or soundproof sections of structures.
41-4011.00	Sales Representatives, Wholesale and Manufacturing, Technical and Scientific Products	Sell goods for wholesalers or manufacturers where technical or scientific knowledge is required in such areas as biology, engineering, chemistry, and electronics, normally obtained from at least 2 years of post-secondary education.
51-9012.00	Separating, Filtering, Clarifying, Precipitating, and Still Machine Setters, Operators, and Tenders	Set up, operate, or tend continuous flow or vat-type equipment; filter presses; shaker screens; centrifuges; condenser tubes; precipitating, fermenting, or evaporating tanks; scrubbing towers; or batch stills. These machines extract, sort, or separate liquids, gases, or solids from other materials to recover a refined product. Includes dairy processing equipment operators.
47-5013.00	Service Unit Operators, Oil, Gas, and Mining	Operate equipment to increase oil flow from producing wells or to remove stuck pipe, casing, tools, or other obstructions from drilling wells. May also perform similar services in mining exploration operations.
47-2211.00	Sheet Metal Workers	Fabricate, assemble, install, and repair sheet metal products and equipment, such as ducts, control boxes, drainpipes, and furnace casings. Work may involve any of the following: setting up and operating fabricating machines to cut, bend, and straighten sheet metal; shaping metal over anvils, blocks, or forms using hammer; operating soldering and welding equipment to join sheet metal parts; inspecting, assembling, and smoothing seams and joints of burred surfaces.
43-5071.00	Shipping, Receiving, and Traffic Clerks	Verify and keep records on incoming and outgoing shipments. Prepare items for shipment. Duties include assembling, addressing, stamping, and shipping merchandise or material; receiving, unpacking, verifying and recording incoming merchandise or material; and arranging for the transportation of products.
19-1031.01	Soil and Water Conservationists	Plan and develop coordinated practices for soil erosion control, soil and water conservation, and sound land use.

11-3071.02	Storage and Distribution Managers	Plan, direct, and coordinate the storage and distribution operations within an organization or the activities of organizations that are engaged in storing and distributing materials and products.
13-1073.00	Training and Development Specialists	Conduct training and development programs for employees.
11-3071.01	Transportation Managers	Plan, direct, and coordinate the transportation operations within an organization or the activities of organizations that provide transportation services.
53-6051.07	Transportation Vehicle, Equipment and Systems Inspectors, except Aviation	Inspect and monitor transportation equipment, vehicles or systems to ensure compliance with regulations and safety standards.
53-3032.00	Truck Drivers, Heavy and Tractor-Trailer	Drive a tractor-trailer combination or a truck with a capacity of at least 26,000 GVW, to transport and deliver goods, livestock, or materials in liquid, loose, or packaged form. May be required to unload truck. May require use of automated routing equipment. Requires commercial drivers' license.
19-3051.00	Urban and Regional Planners	Develop comprehensive plans and programs for use of land and physical facilities of local jurisdictions, such as towns, cities, counties, and metropolitan areas.
13-1022.00	Wholesale and Retail Buyers, except Farm Products	Buy merchandise or commodities, other than farm products, for resale to consumers at the wholesale or retail level, including both durable and nondurable goods. Analyze past buying trends, sales records, price, and quality of merchandise to determine value and yield. Select, order, and authorize payment for merchandise according to contractual agreements. May conduct meetings with sales personnel and introduce new products.

The following table includes **Green New and Emerging (N&E)** occupations. The impact of green economy activities and technologies is sufficient to create the need for unique work and worker requirements, which resulted in the generation of a new occupation relative to the O*NET taxonomy.

O*NET-SOC Code	O*NET-SOC Title	O*NET-SOC Description
n/a	Air Quality Control Specialists	Perform a wide range of air quality compliance duties including equipment and facility permitting, compliance auditing, emissions control research, recordkeeping and reporting, participation in planning processes.
17-3027.01	Automotive Engineering Technicians	Assist engineers in determining the practicality of proposed product design changes, and plan and carry out tests on experimental test devices and equipment for performance, durability and efficiency.
17-2141.02	Automotive Engineers	Develop new or improved designs for vehicle structural members, engines, transmissions and other vehicle systems, using computer-assisted design technology. Direct building, modification, and testing of vehicle and components.
17-2199.01	Biochemical Engineers	Apply knowledge of biology, chemistry, and engineering to develop usable, tangible products. Solve problems related to materials, systems and processes that interact with humans, plants, animals, microorganisms, and biological materials.
51-8099.01	Biofuels Processing Technicians	Calculate, measure, load, mix, and process refined feedstock with additives in fermentation or reaction process vessels and monitor production process. Perform, and keep records of, plant maintenance, repairs, and safety inspections.
11-3051.03	Biofuels Production Managers	Manage operations at biofuels power generation facilities. Collect and process information on plant performance, diagnose problems, and design corrective procedures.
11-9041.01	Biofuels/Biodiesel Technology and Product Development Managers	Define, plan, or execute biofuels/biodiesel research programs that evaluate alternative feedstock and process technologies with near-term commercial potential.

n/a	Biomass Plant Engineers	Design plants that generate electricity from the combustion of biomass.
51-8099.03	Biomass Plant Technicians	Control and monitor biomass plant activities and perform maintenance as needed.
11-3051.04	Biomass Production Managers	Manage operations at biomass power generation facilities. Direct work activities at plant, including supervision of operations and maintenance staff.
11-9199.11	Brownfield Redevelopment Specialists and Site Managers	Participate in planning and directing cleanup and redevelopment of contaminated properties for reuse. Does not include properties sufficiently contaminated to qualify as Superfund sites.
n/a	Carbon Capture and Sequestration Systems Installers	Install and maintain carbon energy capture or carbon sequestration facilities.
n/a	Carbon Credit Traders	Represent companies in the sale and purchase of carbon emissions permits.
n/a	Carbon Trading Analysts	Analyze pricing and risks of carbon trading products; develop solutions to help clients hedge carbon exposure and risk.
11-1011.03	Chief Sustainability Officers	Communicate and coordinate with management, shareholders, customers, and employees to address sustainability issues. Enact or oversee a corporate sustainability strategy.
19-2041.01	Climate Change Analysts	Research and analyze policy developments related to climate change. Make climate-related recommendations for actions such as legislation, awareness campaigns, or fundraising approaches.
11-9199.02	Compliance Managers	Plan, direct, or coordinate activities of an organization to ensure compliance with ethical or regulatory standards.
17-3029.02	Electrical Engineering Technologists	Apply engineering theory and technical skills to support electrical engineering activities such as process control, electrical power distribution, and instrumentation design. Prepare layouts of machinery and equipment, plan the flow of work, conduct statistical studies and analyze production costs.

17-3029.03	Electromechanical Engineering Technologists	Apply engineering theory and technical skills to support electromechanical engineering activities such as computer-based process control, instrumentation, and machine design. Prepare layouts of machinery and equipment, plan the flow of work, conduct statistical studies and analyze production costs.
17-3029.04	Electronics Engineering Technologists	Apply engineering theory and technical skills to support electronics engineering activities such as electronics systems and instrumentation design and digital signal processing.
13-1199.01	Energy Auditors	Conduct energy audits of buildings, building systems and process systems. May also conduct investment grade audits of buildings or systems.
41-3099.01	Energy Brokers	Purchase or sell energy for customers.
17-2199.03	Energy Engineers	Design, develop, and evaluate energy-related projects and programs to reduce energy costs or improve energy efficiency during the designing, building, or remodeling stages of construction. May specialize in electrical systems; heating, ventilation, and air-conditioning (HVAC) systems; green buildings; lighting; air quality; or energy procurement.
n/a	Environmental Certification Specialists	Guide clients such as manufacturers, organic farms, and timber companies through the process of being certified as green.
19-3011.01	Environmental Economists	Assess and quantify the benefits of environmental alternatives, such as use of renewable energy resources.
19-2041.02	Environmental Restoration Planners	Collaborate with field and biology staff to oversee the implementation of restoration projects and to develop new products. Process and synthesize complex scientific data into practical strategies for restoration, monitoring or management.
13-2099.01	Financial Quantitative Analysts	Develop quantitative financial products used to inform individuals and financial institutions engaged in saving, lending, investing, borrowing, or managing risk. Investigate methods for financial analysis to create mathematical models used to develop improved analytical tools and advanced financial investment instruments.

43-5011.01	Freight Forwarders	Research rates, routings, or modes of transport for shipment of products. Maintain awareness of regulations affecting the international movement of cargo. Make arrangements for additional services such as storage and inland transportation.
17-2141.01	Fuel Cell Engineers	Design, evaluate, modify, and construct fuel cell components and systems for transportation, stationary, or portable applications.
17-3029.10	Fuel Cell Technicians	Install, operate, and maintain integrated fuel cell systems in transportation, stationary, or portable applications.
15-1099.07	Geographic Information Systems Technicians	Assist scientists, technologists, and related professionals in building, maintaining, modifying, and using geographic information systems (GIS) databases. May also perform some custom application development and provide user support.
15-1099.06	Geospatial Information Scientists and Technologists	Research and develop geospatial technologies. May produce databases, perform applications programming or coordinate projects. May specialize in areas such as agriculture, mining, health care, retail trade, urban planning or military intelligence.
11-3051.02	Geothermal Production Managers	Manage operations at geothermal power generation facilities. Maintain and monitor geothermal plant equipment for efficient and safe plant operations.
49-9099.01	Geothermal Technicians	Perform technical activities at power plants or individual installations necessary for the generation of power from geothermal energy sources. Monitor and control operating activities at geothermal power generation facilities and perform maintenance and repairs as necessary. Install, test, and maintain residential and commercial geothermal heat pumps.
11-2011.01	Green Marketers	Create and implement methods to market green products and services.
n/a	Greenhouse Gas Emissions Permitting Consultants	Conduct data gathering, data analysis, calculation, inventories and reduction planning, and be familiar with emerging regulations on greenhouse gas management.
n/a	Greenhouse Gas Emissions Report Verifiers	Conduct data audits of reported greenhouse gas emissions inventories.

51-8099.04	Hydroelectric Plant Technicians	Monitor and control activities associated with hydropower generation. Operate plant equipment, such as turbines, pumps, valves, gates, fans, electric control boards, and battery banks. Monitor equipment operation and performance and make necessary adjustments to ensure optimal performance. Perform equipment maintenance and repair as necessary.
11-3051.06	Hydroelectric Production Managers	Manage operations at hydroelectric power generation facilities. Maintain and monitor hydroelectric plant equipment for efficient and safe plant operations.
19-2041.03	Industrial Ecologists	Study or investigate industrial production and natural ecosystems to achieve high production, sustainable resources, and environmental safety or protection. May apply principles and activities of natural ecosystems to develop models for industrial systems.
17-3029.05	Industrial Engineering Technologists	Apply engineering theory and technical skills to support industrial engineering activities such as quality control, inventory control and material flow methods. May conduct statistical studies and analyze production costs.
13-2099.03	Investment Underwriters	Intermediate between corporate issuers of securities and clients regarding private equity investments. Underwrite the issuance of securities to provide capital for client growth. Negotiate and structure the terms of mergers and acquisitions.
13-1081.02	Logistics Analysts	Analyze product delivery or supply chain processes to identify or recommend changes. May manage route activity including invoicing, electronic bills, and shipment tracing.
13-1081.01	Logistics Engineers	Design and analyze operational solutions for projects such as transportation optimization, network modeling, process and methods analysis, cost containment, capacity enhancement, routing and shipment optimization, and information management.
11-9199.06	Logistics Managers	Plan, direct, or coordinate purchasing, warehousing, distribution, forecasting, customer service, or planning services. Manage logistics personnel and logistics systems and direct daily operations.
17-3029.06	Manufacturing Engineering Technologists	Apply engineering theory and technical skills to support manufacturing engineering activities. Develop tools, implement designs and integrate machinery, equipment and computer technologies to ensure effective manufacturing processes.

17-2199.04	Manufacturing Engineers	Apply knowledge of materials and engineering theory and methods to design, integrate, and improve manufacturing systems or related processes. May work with commercial or industrial designers to refine product designs to increase producibility and decrease costs.
17-3029.09	Manufacturing Production Technicians	Apply knowledge of manufacturing engineering systems and tools to set up, test, and adjust manufacturing machinery and equipment, using any combination of electrical, electronic, mechanical, hydraulic, pneumatic and computer technologies.
17-3029.07	Mechanical Engineering Technologists	Apply engineering theory and technical skills to support mechanical engineering activities such as generation, transmission and use of mechanical and fluid energy. Prepare layouts of machinery and equipment and plan the flow of work. May conduct statistical studies and analyze production costs.
17-2199.05	Mechatronics Engineers	Apply knowledge of mechanical, electrical, and computer engineering theory and methods to the design of automation, intelligent systems, smart devices, or industrial systems control.
n/a	Methane Capturing System Engineers/Installers/Project Managers	Design gas recovery systems and oversee installation and development process, including recovery modeling, permitting, specifications preparation and project oversight. Develop client relationships and arrange for sales of energy.
11-3051.05	Methane/Landfill Gas Collection System Operators	Direct daily operations, maintenance, or repair of landfill gas projects, including maintenance of daily logs, determination of service priorities, and compliance with reporting requirements.
51-8099.02	Methane/Landfill Gas Generation System Technicians	Monitor, operate, and maintain landfill gas collection system components and environmental monitoring and control systems.
17-2199.06	Microsystems Engineers	Apply knowledge of electronic and mechanical engineering theory and methods, as well as specialized manufacturing technologies, to design and develop microelectromechanical systems (MEMS) devices.
17-2199.09	Nanosystems Engineers	Design, develop, and supervise the production of materials, devices, and systems of unique molecular or macromolecular composition, applying principles of nanoscale physics and electrical, chemical, and biological engineering.

17-3029.12	Nanotechnology Engineering Technicians	Operate commercial-scale production equipment to produce, test, and modify materials, devices, and systems of molecular or macromolecular composition. Work under the supervision of engineering staff.
17-3029.11	Nanotechnology Engineering Technologists	Implement production processes for nanoscale designs to produce and modify materials, devices, and systems of unique molecular or macromolecular composition. Operate advanced microscopy equipment to manipulate nanoscale objects. Work under the supervision of engineering staff.
17-2199.07	Photonics Engineers	Apply knowledge of engineering and mathematical theory and methods to design technologies specializing in light information and light energy.
17-3029.08	Photonics Technicians	Build, install, test, and maintain optical and fiber optic equipment such as lasers, lenses and mirrors using spectrometers, interferometers, or related equipment.
19-4099.02	Precision Agriculture Technicians	Apply geospatial technologies, including geographic information systems (GIS) and Global Positioning System (GPS), to agricultural production and management activities, such as pest scouting, site-specific pesticide application, yield mapping, and variable-rate irrigation. May use computers to develop and analyze maps and remote sensing images to compare physical topography with data on soils, fertilizer, pests or weather.
51-9199.01	Recycling and Reclamation Workers	Prepare and sort materials or products for recycling. Identify and remove hazardous substances. Dismantle components of products such as appliances.
53-1021.01	Recycling Coordinators	Supervise curbside and drop-off recycling programs for municipal governments or private firms.
11-9199.01	Regulatory Affairs Managers	Plan, direct, or coordinate production activities of an organization to ensure compliance with regulations and standard operating procedures.
13-1041.07	Regulatory Affairs Specialists	Coordinate and document internal regulatory processes, such as internal audits, inspections, license renewals or registrations. May compile and prepare materials for submission to regulatory agencies.
19-2099.01	Remote Sensing Scientists and Technologists	Apply remote sensing principles and methods to analyze data and solve problems in areas such as natural resource management, urban planning, and homeland security. May develop new analytical techniques and sensor systems or develop new applications for existing systems.

19-4099.03	Remote Sensing Technicians	Apply remote sensing technologies to assist scientists in areas such as natural resources, urban planning, and homeland security. May prepare flight plans and sensor configurations for flight trips.
13-2099.02	Risk Management Specialists	Analyze and make decisions on risk management issues by identifying, measuring and managing operational and enterprise risks for an organization.
17-2199.08	Robotics Engineers	Research, design, develop, and test robotic applications.
17-3024.01	Robotics Technicians	Build, install, test, and maintain robotic equipment or related automated production systems.
41-3031.03	Securities and Commodities Traders	Buy and sell securities and commodities to transfer debt, capital, or risk. Establish and negotiate unit prices and terms of sale.
47-1011.03	Solar Energy Installation Managers	Direct work crews installing residential or commercial solar photovoltaic or thermal systems.
17-2199.11	Solar Energy Systems Engineers	Perform site-specific engineering analysis or evaluation of energy efficiency and solar projects involving residential, commercial, or industrial customers. Design solar domestic hot water and space heating systems for new and existing structures, applying knowledge of structural energy requirements, local climates, solar technology, and thermodynamics.
47-4099.01	Solar Photovoltaic Installers	Assemble, install, or maintain solar photovoltaic (PV) systems on roofs or other structures in compliance with site assessment and schematics. May include measuring, cutting, assembling, and bolting structural framing and solar modules. May perform minor electrical work such as current checks.
n/a	Solar Power Plant Technicians	Monitor and repair the instrumentation, controls, and electrical systems in a utility-scale solar power generating facility.
41-4011.07	Solar Sales Representatives and Assessors	Contact new or existing customers to determine their solar equipment needs, suggest systems or equipment, or estimate costs.
47-4099.02	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.

n/a	Solar Thermoelectric Plant/Concentrating Thermal Power (CSP) Plant Operators	Direct the operations of a commercial solar-generated power production plant.
11-9199.04	Supply Chain Managers	Direct, or coordinate production, purchasing, warehousing, distribution, or financial forecasting services and activities to limit costs and improve accuracy, customer service and safety. Examine existing procedures and opportunities for streamlining activities to meet product distribution needs. Direct the movement, storage, and processing of inventory.
13-1199.05	Sustainability Specialists	Address organizational sustainability issues, such as waste stream management, green building practices, and green procurement plans.
n/a	Sustainable Design Specialists	Design from the outset for recycling, reuse or remanufacturing.
n/a	Testing Adjusting and Balancing TAB Technicians	Test, adjust, and balance HVAC systems so they perform as designed.
17-2051.01	Transportation Engineers	Develop plans for surface transportation projects according to established engineering standards and state or federal construction policy. Prepare plans, estimates, or specifications to design transportation facilities. Plan alterations and modifications of existing streets, highways, or freeways to improve traffic flow.
19-3099.01	Transportation Planners	Prepare studies for proposed transportation projects. Gather, compile, and analyze data. Study the use and operation of transportation systems. Develop transportation models or simulations.
17-2199.02	Validation Engineers	Design and plan protocols for equipment and processes to produce products meeting internal and external purity, safety, and quality requirements.
11-9121.02	Water Resource Specialists	Design or implement programs and strategies related to water resource issues such as supply, quality, and regulatory compliance issues.
17-2051.02	Water/Wastewater Engineers	Design or oversee projects involving provision of fresh water, disposal of wastewater and sewage, or prevention of flood-related damage. Prepare environmental documentation for water resources, regulatory program compliance, data management and analysis, and field work. Perform hydraulic modeling and pipeline design.

47-4099.03	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.
17-2199.10	Wind Energy Engineers	Design underground or overhead wind farm collector systems and prepare and develop site specifications.
11-9199.09	Wind Energy Operations Managers	Manage wind field operations, including personnel, maintenance activities, financial activities, and planning.
11-9199.10	Wind Energy Project Managers	Lead or manage the development and evaluation of potential wind energy business opportunities, including environmental studies, permitting, and proposals. May also manage construction of projects.
49-9099.02	Wind Turbine Service Technicians	Inspect, diagnose, adjust, or repair wind turbines. Perform maintenance on wind turbine equipment including resolving electrical, mechanical, and hydraulic malfunctions.