HOT RUBBLE

RESA
Capability Solutions

HYDROGEN AND FUEL CELL CAREER GUIDE

August 2021

Abstract

An introduction to the career pathways and job opportunities required to support the roll out of Hydrogen and Fuel Cell technologies in Australia.

HOT RUBBLE

Acknowledgement of Country

RESA acknowledges the Traditional Owners of the land on which we live and work. We recognise the importance of traditions and cultural beliefs of Aboriginal and Torres Strait Islander people, and we offer our respect to Elders past, present and emerging.

Disclaimer

This document has been adapted from the US Office of Energy Efficiency & Renewable Energy, Hydrogen and Fuel Cell Technologies Office online interactive Hydrogen and Fuel Cells Career Map . References have been modified using publically available occupational data relevant to the Australian job market. Salary information has been sourced from the SEEK – Salary Look up tool.

This report is supplied in good faith. In no event shall RESA be liable for any incidental or consequential damages arising from any use or reliance on the material provided.

Copyright

HOT RUBBLE

Contents

HOT RUBBLE

Hydrogen and Fuel Cell Careers: *At a Glance*

The Hydrogen and Fuel Cell Career Guide provides an insight into the job roles that will be needed to support a Hydrogen and Fuel Cell industry in Australia. This careers map is adapted from the work of the US Office of Energy Efficiency & Renewable Energy available from the online interactive Hydrogen and Fuel Cells Career Map

It is expected that as Hydrogen energy technology advances and research and development projects progress through to commercialisation the identified job roles may require some upskilling through customization and new skills requirements and job roles may emerge.

This Hydrogen and Fuel Cell Career Guide includes:

- Table of occupations by level and area of operations
- Distribution of occupations by level
    - Classification of operation by RESA occupational level
- Distribution of occupations by sub sector
- Occupational profiles including:
    - Title/s
    - Minimum educational requirements
    - Salary range
    - Job skills
    - Job duties
    - Job profile
- Emerging jobs
- Summary salary table
- Useful links

With hydrogen technology projects underway all around Australia, there are many exciting opportunities to explore.

Map image: Australia's Hydrogen Opportunities Tool: Geoscience Australia, AusH2

Occupation Table

The occupation table below reflects the US Office of Energy Efficiency and Renewable Energy grouping by level and area of operations. The occupational profiles are grouped by Level as indicated by the colour coded bar at the top of each page. Green – Entry Level, Yellow – Mid Level and Blue- Advanced.

	Research and Development, Engineering and Manufacturing	Operations and Management	Communications, Training and Outreach
Entry Level	Advanced Manufacturing Technician Instrumentation and Electronics Technician Electrician Assembler and Fabricator Computer Numerical Control Operator (CNC) Plant Operator Industrial Equipment Mechanic	Transportation Worker Construction Worker Trade Worker Salesperson Legal Assistant	Education Aide
Mid-Level	Chemical Engineer Materials Scientist Environmental Scientist Software Engineer Civil Engineer Research Engineer Environmental Engineer Electrical Engineer Mechanical Engineer	Project Manager Safety and Occupational Health Specialist Computational Scientist Buyer Industrial Engineer Power Systems / Transmission Engineer Sales Engineer Power Marketer Logistician	Public Affairs Specialist Editor Writer Digital Communications Officer
Advanced	Engineering Manager	Finance Manager Project Developer Lawyer Regulatory Expert Economist Site / Plant Manager Asset Manager Budget Analyst	Professor Communications Manager

Source: US Office of Energy Efficiency & Renewable Energy

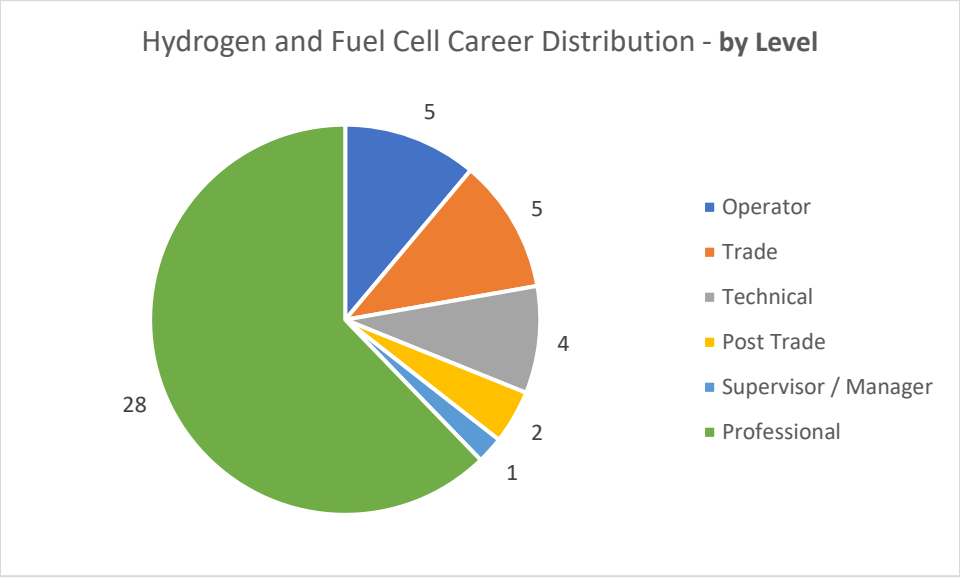
HOT RUBBLE

Occupations by Industry Entry Level - RESA

We have classified occupations by industry entry level to simplify the process of identifying career pathways.

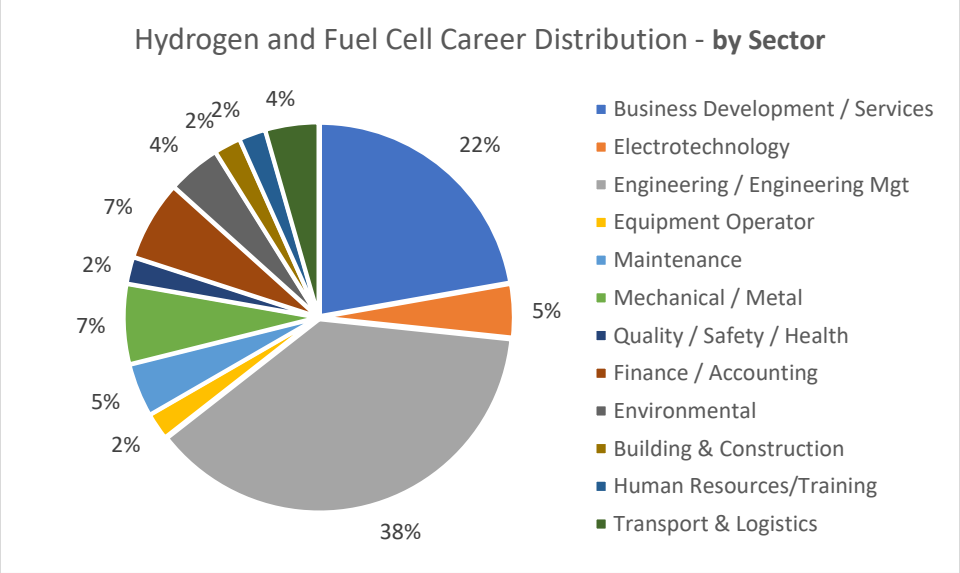
Level	Occupation Title
Operator	Transportation Worker Construction Worker Salesperson Legal Assistant Plant Operator
Trade	Trade Worker Industrial Equipment Mechanic Assembler and Fabricator Instrumentation and Electronics Technician Electrician
Post Trade	Computer Numerical Controlled Machine Operator Advanced Manufacturing Technician
Technical	Education Aide Writer Editor Public Affairs Specialist
Supervisor / Manager	Logistician
Professional	Power Marketer Sales Engineer Industrial Engineer Electrical Engineer Research Engineer Software Engineer Chemical Engineer Materials Scientist Environmental Scientist Professor Communications Manager Asset Manager Site/Plant Manager Economist Regulatory Expert Lawyer Project Developer Budget Analyst Finance Manager Buyer (Supply Chain Manager) Computational Scientist (Data Scientist) Safety and Occupational Health Specialist Project Manager Power Systems Transition Engineer Mechanical Engineer Environmental Engineer Civil Engineer Engineering Manager

The graph below highlights the demand for the range of occupations at the Professional level, followed by Trades, Operators and Technical roles.



Graph: Hydrogen and Fuel Cell Career Distribution by Level

The occupations in demand cross over a range of industry subsectors with Engineering/ Engineering Management and Business Development / Services having the broadest range of occupations.



Graph: Hydrogen and Fuel Cell Career Distribution by Sector

HOT RUBBLE

Occupational Profiles

Entry Level

Communications, Training and Outreach

TITLE(S)	Educational Aide, Teacher's Assistant
MINIMUM EDUCATION REQUIREMENTS	Certificate III in Education Support, Certificate IV in Training and Assessment Associates degree - Education
SALARY	$50,000 - $70,000 See SEEK – Salary Lookup for more information
JOB SKILLS	- Communication skills. Educational aides need to discuss students' progress with teachers and parents, so they need to be able to communicate well. - Interpersonal skills. Educational aides interact with a variety of people, including teachers, students, parents, and administrators. They need to develop good working relationships with the people they work with. - Patience. Working with students of different abilities and backgrounds can be difficult. Educational aides must be patient with students who struggle with material. - Resourcefulness. Educational aides must be resourceful and knowledgeable in assisting and managing developmentally appropriate programs for a wide range of ages.
JOB DUTIES	Teacher's Assistants typically do the following: - Reinforce lessons by reviewing material with students one-on-one or in small groups - Follow school and class rules to teach students proper behavior - Help teachers with recordkeeping, such as taking attendance and calculating grades - Get equipment or materials ready to help teachers prepare for lessons - Supervise students outside of the classroom, such as between classes, during lunch and recess, and on field trips

HOT RUBBLE

JOB PROFILE	Educators plan, develop, and implement activities for educational programs, including lesson plans, curriculum development, and outreach. They serve as subject matter experts for educational practices, focusing on emerging education research, effectiveness of particular teaching approaches, and evidence-based practice. Educators collaborate with subject matter experts to ensure that content taught is accurate and up-to-date. At the entry level, educational aides assist in implementing and leading planned activities for program participants. They use prepared curriculum and program materials, and assist in establishing a program environment that sustains participant interest and promotes positive interactions with other children, youth, and adults. A bachelor's degree in education is preferred.

HOT RUBBLE

Operations and Management

TITLE(S)	Transportation Worker, Truck driver, Driver, Long-haul truck driver, Heavy and Tractor-trailer truck driver, Motor Vehicle Operator
MINIMUM EDUCATION REQUIREMENTS	High school certificate or equivalent, HR / MR Licence
SALARY	$50,000 - $70,000 See SEEK – Salary Lookup for more information
JOB SKILLS	- Hand-eye coordination. Drivers of heavy trucks and tractor-trailers must be able to coordinate their legs, hands, and eyes together well to always be aware of the situation around them and to drive such a heavy vehicle safely. - Visual ability. Truck drivers must be able to pass vision tests. Federal regulations require a driver to have at least 20/40 vision with a 70-degree field of vision in each eye and the ability to distinguish the colors on a traffic light.. Eyesight, peripheral vision, and color vision may be tested. - Hearing ability. Federal regulations require that a driver be able to hear a forced whisper in one ear at five feet (with or without the use of a hearing aid). - Manual-dexterity. Crew members need good balance to maneuver through tight spaces and on wet or uneven surfaces. - Physical health. Federal regulations do not allow people to become truck drivers if they have a medical condition which may interfere with their ability to operate a truck. - Physical strength. Some drivers may have to lift heavy equipment. - Communication skills. All employees have to be able to communicate effectively with each other to avoid accidents and keep the deliveries on schedule. - Mechanical skills. All drivers work with complex machines. Most have to be able to respond appropriately to equipment failure or malfunction, warnings and alarms and carry out routine operational maintenance. - Age restrictions may apply for heavy vehicle and road train operations.
JOB DUTIES	Heavy and tractor-trailer truck drivers typically do the following: - Drive long distances - Report to a dispatcher any incidents encountered on the road

	- Follow all applicable traffic laws - Inspect their trailers before and after the trip, and record any defects they find - Maintain a log of their working hours, following all federal and state regulations - Report serious mechanical problems to the appropriate personnel - Keep their trucks and associated equipment clean and in good working order
JOB PROFILE	Heavy and tractor-trailer truck drivers transport goods from one location to another. Most tractor-trailer drivers are long-haul drivers and operate trucks with a gross vehicle weight (GVW) capacity defined by the National Heavy Vehicle Regulator. These drivers deliver goods over intercity routes, sometimes spanning several states. Most heavy and tractor-trailer truck drivers' routes are assigned by a dispatcher, but some independent drivers still plan their own routes. They may use satellite tracking to help them plan. A driver must know which roads allow trucks and which do not. Drivers also must plan legally required rest periods into their trip. Some drivers have a small number of routes that they drive regularly, and others drivers take many different routes throughout the country.

HOT RUBBLE

TITLE(S)	Construction Worker, Construction Laborer
MINIMUM EDUCATION REQUIREMENTS	High school certificate or equivalent, White Card, Pre-vocational skill set or certificate
SALARY	$50,000 - $70,000 See SEEK – Salary Lookup for more information
JOB SKILLS	- Color vision. Construction laborers and helpers may need to be able to distinguish colors to do their job. For example, an electrician's helper must be able to distinguish different colors of wire to help the lead electrician. - Math skills. Construction laborers and some helpers need to perform basic math calculations while measuring on jobsites or assisting a surveying crew. - Mechanical skills. Construction laborers are frequently required to operate and maintain equipment, such as jackhammers. - Physical stamina. Construction laborers and helpers must have the endurance to perform strenuous tasks throughout the day. Road construction labourers, for example, spend hours on their feet—often in hot temperatures—with few breaks. - Physical strength. Construction laborers and helpers may be required to lift heavy materials or equipment.
JOB DUTIES	Construction laborers and helpers typically do the following: - Clean and prepare construction sites by removing debris and possible hazards - Load or unload building materials to be used in construction - Build or take apart bracing, scaffolding, and temporary structures - Dig trenches, backfill holes, or compact earth to prepare for construction - Operate or tend equipment and machines used in construction - Follow construction plans and instructions from supervisors or more experienced workers - Assist trades workers with their duties
JOB PROFILE	Construction labourers and helpers work on almost all construction sites, performing a wide range of tasks varying in complexity from very easy to extremely difficult and hazardous. Although many of the tasks they perform require some training and experience, most tasks can be learned quickly.

TITLE(S)	Trade Worker
MINIMUM EDUCATION REQUIREMENTS	Apprenticeship or technical school
SALARY	$80,000 - $120,000 See SEEK – Salary Lookup for more information
JOB SKILLS	- Physical strength. Trade workers must be able to lift and carry heavy materials. For example, the forms into which concrete is poured. - Stamina. Trade workers must be able to spend a lot of time kneeling, bending, and reaching. - Color vision. Trade workers need good color vision because workers frequently must identify electrical wires by color. - Critical-thinking skills. Trade workers perform tests and use the results to diagnose problems. For example, when an outlet is not working, they may use a multimeter to check the voltage, amperage, or resistance to determine the best course of action. - Customer-service skills. Some trade workers work with people on a regular basis. As a result, they should be friendly and be able to address customers' questions. - Managerial skills. Some trade workers must be able to direct others' work as well as plan work schedules. Often, this work includes preparing estimates, scheduling jobs, and other administrative tasks. - Troubleshooting skills. Trade workers must diagnose and repair problems.
JOB DUTIES	Job duties will depend on the trade undertaken and the work environment. Relevant trades may include: Electrician, HV Electrician, Instrumentation and Control Technician Automotive Electrician Mechanical Fitter Steel Fixer, Builder, Concreter
JOB PROFILE	After a site is selected and construction begins, trade workers help install the infrastructure and support structures. This requires the work of many skilled people, including a wide variety of trade workers. Trade workers in the

construction phase are primarily, but are not limited to cement masons, electricians, and equipment operators.

HOT RUBBLE

TITLE(S)	Salesperson, Wholesale and Manufacturing Sales Representatives, Manufacturers' Representatives, Manufacturers' Agents
MINIMUM EDUCATION REQUIREMENTS	High school certificate, Bachelor degree – Business or Marketing
SALARY	$72,499 (Median wage) See SEEK – Salary Lookup for more information
JOB SKILLS	- Customer-service skills. Sales representatives must be able to listen to the customer's needs and concerns before and after the sale. - Interpersonal skills. Sales representatives must be able to work well with many types of people. They must be able to build good relationships with clients and with other members of the sales team. - Self-confidence. Sales representatives must be confident and persuasive when making sales presentations. In addition, making a call to a potential customer who is not expecting to be contacted, or "cold calling," requires confidence and composure. - Stamina. Sales representatives are often on their feet for long periods of time and may carry heavy sample products.
JOB DUTIES	Wholesale and manufacturing sales representatives typically do the following: - Identify prospective customers by using business directories, following leads from existing clients, and attending trade shows and conferences - Contact new and existing customers to discuss their needs and explain how specific products and services can meet these needs - Help customers select products to meet customers' needs, product specifications, and regulations - Emphasize product features that will meet customers' needs and exhibit product capabilities and limitations - Answer customers' questions about prices, availability, and product uses - Negotiate prices and terms of sale and service agreements - Prepare sales contracts and submit orders for processing - Collaborate with colleagues to exchange information, such as selling strategies and marketing information

	- Follow up with customers to make sure they are satisfied with their purchases and to answer any questions or concerns
JOB PROFILE	Wholesale and manufacturing sales representatives sell goods for wholesalers or manufacturers to businesses, government agencies, and other organizations. They contact customers, explain product features, answer any questions that their customers may have, and negotiate prices. Rather than selling goods directly to consumers, wholesale and manufacturing sales representatives deal with businesses, government agencies, and other organizations. After the sale, representatives may make follow-up visits to ensure that equipment is functioning properly and may even help train customers' employees to operate and maintain new equipment. In addition to selling products, wholesale and manufacturing sales representatives analyze sales statistics, prepare reports, and handle administrative duties such as filing expense accounts, scheduling appointments, and making travel plans. Staying up-to-date on new products and the changing needs of customers is important. Sales representatives accomplish this in a variety of ways, including attending trade shows at which new products and technologies are showcased. They attend conferences and conventions to meet other sales representatives and clients and to discuss new product developments. They also read about new and existing products and monitor the sales, prices, and products of their competitors.

TITLE(S)	Legal Assistant, Paralegal, Law Clerk, Legal Staff Assistant
MINIMUM EDUCATION REQUIREMENTS	Associate degree – Paralegal studies, Certificate III in Business Administration (Legal) or Certificate IV in Legal Services
SALARY	$60,000 - $80,000 See SEEK – Salary Lookup for more information
JOB SKILLS	- Communication skills. Paralegals must be able to document and present their research and related information to their supervising lawyer. - Computer skills. Paralegals need to be familiar with using computers for legal research and litigation support. They also use computer programs for organizing and maintaining important documents. - Interpersonal skills. Paralegals spend most of their time working with clients and other professionals and must be able to develop good relationships. They must make clients feel comfortable sharing personal information related to their cases. - Organizational skills. Paralegals may be responsible for many cases at one time. They must adapt quickly to changing deadlines. - Research skills. Paralegals need good research and investigative skills to conduct legal research.
JOB DUTIES	Paralegals and legal assistants typically do the following: - Investigate and gather the facts of a case - Conduct research on relevant laws, regulations, and legal articles - Organize and maintain documents in paper or electronic filing systems - Gather and arrange evidence and other legal documents for attorney review and case preparation - Write or summarize reports to help lawyers prepare for trials - Draft correspondence and legal documents, such as contracts and mortgages - Get affidavits and other formal statements that may be used as evidence in court - Help lawyers during trials by handling exhibits, taking notes, or reviewing trial transcripts

	- File exhibits, briefs, appeals and other legal documents with the court or opposing counsel - Call clients, witnesses, lawyers, and outside vendors to schedule interviews, meetings, and depositions
JOB PROFILE	Paralegals and legal assistants do a variety of tasks to support lawyers, including maintaining and organizing files, conducting legal research, and drafting documents. Paralegals and legal assistants help lawyers prepare for hearings, trials, and corporate meetings. Paralegals use technology and computer software for managing and organizing the increasing amount of documents and data collected during a case. Many paralegals use computer software to catalog documents, and to review documents for specific keywords or subjects. Because of these responsibilities, paralegals must be familiar with electronic database management and be current on the latest software used for electronic discovery. Electronic discovery refers to all electronic materials obtained by the parties during the litigation or investigation. These materials may be emails, data, documents, accounting databases, and websites. Paralegals' specific duties often vary depending on the area of law in which they work.

HOT RUBBLE

Research and Development, Engineering and Manufacturing

TITLE(S)	Industrial Equipment Mechanic, Industrial Machinery Mechanic, Machinery Maintenance Worker
MINIMUM EDUCATION REQUIREMENTS	High School certificate or equivalent, Pre-vocational skill set or certificate or apprenticeship
SALARY	$79,999 (Median wage) See SEEK – Salary Lookup for more information
JOB SKILLS	- Manual dexterity. When handling very small parts, workers must have a steady hand and good hand-eye coordination. - Mechanical skills. Industrial machinery mechanics, machinery maintenance workers, and millwrights use technical manuals and sophisticated diagnostic equipment to figure out why machines are not working. Workers must be able to reassemble large, complex machines after finishing a repair. - Troubleshooting skills. Industrial machinery mechanics, machinery maintenance workers, and millwrights must observe, diagnose, and fix problems that a machine may be having.
JOB DUTIES	Industrial machinery mechanics typically do the following: - Read technical manuals to understand equipment and controls - Disassemble machinery and equipment when there is a problem - Repair or replace broken or malfunctioning components - Perform tests and run initial batches to make sure that the machine is running smoothly - Adjust and calibrate equipment and machinery to optimal specifications
JOB PROFILE	Industrial machinery mechanics and machinery maintenance workers maintain and repair factory equipment and other industrial machinery, such as conveying systems, production machinery, and packaging equipment. Industrial machinery mechanics keep machines in good working order. To do this task, they must be able to detect and correct errors before the machine or the products it produces are damaged. Industrial machinery mechanics use technical manuals, their understanding of industrial equipment, and careful observation to

determine the cause of a problem. These mechanics often need years of training and experience to be able to diagnose all of the problems they find in their work. They may use computerized diagnostic systems and vibration analysis techniques to help figure out the source of problems. Mechanics use their knowledge of electronics and computer programming to repair sophisticated equipment. Industrial machinery mechanics also do preventive maintenance. In addition to working with hand tools, mechanics commonly use lathes, grinders, or drill presses. Many also are required to weld.

HOT RUBBLE

TITLE(S)	Plant Operator, Engineering Equipment Operator, Construction Equipment Operator, Storage Facility Operator
MINIMUM EDUCATION REQUIREMENTS	High School certificate or equivalent, License
SALARY	$50,000 - $70,000 See SEEK – Salary Lookup for more information
JOB SKILLS	- Customer-service skills. These workers interact with customers on a regular basis. They need to be friendly and able to address customers' questions. - Dexterity. Many repair and maintenance tasks, such as repairing small devices, connecting or attaching components, and using hand tools, require a steady hand and good hand–eye coordination. - Troubleshooting skills. Workers find, diagnose, and repair problems. They perform tests to figure out the cause of problems before fixing equipment.
JOB DUTIES	- Knowledge of equipment assembly, repair, and installation - Ability to operate heavy machinery and equipment - Ability to interpret instructions, specification, etc., and reliability and dependability as an engineering equipment operator - Ability to drive motor vehicles safely - Knowledge of math and science concepts related to bioenergy.
JOB PROFILE	Plant operators work to keep the plant operational and efficient, in order to maximize outputs for distribution to upgrading facilities and end consumers. Industrial plant activities generally revolve around keeping the plant operational and can include working with heavy industrial equipment, fixing any worn or broken machinery parts, and testing the quality of the end products. At the entry level, plant operators work under supervision with equipment, including heavy construction, maintenance, and industrial machines. A High School certificate is required. On-the-job training, apprenticeship, or trade school experience is highly preferred. Employers value relevant experience gained through part-time employment, internships, or volunteer work.

TITLE(S)	Computer Numerical Controlled Machine Operator, CNC Machinist, Computer-Controlled Machine Tool Operator
MINIMUM EDUCATION REQUIREMENTS	High School certificate or equivalent, Pre-vocational skill set or certificate or apprenticeship
SALARY	$79,999 (Median wage) See SEEK – Salary Lookup for more information
JOB SKILLS	- Computer skills. Metal and plastic machine workers must often be able to use programmable devices, computers, and robots on the factory floor. - Dexterity. Metal and plastic machine workers who work in metal and plastic machined goods manufacturing use precise hand movements to make the necessary shapes, cuts, and edges that designs require. - Mechanical skills. Metal and plastic machine workers set up and operate machinery. They must be comfortable working with machines and have a good understanding of how the machines and all their parts work. - Physical stamina. Metal and plastic machine workers must be able to stand for long periods and perform repetitive work. - Physical strength. Metal and plastic machine workers must be strong enough to guide and load heavy and bulky parts and materials into machines.
JOB DUTIES	Metal and plastic machine workers typically do the following: - Set up machines according to blueprints - Monitor machines for unusual sound or vibration - Insert material into machines, manually or with a hoist - Operate metal or plastic molding, casting, or coremaking machines - Adjust machine settings for temperature, cycle times, and speed and feed rates - Remove finished products and smooth rough edges and imperfections - Test and compare finished workpieces to specifications - Remove and replace dull cutting tools - Document production numbers in a computer database
JOB PROFILE	Computer-controlled machine tool operators operate computer-controlled machines or robots to perform functions on metal or plastic workpieces.

Computer numerically controlled machine tool programmers develop computer programs to control the machining or processing of metal or plastic parts by automatic machine tools, equipment, or systems.

HOT RUBBLE

TITLE(S)	Assembler and Fabricator
MINIMUM EDUCATION REQUIREMENTS	High School certificate or equivalent, Pre-vocational skill set or certificate or apprenticeship
SALARY	$50,000 - $70,000 See SEEK – Salary Lookup for more information
JOB SKILLS	- Color vision. Assemblers and fabricators who make electrical and electronic products must be able to distinguish different colors because the wires they work with often are color coded. - Dexterity. Assemblers and fabricators should have a steady hand and good hand-eye coordination, as they must grasp, manipulate, or assemble parts and components that are often very small. - Math skills. Assemblers and fabricators must know basic math and must be able to use computers, as the manufacturing process continues to advance technologically. - Mechanical skills. Modern production systems require assemblers and fabricators to be able to use programmable motion-control devices, computers, and robots on the factory floor. - Physical stamina. Assemblers and fabricators must be able to stand for long periods and perform repetitious work. - Physical strength. Assemblers and fabricators must be strong enough to lift heavy components or pieces of machinery. Some assemblers, such as those in the aerospace industry, must frequently bend or climb ladders when assembling parts. - Technical skills. Assemblers and fabricators must be able to understand technical manuals, blueprints, and schematics for a wide range of products and machines to properly manufacture the final product.
JOB DUTIES	Assemblers and fabricators typically do the following: - Read and understand schematics and blueprints - Use hand tools or machines to assemble parts - Conduct quality control checks - Work closely with designers and engineers in product development

JOB PROFILE	Assemblers and fabricators have an important role in the manufacturing process. They assemble both finished products and the pieces that go into them. The products encompass a full range of manufactured goods, including aircraft, toys, household appliances, automobiles, computers, and electronic devices. Changes in technology have transformed the manufacturing and assembly process. Modern manufacturing systems use robots, computers, programmable motion-control devices, and various sensing technologies. These technological changes affect the way in which goods are made and the jobs of those who make them. Advanced assemblers must be able to work with these new technologies and use them to manufacture goods. The job of an assembler or fabricator requires a range of knowledge and skills. Skilled assemblers putting together complex machines, for example, read detailed schematics that show how to assemble the machine. After determining how parts should connect, they use hand or power tools to trim, shim, cut, and make other adjustments to fit components together. Once the parts are properly aligned, they connect them with bolts and screws or weld or solder pieces together. Quality control is important throughout the assembly process, so assemblers look for faulty components and mistakes in the assembly process. They help fix problems before defective products are made. Manufacturing techniques are moving away from traditional assembly line systems toward lean manufacturing systems, which use teams of workers to produce entire products or components. Lean manufacturing has changed the nature of the assemblers' duties. It has become more common to involve assemblers and fabricators in product development. Designers and engineers consult manufacturing workers during the design stage to improve product reliability and manufacturing efficiency. Some experienced assemblers work with designers and engineers to build prototypes or test products.

TITLE(S)	Advanced Manufacturing Technician, Industrial Engineering Technician, Manufacturing Production Technician, Electro-Mechanical Technician, Electronics Maintenance Technician
MINIMUM EDUCATION REQUIREMENTS	Associate's degree, post secondary certificate
SALARY	$50,000 - $70,000 See SEEK – Salary Lookup for more information
JOB SKILLS	- Analytical skills. Industrial engineering technicians must be able to help industrial engineers figure out how systems should work and how changes in conditions, operations, and the environment will affect outcomes. - Communication skills. Industrial engineering technicians receive instructions from industrial engineers. They must be able to clearly understand and follow instructions and communicate problems to their supervisors. - Critical-thinking skills. Industrial engineering technicians must be able to help industrial engineers figure out why certain processes or operations are not working as well as they might. They must ask the right questions to identify and correct weaknesses. - Detail oriented. Industrial engineering technicians must gather and record measurements and observations needed by industrial engineers. - Math skills. Industrial engineering technicians use the principles of mathematics for analysis, design, and troubleshooting in their work. - Observational skills. These technicians spend much of their time evaluating the performance of other people or organizations and then make suggestions for improvements or corrective action. They must gather and record information without interfering with workers in their environments.
JOB DUTIES	Industrial engineering technicians typically do the following: - Suggest revisions to methods of operation, material handling, or equipment layout - Interpret engineering drawings, schematic diagrams, and formulas - Confer with management or engineering staff to determine quality and reliability standards

	- Recommend changes to production standards in order to achieve the best quality within the limits of the capabilities of the equipment - Help plan work assignments, taking into account workers' performance, the capabilities of machines, and production schedules - Prepare charts, graphs, and diagrams to illustrate workflow, routing, floor layouts, how materials are handled, and how machines are used - Collect data to assist in process improvement activities
JOB PROFILE	Industrial engineering technicians study the time and steps workers take to do a task (time and motion studies). To set reasonable production rates, they consider how workers perform operations such as maintenance, production, and service. They also observe workers to make sure that equipment is being used and maintained according to quality assurance standards. They then evaluate the resulting data to recommend or justify changes to the operations or to the standards for improving quality and efficiency. Industrial engineering technicians' versatility allows them to be useful in a variety of projects. For example, they work in supply chain management to help businesses minimize inventory costs, in quality assurance to help businesses keep their customers satisfied, and in the growing field of project management to control costs and maximize efficiencies. Industrial engineering technicians generally work in teams under the supervision of industrial engineers.

TITLE(S)	Instrumentation and Electronics Technician, Electrical and Electronics Engineering Technician, Instrumentation Technician
MINIMUM EDUCATION REQUIREMENTS	High School certificate or equivalent, Pre-vocational skill set or certificate or apprenticeship, Associate's degree
SALARY	$70,000 - $90,000 See SEEK – Salary Lookup for more information
JOB SKILLS	- Logical-thinking skills. Electrical and electronics engineering technicians must isolate and then identify problems for the engineering staff to work on. They need good reasoning skills to identify and fix problems. Technicians must also be able to follow a logical sequence or specific set of rules to carry out engineers' designs, inspect designs for quality control, and put together prototypes. - Math skills. Electrical and electronics engineering technicians use math for analysis, design, and troubleshooting in their work. - Mechanical skills. Electronics engineering technicians in particular must be able to use hand tools and soldering irons on small circuitry and electronic parts to create detailed electronic components by hand. - Observational skills. Electrical engineering technicians sometimes visit construction sites to make sure that electrical engineers' designs are being carried out correctly. They are responsible for evaluating projects onsite and reporting problems to engineers. - Problem-solving skills. Electrical and electronics engineering technicians create what engineers have designed and often test the designs to make sure that they work. Technicians help to resolve any problems that come up in carrying out the engineers' designs. - Writing skills. These technicians must write reports about onsite construction, the results of testing, or problems they find when carrying out designs. Their writing must be clear and well organized so that the engineers they work with can understand the reports.
JOB DUTIES	Electrical engineering technicians typically do the following: - Put together electrical and electronic systems and prototypes - Build, calibrate, and repair electrical instruments or testing equipment

	- Visit construction sites to observe conditions affecting design - Identify solutions to technical design problems that arise during the construction of electrical systems - Inspect designs for quality control, report findings, and make recommendations - Draw diagrams and write specifications to clarify design details of experimental electronics units - Electronics engineering technicians typically do the following: - Design basic circuitry and draft sketches to clarify details of design documentation, under engineers' direction - Build prototypes from rough sketches or plans - Assemble, test, and maintain circuitry or electronic components according to engineering instructions, technical manuals, and knowledge of electronics - Adjust and replace defective circuitry and electronic components - Make parts, such as coils and terminal boards, by using bench lathes, drills, or other machine tools
JOB PROFILE	Electrical engineering technicians install and maintain electrical control systems and equipment, and modify electrical prototypes, parts, and assemblies to correct problems. When testing systems, they set up test equipment and evaluate the performance of developmental parts, assemblies, or systems under simulated conditions. They then analyze test information to resolve design-related problems. Electronics engineering technicians identify and resolve equipment malfunctions and then work with manufacturers to get replacement parts. They also calibrate and perform preventative maintenance on equipment and systems. These technicians often need to read blueprints, schematic drawings, and engineering instructions for assembling electronic units. They also write reports and record data on testing techniques, laboratory equipment, and specifications.

TITLE(S)	Electrician
MINIMUM EDUCATION REQUIREMENTS	High School certificate or equivalent, Pre-vocational skill set or certificate or apprenticeship
SALARY	$60,000 - $80,000 See SEEK – Salary Lookup for more information
JOB SKILLS	- Business skills. Self-employed electricians must be able to bid on new jobs, track inventory, and plan payroll and work assignments. - Color vision. Electricians must identify electrical wires by color. - Critical-thinking skills. Electricians perform tests and use the results to diagnose problems. For example, when an outlet is not working, they may use a multimeter to check the voltage, amperage, or resistance to determine the best course of action. - Customer-service skills. Residential electricians work with people on a regular basis. They should be friendly and be able to address customers' questions. - Physical stamina. Electricians often need to move around all day while running wire and connecting fixtures to the wire. - Physical strength. Electricians need to be strong enough to move heavy components, which may weigh up to 50 pounds. - Troubleshooting skills. Electricians find, diagnose, and repair problems. For example, if a motor stops working, they perform tests to determine the cause of its failure and then, depending on the results, fix or replace the motor.
JOB DUTIES	Electricians typically do the following: - Read blueprints or technical diagrams - Install and maintain wiring, control, and lighting systems - Inspect electrical components, such as transformers and circuit breakers - Identify electrical problems using a variety of testing devices - Repair or replace wiring, equipment, or fixtures using hand tools and power tools - Follow state and local building regulations based on the National Electrical Code

	- Direct and train workers to install, maintain, or repair electrical wiring or equipment
JOB PROFILE	Electricians install, maintain, and repair electrical power, communications, lighting, and control systems in homes, businesses, and factories. Electricians read blueprints, which are technical diagrams of electrical systems that show the location of circuits, outlets, and other equipment. They use different types of hand and power tools, such as conduit benders, to run and protect wiring. Other commonly used hand and power tools include screwdrivers, wire strippers, drills, and saws. While troubleshooting, electricians also may use ammeters, voltmeters, thermal scanners, and cable testers to find problems and ensure that components are working properly.

HOT RUBBLE

Mid - Level

Communications, Training and Outreach

TITLE(S)	Writer
MINIMUM EDUCATION REQUIREMENTS	Bachelor's degree
SALARY	$80,000 - $120,000 See SEEK – Salary Lookup for more information
JOB SKILLS	- Adaptability. Writers and authors need to be able to adapt to newer software platforms and programs, including various Content Management Systems (CMS). - Creativity. Writers and authors must be able to develop new and interesting plots, characters, or ideas so they can come up with new stories. - Critical-thinking skills. Writers and authors must have dual expertise in thinking through or understanding new concepts, and conveying it through writing. - Determination. Writers and authors sometimes work on projects that take years to complete. Freelance writers who are paid per assignment must demonstrate perseverance and personal drive to meet deadlines. - Persuasion. Writers, especially those in advertising, must be able to persuade others to feel a certain way about a good or service. - Social perceptiveness. Writers and authors must understand how readers react to certain ideas in order to connect with their audience. - Writing skills. Writers and authors must be able to write clearly and effectively in order to convey feeling and emotion and communicate with readers.
JOB DUTIES	Writers and authors typically do the following: - Choose subject matter that interests readers - Write fiction or nonfiction through scripts, novels, biographies, and more - Conduct research to obtain factual information and authentic detail - Write advertising copy for newspapers, magazines, broadcasts, and the Internet - Present drafts to editors and clients for feedback

	- Work with editors and clients to shape the material so it can be published
JOB PROFILE	Writers and authors develop written content for advertisements, books, magazines, movie and television scripts, songs, blogs, or other types of media. Writers and authors develop written material—namely, stories and advertisements—for books, magazines, and online publications. Writers must establish their credibility with editors and readers through strong research and the use of appropriate sources and citations. Writers and authors select the material they want to use and then convey the information to readers. With help from editors, they may revise or rewrite sections, searching for the best organization and the most appropriate phrasing.

TITLE(S)	Editor
MINIMUM EDUCATION REQUIREMENTS	Bachelor's degree
SALARY	$77,499 (Median) See SEEK – Salary Lookup for more information
JOB SKILLS	- Creativity. Editors must be creative, curious, and knowledgeable in a broad range of topics. Some editors must regularly come up with interesting story ideas and attention-grabbing headlines. - Detail oriented. One of an editor's main tasks is to make sure that material is error free and matches the style of a publication. - Good judgment. Editors must decide if certain stories are ethical or if there is enough evidence to report them. - Interpersonal skills. In working with writers, editors must have tact and the ability to guide and encourage them in their work. - Writing skills. Editors must ensure that all written content has correct grammar, punctuation, and syntax. Editors must be able to write clearly and logically.
JOB DUTIES	Editors typically do the following: - Read content and correct spelling, punctuation, and grammatical errors - Rewrite text to make it easier for readers to understand - Verify facts using standard reference sources - Evaluate submissions from writers to decide what to publish - Work with writers to help their ideas and stories succeed - Develop story and content ideas according to the publication's style and editorial policy - Allocate space for the text, photos, and illustrations that make up a story - Approve final versions submitted by staff
JOB PROFILE	Editors plan, coordinate, and revise material for publication in books, newspapers, magazines, or websites. Editors review story ideas and decide what material will appeal most to readers. During the review process, editors offer comments to improve the product, and suggest titles and headlines. In smaller

organizations, a single editor may perform all of the editorial duties or share them with only a few other people.

TITLE(S)	Public Affairs Specialist, Public Relations Specialist
MINIMUM EDUCATION REQUIREMENTS	Bachelor's degree
SALARY	$60,000 - $80,000 See SEEK – Salary Lookup for more information
JOB SKILLS	- Interpersonal skills. Public relations specialists deal with the public and the media regularly; therefore, they must be open and friendly to maintain a favorable image for their organization. - Organizational skills. Public relations specialists are often in charge of managing several events at the same time, requiring superior organizational skills. - Problem-solving skills. Public relations specialists sometimes must explain how a company or client is handling sensitive issues. They must use good judgment in what they report and how they report it. - Speaking skills. Public relations specialists regularly speak on behalf of their organization. When doing so, they must be able to clearly explain the organization's position. - Writing skills. Public relations specialists must be able to write well-organized and clear press releases and speeches. They must be able to grasp the key messages they want to get across and write them in a short, succinct way to get the attention of busy readers or listeners.
JOB DUTIES	Public relations specialists typically do the following: - Write press releases and prepare information for the media - Respond to information requests from the media - Help clients communicate effectively with the public - Help maintain their organization's corporate image and identity - Draft speeches and arrange interviews for an organization's top executives - Evaluate advertising and promotion programs to determine whether they are compatible with their organization's public relations efforts - Evaluate public opinion of clients through social media

JOB PROFILE	Public relations specialists create and maintain a favorable public image for the organization they represent. They design media releases to shape public perception of their organization and to increase awareness of its work and goals. Public relations specialists, also called communications specialists and media specialists, handle an organization's communication with the public, including consumers, investors, reporters, and other media specialists. In government, public relations specialists may be called press secretaries. In this setting, workers keep the public informed about the activities of government officials and agencies.

Operations and Management

TITLE(S)	Logistician, Logistics Specialist
MINIMUM EDUCATION REQUIREMENTS	Bachelor's degree – Business, certification
SALARY	$100,000 - $150,000 See SEEK – Salary Lookup for more information
JOB SKILLS	- Communication skills. Logisticians need strong communication skills in order to collaborate with colleagues and do business with suppliers and customers. - Critical-thinking skills. Logisticians must develop, adjust, and carry out logistical plans. They often must find ways to reduce costs and improve efficiency. - Organizational skills. Logisticians must be able to perform several tasks at one time, keep detailed records, and simultaneously manage several projects in a fast-paced environment. - Problem-solving skills. Logisticians must handle unforeseen issues, such as delivery problems, and adjust plans as needed to resolve the issues.
JOB DUTIES	Logisticians typically do the following: - Manage the logistical aspects of a product's life cycle from design to disposal - Direct the allocation of materials, supplies, and products - Develop business relationships with suppliers and clients - Understand clients' needs and know how to meet them - Design strategies to minimize the cost or time required to transport goods - Review logistical functions and identify areas for improvement - Propose improvements to management and customers
JOB PROFILE	Logisticians analyze and coordinate an organization's supply chain—the system that moves a product from supplier to consumer. They manage the entire life cycle of a product, which includes how a product is acquired, distributed, allocated, and delivered. Logisticians oversee activities that include purchasing, transportation, inventory, and warehousing. They may direct the movement of a range of goods, people, or supplies, from common consumer goods to military supplies and personnel. Logisticians use software systems to plan and track the movement of products. They operate software programs designed specifically to

	manage logistical functions, such as procurement, inventory management, and other supply chain planning and management systems.

HOT RUBBLE

TITLE(S)	Power Marketer
MINIMUM EDUCATION REQUIREMENTS	Bachelor's degree – Finance, Economics, Business, Marketing
SALARY	$70,000 - $90,000 See SEEK – Salary Lookup for more information
JOB SKILLS	- Customer service. Power marketers must be persuasive, credible and help clients feel comfortable with the agent's recommendations. - Critical thinking skills. Power marketers must assess all available information and use it to determine what marketing strategy would work best for a company. - Strong math and financial analysis skills. To judge the profitability of potential deals, power marketers must have strong math skills. - Decision-making and negotiation skills. A primary role of power marketers is to negotiate and facilitate the execution of power purchase agreements. During negotiations, they must represent the company in the options that are offered. More experienced power marketers may be in positions in which they must make split-second decisions with large sums of money at stake. - Detail oriented. Power marketers must pay close attention to the details of power contracts, financial pro formas because small changes can have large consequences. They also perform precise data analysis. - Initiative. Power marketers may be required to create their own client base by making "cold" sales calls to people to whom they have not been referred and to people not expecting the call.
JOB DUTIES	Power marketers typically do the following: - Monitor and forecast marketing and sales trends - Measure the effectiveness of marketing programs and strategies - Devise and evaluate methods for collecting data, such as interviews and market report reviews - Gather data about consumers, competitors, and market conditions - Analyze data using statistical software

	- Convert complex data and findings into understandable tables, graphs, and written reports - Prepare reports and present results to clients or management - Support or lead power proposal development - Develop Pro Forma pricing - Work closely with legal staff to draft power purchase agreements - Lead power purchase agreement negotiations.
JOB PROFILE	Power Marketers research energy markets, meet with power buyers, build relationships, marketing, write proposals, and negotiate power purchase agreements. They are familiar with the current state of various market drivers throughout the country. Power marketers perform research and gather data to help an energy company market its available power generation to utilities or other buyers. They gather data on consumer demographics, preferences, needs, and buying habits. They collect data and information using a variety of methods, such as interviews, and literature reviews. Power marketers help determine a company's position in the marketplace by researching their competitors and analyzing their prices, sales, and marketing methods. Using this information, they may determine potential markets, product demand, and pricing. Power marketers also use their research and data analysis to identify potential power purchasers who may be interested in purchasing the power generated. Once a power buyer has been identified, the power marketer will assist or lead the development of the power proposal. They develop the pro forma pricing form and are responsible for the negotiations that take place with the buyer. The power marketer represents the company, ensuring that the power purchase price. Throughout the power purchase negotiation process, the power marketer works closely with the legal department and provides status updates to management.

HOT RUBBLE

TITLE(S)	Sales Engineer, Technical Sales Engineer, Senior Sales Executive, Vice President of Sales, Key Account Manager
MINIMUM EDUCATION REQUIREMENTS	Bachelor's degree – Engineering, Marketing, Business
SALARY	$80,000 - $120,000 See SEEK – Salary Lookup for more information
JOB SKILLS	- Interpersonal skills. Strong interpersonal skills are a valuable characteristic for sales engineers, both for building relationships with clients and effectively communicating with other members of the sales team. - Problem-solving skills. Sales engineers must be able to listen to the customer's desires and concerns, and then recommend solutions, possibly including customizing a product. - Self-confidence. Sales engineers should be confident and persuasive when making sales presentations. - Technological skills. Sales engineers must have extensive knowledge of the technologically sophisticated products they sell in order to explain their advantages and answer questions.
JOB DUTIES	Sales engineers typically do the following: - Prepare and deliver technical presentations explaining products or services to existing and prospective customers - Confer with customers and engineers to assess equipment needs and to determine system requirements - Collaborate with sales teams to understand customer requirements and provide sales support - Secure and renew orders and arrange delivery - Plan and modify products to meet customer needs - Help clients solve problems with installed equipment - Recommend improved materials or machinery to customers, showing how changes will lower costs or increase production - Help in researching and developing new products

JOB PROFILE	Sales engineers sell complex scientific and technological products or services to businesses. They must have extensive knowledge of the products' parts and functions and must understand the scientific processes that make these products work. Sales engineers specialize in technologically and scientifically advanced products. They use their technical skills to explain the benefits of their products or services to potential customers and to show how their products or services are better than their competitors'. Some sales engineers work for the companies that design and build technical products. Others work for independent sales firms.

TITLE(S)	Power Systems Transition Engineer, Power Engineer
MINIMUM EDUCATION REQUIREMENTS	Bachelor's degree – Engineering (Electrical, Instrumentation, Control Systems)
SALARY	$80,000 - $120,000 See SEEK – Salary Lookup for more information
JOB SKILLS	- Detail oriented. They design and develop complex electrical systems and electronic components and products. They must keep track of multiple design elements and technical characteristics or requirements during these processes. - Math skills. They use the principals of calculus and other advanced topics in mathematics for analysis, design, and troubleshooting in their work. - Communication skills. They work closely with other engineers and technicians. They must be able to clearly explain their designs and reasoning and to relay instructions during product development, production and construction. They may also need to explain complex issues to customers who have little or no technical expertise. Additionally, they may need to review and be involved in contract negotiations. - Project management. When designing or implementing, a power system design or other project, these engineers must be able to manage the various aspects of the project in order to complete the tasks on schedule and within budget. Where applicable, Power Systems Engineers must be able to monitor and evaluate the work at the job site as a project progresses. - Writing skills. Power Systems Engineers must have good technical writing skills. They write reports and summaries on the interconnection studies they manage, contribute to standards development, prepare specifications and requirement documents, and provide status reports on projects. The findings and specifications identified in these reports and other documents need to be easily understood by individuals from technical and non-technical backgrounds. - Leadership skills. Power Systems Engineers play a significant role in driving innovations and successfully implementing projects. They often support managers with project planning as well as lead teams from various technical backgrounds such as other engineers, surveyors, construction managers, or technicians.

JOB DUTIES	In summary, they typically do the following: - Provide power systems design and support to development and construction teams working on power plant projects - Design collection systems, including cable routing and cable sizing - Manage and perform system studies such as interconnection, power system or grounding system studies - Support the negotiation of LGIA and TSAs - Review interconnection standards, establish interconnection requirements and ensure compliance - Develop procurement specifications for substation, transmission line and other subcontracts - Prepare drawings of grid interconnection and collection system for interconnection applications - Collect system data from client, utility, suppliers, and subcontractors for system modeling. - Optimize power transmission systems - Ensure construction and interconnection protocols have been met.
JOB PROFILE	A Power Systems Engineer may be responsible for evaluating interconnection standards and transmission feasibility, system impact and facility studies or testing new electrical components. Their responsibilities may also include working on transmission and/or distribution systems.

TITLE(S)	Industrial Engineer, Manufacturing Engineer, Process Engineer
MINIMUM EDUCATION REQUIREMENTS	Bachelor's degree - Engineering
SALARY	$60,000 - $80,000 See SEEK – Salary Lookup for more information
JOB SKILLS	- Creativity. Industrial engineers use creativity and ingenuity to design new production processes in many kinds of settings in order to reduce the use of material resources, time, or labor while accomplishing the same goal. - Critical-thinking skills. Industrial engineers create new systems to solve problems related to waste and inefficiency. Solving these problems requires logic and reasoning to identify strengths and weaknesses of alternative solutions, conclusions, or approaches to the problems. - Listening skills. These engineers often operate in teams, but they also must solicit feedback from customers, vendors, and production staff. They must listen to customers and clients in order to fully grasp ideas and problems the first time. - Math skills. Industrial engineers use the principles of calculus, trigonometry, and other advanced topics in mathematics for analysis, design, and troubleshooting in their work. - Problem-solving skills. In designing facilities for manufacturing and processes for providing services, these engineers deal with several issues at once, from workers' safety to quality assurance. - Speaking skills. Industrial engineers sometimes have to explain their instructions to production staff or technicians before they can make written instructions available. Being able to explain concepts clearly and quickly is crucial to preventing costly mistakes and loss of time. - Writing skills. Industrial engineers must prepare documentation for other engineers or scientists, or for future reference. The documentation must be coherent and explain their thinking clearly so that the others can understand the information.
JOB DUTIES	Industrial engineers typically do the following:

	- Review production schedules, engineering specifications, process flows, and other information to understand methods that are applied and activities that take place in manufacturing and services - Figure out how to manufacture parts or products, or deliver services, with maximum efficiency - Develop management control systems to make financial planning and cost analysis more efficient - Enact quality control procedures to resolve production problems or minimize costs - Design control systems to coordinate activities and production planning in order to ensure that products meet quality standards - Confer with clients about product specifications, vendors about purchases, management personnel about manufacturing capabilities, and staff about the status of projects
JOB PROFILE	Industrial engineers find ways to eliminate wastefulness in production processes. They devise efficient systems that integrate workers, machines, materials, information, and energy to make a product or provide a service.

TITLE(S)	Buyer, Purchasing Agent, Purchasing Specialist, Commodity Manager, Purchasing Manager
MINIMUM EDUCATION REQUIREMENTS	Bachelor's degree – Finance, Business, Economics, Accounting
SALARY	$100,000 - $150,000 See SEEK – Salary Lookup for more information
JOB SKILLS	- Analytical skills. When evaluating suppliers, buyers and purchasing agents must analyze their options and choose a supplier with the best combination of price, quality, delivery, or service. - Decision making skills. Buyers and purchasing agents must have the ability to make informed and timely decisions, choosing products that they think will sell. - Math skills. Buyers and purchasing agents must possess basic math skills. They must be able to compare prices from different suppliers to ensure that their organization is getting the best deal. - Negotiating skills. Buyers and purchasing agents often must negotiate the terms of a contract with a supplier. Interpersonal skills and self-confidence, in addition to knowledge of the product, can help lead to successful negotiations.
JOB DUTIES	Buyers and purchasing agents typically do the following: - Evaluate suppliers on the basis of the price, quality, and speed of delivery of their products and services - Interview vendors and visit suppliers' plants and distribution centers to examine and learn about products, services, and prices - Attend meetings, trade shows, and conferences to learn about new industry trends and make contacts with suppliers - Analyze price proposals, financial reports, and other information to determine reasonable prices - Negotiate contracts on behalf of their organization - Work out agreements with suppliers, such as when products will be delivered - Meet with staff and vendors to discuss defective or unacceptable goods or services and determine corrective action

	- Evaluate and monitor contracts to be sure that vendors and supplies comply with the terms and conditions of the contract and to determine the need for changes - Maintain and review records of items bought, costs, deliveries, product performance, and inventories
JOB PROFILE	Buyers and purchasing agents buy farm products, durable and nondurable goods, and services for organizations and institutions. They try to get the best deal for their organization: the highest quality goods and services at the lowest cost. They do this by studying sales records and inventory levels of current stock, identifying foreign and domestic suppliers, and keeping up to date with changes affecting both the supply of, and demand for, products and materials. Purchasing agents and buyers consider price, quality, availability, reliability, and technical support when choosing suppliers and merchandise. To be effective, purchasing agents and buyers must have a working technical knowledge of the goods or services they are purchasing. Evaluating suppliers is one of the most critical functions of a buyer or purchasing agent. Many organizations run on a lean manufacturing schedule and use just-in-time inventories, so any delays in the supply chain can shut down production and cause the organization to lose customers. Buyers and purchasing agents use many resources to find out all they can about potential suppliers. They attend meetings, trade shows, and conferences to learn about new industry trends and make contacts with suppliers. They often interview prospective suppliers and visit their plants and distribution centers to assess their capabilities. Buyers and purchasing agents must make certain that the supplier can deliver the desired goods or services on time, in the correct quantities, and without sacrificing quality. Once they have gathered information on suppliers, they sign contracts with suppliers who meet the organization's needs and they place orders. Buyers who purchase items to resell to customers may determine which products their organization will sell. They need to be able to predict what will appeal to their customers. If they are wrong, they could jeopardize the profits and reputation of their organization.

TITLE(S)	Computational Scientist, Computer Engineer, Computer Scientist, Mathematician
MINIMUM EDUCATION REQUIREMENTS	Bachelor's degree – Computer Science, Mathematics, Engineering
SALARY	$100,000 - $150,000 See SEEK – Salary Lookup for more information
JOB SKILLS	- Analytical skills. Computer hardware engineers use computer programming tools to analyze the digital circuits in hardware to determine the best design. - Creativity. Computer hardware engineers design new types of information technology devices. - Critical-thinking skills. These engineers use logic and reasoning to clarify goals, examine assumptions, and identify the strengths and weaknesses of alternative solutions to problems. - Problem-solving skills. Computer hardware engineers identify complex problems in computer hardware, develop and evaluate possible solutions, and figure out the best way to implement them. - Speaking skills. Engineers often work on teams and must be able to communicate with other types of engineers as well as with nontechnical team members.
JOB DUTIES	Computer hardware engineers typically do the following: - Design new computer hardware, creating schematics of computer equipment to be built - Test the completed models of the computer hardware they design - Analyze the test results and modify the design as needed - Update existing computer equipment so that it will work with new software - Oversee the manufacturing process for computer hardware - Maintain knowledge of computer engineering trends and new technology
JOB PROFILE	Many hardware engineers design noncomputer devices that incorporate processors and other computer components and connect to the Internet. For example, many car parts have computer systems embedded in them. Computer

hardware engineers also are designing a growing number of medical devices with a computer system and the ability to connect to the Internet.

Computer hardware engineers ensure that computer hardware components work together with the latest software. Therefore, hardware engineers often work with software developers. For example, the hardware and software for a mobile phone frequently are developed jointly. Hardware engineers also may perform some computer programming in a hardware description language (HDL), which describes the digital circuits in hardware. Using this language, computer hardware engineers can simulate how the hardware design would work, test for errors, and then fix the design.

TITLE(S)	Safety and Occupational Health Specialist
MINIMUM EDUCATION REQUIREMENTS	Bachelor's degree , Certificate IV in Occupational Health and Safety or above
SALARY	$80,000 - $120,000 See SEEK – Salary Lookup for more information
JOB SKILLS	- Ability to use technology. Occupational health and safety specialists must be able to use advanced technology. They often work with complex testing equipment. - Communication skills. Occupational health and safety specialists must be able to communicate safety instructions and concerns to employees and managers. They need to be able to work with technicians to collect and test samples of possible hazards, such as dust or vapors, in the workplace. - Detail oriented. Occupational health and safety specialists need to understand and follow safety standards and complex government regulations. - Physical stamina. Occupational health and safety specialists must be able to stand for long periods and be able to travel regularly. Some specialists work in environments that can be uncomfortable, such as tunnels or mines. - Problem-solving skills. Occupational health and safety specialists must be able to solve problems in order to design and implement workplace processes and procedures that help protect workers from hazardous work conditions.
JOB DUTIES	Occupational health and safety specialists typically do the following: - Identify hazards in the workplace - Collect samples of potentially toxic materials for analysis - Inspect and evaluate workplace environments, equipment, and practices for compliance with corporate and government health and safety standards and regulations - Design and implement workplace processes and procedures that help protect workers from hazardous work conditions - Investigate accidents and incidents to identify their causes and to determine how they might be prevented - Conduct training on a variety of topics, such as emergency preparedness

JOB PROFILE	Occupational health and safety specialists analyze many types of work environments and work procedures. Specialists inspect workplaces for adherence to regulations on safety, health, and the environment. They also design programs to prevent disease or injury to workers and damage to the environment. Occupational health and safety specialists examine the workplace for environmental or physical factors that could affect employee health, safety, comfort, and performance. They may examine factors such as lighting, equipment, materials, and ventilation. Specialists seek to increase worker productivity by reducing absenteeism and equipment downtime. In addition to protecting workers, specialists work to prevent harm to property, the environment, and the public by inspecting workplaces for chemical, physical, radiological, and biological hazards. Specialists who work for governments conduct safety inspections and can impose fines.

HOT RUBBLE

TITLE(S)	Project Manager, Construction Manager
MINIMUM EDUCATION REQUIREMENTS	Bachelor's degree – Engineering (Civil, Project, Structural)
SALARY	$120,000 - $200,000 See SEEK – Salary Lookup for more information
JOB SKILLS	- Analytical skills. Most managers plan a project strategy, handle unexpected issues and delays, and solve problems that arise over the course of the project. In addition, many managers use cost-estimating and planning software to determine costs and the materials and time required to complete projects. - Business skills. Construction managers address budget matters and coordinate and supervise workers. Choosing competent staff and establishing good working relationships with them is critical. - Customer-service skills. Construction managers are in constant contact with owners, inspectors, and the public. They must form good working relationships with these people and ensure their needs are met. - Decision making skills. Construction managers choose personnel and subcontractors for specific tasks and jobs. Often, these choices must be made quickly to meet deadlines and budgets. - Initiative. Self-employed construction managers generate their business opportunities and must be proactive in finding new clients. They often market their services and bid on jobs, and they must also learn to perform special home improvement projects, such as installing mosaic glass tiles, sanding wood floors, and insulating homes. - Leadership skills. Managers must effectively delegate tasks to construction workers, subcontractors, and other lower level managers. - Speaking skills. Managers must give clear orders, explain complex information to construction workers and clients, and discuss technical details with other building specialists, such as architects. Self-employed construction managers must get their own projects, so the need to sell their services to potential clients is critical. - Technical skills. Managers must know construction methods and technologies, and must be able to interpret contracts and technical drawings.

	- Time-management skills. Construction managers must meet deadlines. They ensure that construction phases are completed on time so that the next phase can begin as scheduled. For instance, a building's foundation cannot be constructed until the land is completely excavated. - Writing skills. Construction managers must write proposals, plans, and budgets, as well as document the progress of the work for clients and others involved in the building process.
JOB DUTIES	Construction managers typically do the following: - Prepare cost estimates, budgets, and work timetables - Interpret and explain contracts and technical information to other professionals - Report work progress and budget matters to clients - Collaborate with architects, engineers, and other construction specialists - Select subcontractors and schedule and coordinate their activities - Respond to work delays, emergencies, and other problems - Comply with legal requirements, building and safety codes, and other regulations
JOB PROFILE	Construction managers plan, coordinate, budget, and supervise construction projects from start to finish. Construction managers coordinate and supervise a wide variety of projects, including the building of all types of public, residential, commercial, and industrial structures, as well as roads, memorials, and bridges. Either a general contractor or a construction manager will oversee the construction phase of a project, although a construction manager may also consult with the client during the design phase to help refine construction plans and control costs. Construction managers oversee specialized contractors and other personnel. They schedule and coordinate all construction processes so that projects meet design specifications. They ensure that projects are completed on time and within budget. Construction managers work closely with other building specialists and a variety of trade workers.

HOT RUBBLE

Research and Development, Engineering and Manufacturing

TITLE(S)	Mechanical Engineer, Project, Quality, Design, Product, Sales, or Equipment Engineer
MINIMUM EDUCATION REQUIREMENTS	Bachelor's degree - Engineering (Mechanical, Process, Project Management)
SALARY	$80,000 - $120,000 See SEEK – Salary Lookup for more information
JOB SKILLS	- Creativity. Mechanical engineers design and build complex pieces of equipment and machinery. A creative mind is essential for this kind of work. - Listening skills. Mechanical engineers often work on projects with others, such as architects and computer scientists. They must listen to and analyze different approaches made by other experts to complete the task at hand. - Math skills. Mechanical engineers use the principles of calculus, statistics, and other advanced subjects in math for analysis, design, and troubleshooting in their work. - Mechanical skills. Mechanical skills allow engineers to apply basic engineering concepts and mechanical processes to the design of new devices and systems. - Problem-solving skills. Mechanical engineers need good problem-solving skills to take scientific discoveries and use them to design and build useful products.
JOB DUTIES	Mechanical engineers typically do the following: - Analyze problems to see how mechanical and thermal devices might help solve a particular problem - Design or redesign mechanical and thermal devices or subsystems, using analysis and computer-aided design - Develop and test prototypes of devices they design - Analyze the test results and change the design or system as needed - Oversee the manufacturing process for the device
JOB PROFILE	Mechanical engineering is one of the broadest engineering disciplines. Mechanical engineers research, design, develop, build, and test mechanical and thermal sensors and devices, including tools, engines, and machines. Mechanical engineers design and oversee the manufacture of many products ranging from medical devices to new batteries. Mechanical engineers design

power-producing machines, such as electric generators, internal combustion engines, and steam and gas turbines, as well as power-using machines, such as refrigeration and air-conditioning systems. Mechanical engineers design other machines inside buildings, such as elevators and escalators. They also design material-handling systems, such as conveyor systems and automated transfer stations. Like other engineers, mechanical engineers use computers extensively. Mechanical engineers are routinely responsible for the integration of sensors, controllers, and machinery. Computer technology helps mechanical engineers create and analyze designs, run simulations and test how a machine is likely to work, interact with connected systems, and generate specifications for parts.

TITLE(S)	Electrical Engineer
MINIMUM EDUCATION REQUIREMENTS	Bachelor's degree – Engineering (Electrical)
SALARY	$80,000 - $120,000 See SEEK – Salary Lookup for more information
JOB SKILLS	- Concentration. Electrical and electronics engineers design and develop complex electrical systems and electronic components and products. They must be able to keep track of multiple design elements and technical characteristics when performing these tasks. - Initiative. Electrical and electronics engineers must be able to apply their knowledge to new tasks in every project they undertake. In addition, they must engage in continuing education to keep up with changes in technology. - Interpersonal skills. Electrical and electronics engineers must be able to work with others during the manufacturing process to ensure that their plans are implemented correctly. This collaboration includes monitoring technicians and devising remedies to problems as they arise. - Math skills. Electrical and electronics engineers must be able to use the principles of calculus and other advanced math in order to analyze, design, and troubleshoot equipment. - Speaking skills. Electrical and electronics engineers work closely with other engineers and technicians. They must be able to explain their designs and reasoning clearly and to relay instructions during product development and production. They also may need to explain complex issues to customers who have little or no technical expertise. - Writing skills. Electrical and electronics engineers develop technical publications related to equipment they develop, including maintenance manuals, operation manuals, parts lists, product proposals, and design methods documents.
JOB DUTIES	Electrical engineers typically do the following: - Design new ways to use electrical power to develop or improve products

	- Perform detailed calculations to develop manufacturing, construction, and installation standards and specifications - Direct the manufacture, installation, and testing of electrical equipment to ensure that products meet specifications and codes - Investigate complaints from customers or the public, evaluate problems, and recommend solutions - Work with project managers on production efforts to ensure that projects are completed satisfactorily, on time, and within budget
JOB PROFILE	Electrical engineers design, develop, test, and supervise the manufacturing of electrical equipment, such as electric motors, radar and navigation systems, communications systems, or power generation equipment. Electrical engineers also design the electrical systems of automobiles and aircraft.

HOT RUBBLE

TITLE(S)	Environmental Engineer, Hazardous Substances Engineer, Regulatory Compliance Manger
MINIMUM EDUCATION REQUIREMENTS	Bachelor's degree – Science or Engineering (Environmental)
SALARY	$100,000 - $140,000 See SEEK – Salary Lookup for more information
JOB SKILLS	- Imagination. Environmental engineers sometimes have to design systems that will be part of larger ones. They must be able to foresee how the proposed designs will interact with other components of the larger system, including the workers, machinery, and equipment, as well as with the environment. - Interpersonal skills. Environmental engineers must be able to work with others toward a common goal. They usually work with engineers and scientists who design other systems and with the technicians and mechanics who put the designs into practice. - Problem-solving skills. When designing facilities and processes, environmental engineers strive to solve several issues at once, from workers' safety to environmental protection. They must be able to identify and anticipate problems in order to prevent losses for their employers, safeguard workers' health, and mitigate environmental damage. - Reading skills. Environmental engineers often work with businesspeople, lawyers, and other professionals outside their field. They frequently are required to read and understand documents with topics outside their scope of training. - Writing skills. Environmental engineers must be able to write clearly so that others without their specific training can understand their plans, proposals, specifications, findings, and other documents.
JOB DUTIES	Environmental engineers typically do the following: - Prepare, review, and update environmental investigation reports - Design projects that lead to environmental protection, such as water reclamation facilities, air pollution control systems, and operations that convert waste to energy

	- Obtain, update, and maintain plans, permits, and standard operating procedures - Provide technical support for environmental remediation projects and for legal actions - Analyze scientific data and do quality-control checks - Monitor the progress of environmental improvement programs - Inspect industrial and municipal facilities and programs in order to ensure compliance with environmental regulations - Advise corporations and government agencies about procedures for cleaning up contaminated sites
JOB PROFILE	Environmental engineers use the principles of engineering, soil science, biology, and chemistry to develop solutions to environmental problems. They are involved in efforts to improve recycling, waste disposal, public health, and water and air pollution control. They also address global issues, such as unsafe drinking water, climate change, and environmental sustainability. Environmental engineers conduct hazardous-waste management studies in which they evaluate the significance of a hazard and advise on treating and containing it. They also design systems for municipal and industrial water supplies and industrial wastewater treatment, and research the environmental impact of proposed construction projects. Environmental engineers in government develop regulations to prevent mishaps. Some environmental engineers study ways to minimize the effects of acid rain, climate change, automobile emissions, and ozone depletion. They also collaborate with environmental scientists, planners, hazardous waste technicians, and other engineers, as well as with specialists such as experts in law and business, to address environmental problems and environmental sustainability.

HOT RUBBLE

TITLE(S)	Research Engineer, Government Engineer, Research and Development Engineer, Basic Research Engineer, Component Researcher, Materials Engineer
MINIMUM EDUCATION REQUIREMENTS	Bachelor's degree – Engineering / Post Graduate research
SALARY	$85,000 - $110,000 See SEEK – Salary Lookup for more information
JOB SKILLS	- Analytical skills. Operations research analysts use a wide range of methods, such as forecasting, data mining, and statistical analysis, to examine and interpret data. They must determine the appropriate software packages and understand computer programming languages to design and develop new techniques and models. - Communication skills. Operations research analysts often present their data and conclusions to managers and other executives. They also need to communicate technical information to people without a technical background. - Critical-thinking skills. Operations research analysts must be able to figure out what information is relevant to their work. They also must be able to evaluate the costs and benefits of alternative solutions before making a recommendation. - Interpersonal skills. Operations research analysts typically work on teams. They also need to be able to convince managers and top executives to accept their recommendations. - Math skills. The models and methods used by operations research analysts are rooted in statistics, calculus, linear algebra, and other advanced mathematical disciplines. - Problem-solving skills. Operations research analysts need to be able to diagnose problems on the basis of information given to them by others. They then analyze relevant information to solve the problems. - Writing skills. Operations research analysts write memos, reports, and other documents explaining their findings and recommendations.
JOB DUTIES	Operations research analysts typically do the following: - Identify and solve real-world problems in areas such as business, logistics, healthcare, or other fields

	- Collect and organize information from a variety of sources, such as computer databases, sales histories, and customer feedback - Gather input from workers involved in all aspects of a problem or from others who have specialized knowledge, so that they can help solve the problem - Examine information to figure out what is relevant to a problem and what methods might be used to analyze it - Use statistical analysis, simulations, predictive modeling, or other methods to analyze information and develop practical solutions to business problems - Advise managers and other decision makers on the impacts of various courses of action to take in order to address a problem - Write memos, reports, and other documents explaining their findings and recommendations for managers, executives, and other officials
JOB PROFILE	Operations research analysts are involved in all aspects of an organization. They help managers decide how to allocate resources, develop production schedules, manage the supply chain, and set prices. Analysts must first identify and understand the problem to be solved or the processes to be improved. Analysts typically collect relevant data from the field and interview clients or managers involved in the business processes being examined. Analysts show the implications of pursuing different actions and may assist in achieving a consensus on how to proceed. Operations research analysts use sophisticated computer software, such as databases and statistical programs, and modeling packages, to analyze and solve problems. Analysts use these mathematical programs to simulate current and future events and evaluate alternative courses of action. Analysts break down problems into their various parts and analyze the effect that different changes and circumstances would have on each of these parts. There is no one way to solve a problem, and analysts must weigh the costs and benefits of alternative solutions or approaches in their recommendations to managers.

HOT RUBBLE

TITLE(S)	Civil Engineer
MINIMUM EDUCATION REQUIREMENTS	Bachelor's degree - Engineering (Civil, Structural)
SALARY	$80,000 - $120,000 See SEEK – Salary Lookup for more information
JOB SKILLS	- Decision making skills. Civil engineers often balance multiple and frequently conflicting objectives, such as determining the feasibility of plans with regard to financial costs and safety concerns. - Leadership skills. Civil engineers take ultimate responsibility for the projects that they manage or research that they perform. - Math skills. Civil engineers use the principles of calculus, trigonometry, and other advanced topics in mathematics for analysis, design, and troubleshooting in their work. - Organizational skills. Only licensed civil engineers can sign the design documents for infrastructure projects. This requirement makes it imperative that civil engineers be able to monitor and evaluate the work at the jobsite as a project progresses. - Problem-solving skills. Civil engineers work at the highest level of the planning, design, construction, and operation of multifaceted projects or research. The many variables involved require that they possess the ability to identify and evaluate complex problems. They must be able to then utilize their skill and training to develop cost-effective, safe, and efficient solutions. - Speaking skills. Civil engineers must present reports and plans to audiences of people with a wide range of backgrounds and technical knowledge. This requires the ability to speak clearly and to converse with people in various settings, and to translate engineering and scientific information into easy to understand concepts. Writing skills. Civil engineers must be able to communicate with others, such as architects, landscape architects
JOB DUTIES	Civil engineers typically do the following:

	- Analyze long range plans, survey reports, maps, and other data in order to plan projects - Consider construction costs, government regulations, potential environmental hazards, and other factors in planning the stages of, and risk analysis for, a project - Compile and submit permit applications to local, state, and federal agencies, verifying that projects comply with various regulations - Perform or oversee soil testing to determine the adequacy and strength of foundations - Test building materials, such as concrete, asphalt, or steel, for use in particular projects - Provide cost estimates for materials, equipment, or labor to determine a project's economic feasibility - Use design software to plan and design transportation systems, hydraulic systems, and structures in line with industry and government standards - Perform or oversee surveying operations in order to establish reference points, grades, and elevations to guide construction - Present their findings to the public on topics such as bid proposals, environmental impact statements, or descriptions of property - Manage the repair, maintenance, and replacement of public and private infrastructure
JOB PROFILE	Civil engineers design, build, supervise, operate, and maintain construction projects and systems in the public and private sector, including roads, buildings, airports, tunnels, dams, bridges, and systems for water supply and sewage treatment. Many civil engineers work in design, construction, research, and education. Civil engineers inspect projects to insure regulatory compliance. In addition, they are tasked with ensuring that safe work practices are followed at construction sites. Many civil engineers hold supervisory or administrative positions ranging from supervisor of a construction site to city engineer, public works director, and city manager. Others work in design, construction, research, and teaching.

HOT RUBBLE

TITLE(S)	Software Engineer, Software Developer
MINIMUM EDUCATION REQUIREMENTS	Bachelor's degree - Computer Science or Engineering (Software)
SALARY	$80,000 - $120,000 See SEEK – Salary Lookup for more information
JOB SKILLS	- Analytical skills. Developers must analyze users' needs and then design software to meet those needs. - Communication skills. Developers must be able to give clear instructions to others working on a project. They must also explain to their customers how the software works and answer any questions that arise. - Computer skills. Developers must understand computer capabilities and programming languages in order to design effective software. - Creativity. Developers are the creative minds behind new computer software. - Detail oriented. Developers often work on many parts of an application or system at the same time and must therefore be able to concentrate and pay attention to detail. - Interpersonal skills. Software developers must be able to work well with others who contribute to designing, developing, and programming successful software. - Problem-solving skills. Because developers are in charge of software from beginning to end, they must be able to solve problems that arise throughout the design process.
JOB DUTIES	Software developers typically do the following: - Analyze users' needs and then design, test, and develop software to meet those needs - Recommend software upgrades for customers' existing programs and systems - Design each piece of an application or a system and plan how the pieces will work together - Create a variety of models and diagrams (such as flowcharts) that instruct programmers how to write software code - Ensure that a program continues to function normally through software maintenance and testing

	- Document every aspect of an application or a system as a reference for future maintenance and upgrades - Collaborate with other computer specialists to create optimum software
JOB PROFILE	Software developers are the creative minds behind computer programs. Some develop the applications that allow people to do specific tasks on a computer or another device. Others develop the underlying systems that run the devices or that control networks. Software developers are in charge of the entire development process for a software program. They may begin by asking how the customer plans to use the software. They must identify the core functionality that users need from software programs. Software developers must also determine user requirements that are unrelated to the functionality of software, such as the level of security and performance needs. They design the program and then give instructions to programmers, who write computer code and test it. If the program does not work as expected or if testers find it too difficult to use, software developers go back to the design process to fix the problems or improve the program. After the program is released to the customer, a developer may perform upgrades and maintenance. Developers usually work closely with computer programmers. However, in some companies, developers write code themselves instead of giving instructions to the programmers.

TITLE(S)	Environmental Scientist, Environmental Engineer
MINIMUM EDUCATION REQUIREMENTS	Bachelor's degree - Science or Engineering (Environmental)
SALARY	$60,000 - $80,000 See SEEK – Salary Lookup for more information
JOB SKILLS	- Analytical skills. Environmental scientists and specialists base their conclusions on careful analysis of scientific data. They must consider all possible methods and solutions in their analyses. - Communication skills. Environmental scientists and specialists may need to present and explain their findings to audiences of varying backgrounds and to write technical reports. - Interpersonal skills. Environmental scientists and specialists typically work on teams with scientists, engineers, and technicians. Team members must be able to work together effectively to achieve their goals. - Problem-solving skills. Environmental scientists and specialists try to find the best possible solution to problems that affect the environment and people's health. - Self-discipline. Environmental scientists and specialists may spend a lot of time working alone. They need to be able to stay motivated and get their work done without supervision.
JOB DUTIES	Environmental scientists and specialists typically do the following: - Determine data collection methods for research projects, investigations, and surveys - Collect and compile environmental data from samples of air, soil, water, food, and other materials for scientific analysis - Analyze samples, surveys, and other information to identify and assess threats to the environment - Develop plans to prevent, control, or fix environmental problems, such as land or water pollution - Provide information and guidance to government officials, businesses, and the general public on possible environmental hazards and health risks

	- Prepare technical reports and presentations that explain their research and findings
JOB PROFILE	Environmental scientists and specialists use their knowledge of the natural sciences to protect the environment and human health. They may clean up polluted areas, advise policymakers, or work with industry to reduce waste. The federal government and many state and local governments have regulations to ensure that there is clean air to breathe, safe water to drink, and no hazardous materials in the soil. The regulations also place limits on development, particularly near sensitive ecosystems such as wetlands. Environmental scientists and specialists who work for governments ensure that the regulations are followed. Other environmental scientists and specialists work for consulting firms that help companies comply with regulations and policies. Some environmental scientists and specialists focus on environmental regulations that are designed to protect people's health, while others focus on regulations designed to minimize society's impact on the ecosystem.

HOT RUBBLE

TITLE(S)	Materials Scientist, Engineer, Chemist
MINIMUM EDUCATION REQUIREMENTS	Bachelor's degree - Science or Engineering (Materials)
SALARY	$60,000 - $80,000 See SEEK – Salary Lookup for more information
JOB SKILLS	- Analytical skills. Materials scientists carry out scientific experiments and studies. They must be precise and accurate in their analyses, because errors could invalidate their research. - Communication skills. Materials scientists need to communicate with team members and other scientists. They must be able to read and write technical reports and give presentations. - Critical-thinking skills. Materials scientists carefully evaluate their own work and the work of others. They must determine if results and conclusions are based on sound science. - Interpersonal skills. Materials scientists typically work on interdisciplinary research teams and need to work well with others toward a common goal. Many serve as team leaders and must be able to motivate and direct other team members. - Math skills. Materials scientists regularly use complex mathematical equations and formulas, and they need a broad understanding of mathematics, including calculus, algebra, and statistics. - Organizational skills. Materials scientists need to document processes carefully in order to conform to regulations and industry procedures. Disorganization in the workplace can lead to legal problems, damage to equipment, and chemical spills. - Perseverance. Scientific research involves substantial trial and error, and materials scientists must not become discouraged in their work. - Problem-solving skills. Materials scientists research and develop new and improved chemical products, processes, and materials. This work requires a great deal of trial and error on the part of materials scientists before a unique solution is found.

	- Time-management skills. Materials scientists usually need to meet deadlines when conducting research. They must be able to manage time and prioritize tasks efficiently while maintaining their quality of work.
JOB DUTIES	Materials scientists typically do the following: - Plan and carry out complex research projects, such as the development of new products and testing methods - Direct technicians and other workers in testing and analyzing components and the physical properties of materials - Instruct scientists and technicians on proper chemical processing and testing procedures, including ingredients, mixing times, and operating temperatures - Prepare solutions, compounds, and reagents used in laboratory procedures - Analyze substances to determine their composition and concentration of elements - Conduct tests on materials and other substances to ensure that safety and quality standards are met - Write technical reports that detail methods and findings - Present research findings to scientists, engineers, and other colleagues
JOB PROFILE	Materials scientists study substances at the atomic and molecular levels and the ways in which the substances interact with one another. They use their knowledge to develop new and improved products and to test the quality of manufactured goods. Materials scientists work in basic research or in applied research. In basic research, materials scientists investigate the properties, composition, and structure of matter. They also experiment with combinations of elements and the ways in which they interact. In applied research, chemists investigate possible new products and ways to improve existing ones. Materials scientists determine ways to strengthen or combine materials, or develop new materials, for use in a variety of products. Applications of materials science include inventing or improving ceramics, metallic alloys, and superconducting materials. The number of scientific research projects that involve multiple disciplines is increasing, and it is common for materials scientists to work on

	teams with other scientists, such as biologists, physicists, computer specialists, and engineers.

TITLE(S)	Chemical Engineer
MINIMUM EDUCATION REQUIREMENTS	Bachelor's degree - Engineering (Chemical or Industrial Chemistry)
SALARY	$80,000 - $120,000 See SEEK – Salary Lookup for more information
JOB SKILLS	- Analytical skills. Chemical engineers must be able to troubleshoot designs that do not work as planned. They must be able to ask the right questions and then find answers that work. - Creativity. Chemical engineers must be able to explore new ways of applying engineering principles. They work to invent new materials, advanced manufacturing techniques, and new applications in chemical and biomedical engineering. - Ingenuity. Chemical engineers learn the broad concepts of chemical engineering, but their work requires them to apply those concepts to specific production problems. - Interpersonal skills. Because their role is to put scientific principles into practice in manufacturing industries, chemical engineers must develop good working relationships with other workers involved in production processes. - Math skills. Chemical engineers use the principles of calculus and other advanced topics in mathematics for analysis, design, and troubleshooting in their work. - Problem-solving skills. In designing equipment and processes for manufacturing, these engineers must be able to anticipate and identify problems, including such issues as workers' safety and problems related to manufacturing and environmental protection.
JOB DUTIES	Chemical engineers typically do the following: - Conduct research to develop new and improved manufacturing processes - Develop safety procedures for those working with dangerous chemicals - Develop processes for separating components of liquids and gases, or for generating electrical currents, by using controlled chemical processes - Design and plan the layout of equipment

	- Conduct tests and monitor the performance of processes throughout production - Troubleshoot problems with manufacturing processes - Evaluate equipment and processes to ensure compliance with safety and environmental regulations - Estimate production costs for management
JOB PROFILE	Chemical engineers apply the principles of chemistry, biology, physics, and mathematics to solve problems that involve the production or use of chemicals, fuel, drugs, food, and many other products. They design processes and equipment for large-scale manufacturing, plan and test production methods and byproducts treatment, and direct facility operations. Some chemical engineers specialize in a particular process, such as oxidation (a reaction of oxygen with chemicals to make other chemicals) or polymerization (making plastics and resins). Others specialize in a particular field, such as nanomaterials (extremely small substances) or biological engineering. Still others specialize in developing specific products. In addition, chemical engineers work in the production of energy, electronics, food, clothing, and paper. They must understand how the manufacturing process affects the environment and the safety of workers and consumers. Chemical engineers also conduct research in the life sciences, biotechnology, and business services.

HOT RUBBLE

Advanced

Communications, Training and Outreach

TITLE(S)	Professor, Postsecondary Teacher
MINIMUM EDUCATION REQUIREMENTS	Doctoral degree
SALARY	$80,000 - $120,000 See SEEK – Salary Lookup for more information
JOB SKILLS	- Critical-thinking skills. To challenge established theories and beliefs, conduct original research, and design experiments, postsecondary teachers need good critical-thinking skills. - Interpersonal skills. Most postsecondary teachers need to be able to work well with others and must have good communication skills to serve on committees and give lectures. - Resourcefulness. Postsecondary teachers need to be able to present information in a way that students will understand. They need to adapt to the different learning styles of their students and teach students who have little or no experience with the subject. - Speaking skills. Postsecondary teachers need good communication skills to give lectures. - Writing skills. Most postsecondary teachers need to be skilled writers to publish original research and analysis.
JOB DUTIES	Postsecondary teachers typically do the following: - Teach courses in their subject area - Work with students who are taking classes to improve their knowledge or career skills - Develop an instructional plan (known as a course outline or syllabus) for the course(s) they teach and ensure that it meets college and department standards - Plan lessons and assignments - Work with colleagues to develop or modify the curriculum for a degree or certificate program involving a series of courses

	- Assess students' progress by grading assignments, papers, exams, and other work - Advise students about which classes to take and how to achieve their goals - Stay informed about changes and innovations in their field - Conduct research and experiments to advance knowledge in their field - Supervise graduate students who are working toward doctoral degrees - Publish original research and analysis in books and academic journals - Serve on academic and administrative committees that review and recommend policies, make budget decisions, or advise on hiring and promotions within their department
JOB PROFILE	Postsecondary teachers instruct students in a wide variety of academic and career and technical subjects beyond the high school level. They also conduct research and publish scholarly papers and books. Postsecondary teachers, often referred to as professors or faculty, specialize in a variety of subjects and fields. Some teach academic subjects, such as English or philosophy. Others focus on career-related subjects, such as law, nursing, or culinary arts.

HOT RUBBLE

TITLE(S)	Communications Manager, Communications Lead, Supervisory Communications Specialist
MINIMUM EDUCATION REQUIREMENTS	Bachelor's degree - Communications or Media and Communications
SALARY	$100,000 - $150,000 See SEEK – Salary Lookup for more information
JOB SKILLS	- Communication skills. Managers deal with the public regularly; therefore, they must be friendly enough to build rapport and receive cooperation from their media contacts and donors. - Leadership skills. Public relations and fundraising managers often lead large teams of specialists or fundraisers and must be able to guide their activities. - Organizational skills. Public relations and fundraising managers are often in charge of running several events at the same time, requiring superior organizational skills. - Problem-solving skills. Managers sometimes must explain how the company or client is handling sensitive issues. They must use good judgment in what they report and how they report it. - Speaking skills. Public relations and fundraising managers regularly speak on behalf of their organization. When doing so, they must be able to explain the organization's position clearly. - Writing skills. Managers must be able to write well-organized and clear press releases and speeches. They must be able to grasp the key messages they want to get across and write them succinctly in order to keep the attention of busy readers or listeners.
JOB DUTIES	Public relations managers typically do the following: - Write press releases and prepare information for the media - Identify main client groups and audiences and determine the best way to reach them - Designate an appropriate spokesperson or information source for media inquiries - Help clients communicate effectively with the public - Develop their organization's or client's corporate image and identity

	- Assist and inform an organization’s executives and spokespeople - Devise advertising and promotion programs - Assign, supervise, and review the activities of staff
JOB PROFILE	Public relations managers review press releases and sponsor corporate events to help maintain and improve the image of their organization or client. Public relations managers help to clarify their organization’s point of view to its main audience through media releases and interviews. They observe social, economic, and political trends that might ultimately affect their organization, and they recommend ways to enhance the firm's image based on those trends. In addition, public relations managers may handle internal communications, such as company newsletters, and may help financial managers produce an organization’s reports. They may also draft speeches, arrange interviews, and maintain other forms of public contact to help the organization’s top executives. Public relations managers must be able to work well with many types of specialists to report the facts accurately.

Operations and Management

TITLE(S)	Budget Analyst, Financial Analyst
MINIMUM EDUCATION REQUIREMENTS	Bachelor's degree – Business Administration, Accounting, Economics, Finance or Statistics
SALARY	$80,000 - $120,000 See SEEK – Salary Lookup for more information
JOB SKILLS	- Analytical skills. Budget analysts must be able to process a variety of information, evaluate costs and benefits, and solve complex problems. - Communication skills. Budget analysts need strong communication skills because they often have to explain and defend their analyses and recommendations in meetings and legislative committee hearings. - Detail oriented. Creating an efficient budget requires careful analysis of each budget item. - Math skills. Most budget analysts need math skills and should be able to use certain software, including spreadsheets, database functions, and financial analysis programs. - Writing skills. Budget analysts must present technical information in writing that is understandable for the intended audience.
JOB DUTIES	Budget analysts typically do the following: - Work with program and project managers to develop the organization's budget - Review managers' budget proposals for completeness, accuracy, and compliance with laws and other regulations - Combine all the program and department budgets together into a consolidated organizational budget and review all funding requests for merit - Explain their recommendations for funding requests to others in the organization, legislators, and the public - Help the chief operations officer, agency head, or other top managers analyze proposed plans and find alternatives if the projected results are unsatisfactory - Monitor organizational spending to ensure that it is within budget

	- Inform program managers of the status and availability of funds - Estimate future financial needs
JOB PROFILE	Budget analysts help public and private institutions organize their finances. They prepare budget reports and monitor institutional spending. Budget analysts advise various institutions—including governments, universities, and businesses—on how to organize their finances. They prepare annual and special reports and evaluate budget proposals. They analyze data to determine the costs and benefits of various programs and recommend funding levels based on their findings. Sometimes, budget analysts use cost-benefit analyses to review financial requests, assess program tradeoffs, and explore alternative funding methods. Budget analysts also may examine past budgets and research economic and financial developments that affect the organization's income and expenditures. Budget analysts may recommend program spending cuts or redistributing extra funds. Throughout the year, budget analysts oversee spending to ensure compliance with the budget and determine whether changes to funding levels are needed for certain programs. Analysts also evaluate programs to determine whether they are producing the desired results.

TITLE(S)	Asset Manager, Senior Financial Analyst
MINIMUM EDUCATION REQUIREMENTS	Bachelor's degree – Business Administration, Accounting, Economics, Finance or Statistics
SALARY	$120,000 - $200,000 See SEEK – Salary Lookup for more information
JOB SKILLS	- Analytical skills. Financial managers increasingly are assisting executives in making decisions that affect their organization, a task which requires analytical ability. - Communication skills. Excellent communication skills are essential because financial managers must explain and justify complex financial transactions. - Detail oriented. In preparing and analyzing reports such as balance sheets and income statements, financial managers must be precise and attentive to their work in order to avoid errors. - Math skills. Financial managers must be skilled in math, including algebra. An understanding of international finance and complex financial documents also is important. - Organizational skills. Financial managers deal with a range of information and documents and so they must stay organized to do their jobs effectively.
JOB DUTIES	Financial managers typically do the following: - Prepare financial statements, business activity reports, and forecasts - Monitor financial details to ensure that legal requirements are met - Supervise employees who do financial reporting and budgeting - Review company financial reports and seek ways to reduce costs - Analyze market trends to maximize profits and find expansion opportunities - Help management make financial decisions
JOB PROFILE	Financial managers are responsible for the financial health of an organization. They produce financial reports, direct investment activities, and develop strategies and plans for the long-term financial goals of their organization. The role of the financial manager, particularly in business, is changing in response to technological advances that have substantially reduced the amount of time it takes to produce financial reports. Financial managers' main responsibility used

to be monitoring a company's finances, but they now do more data analysis and advise senior managers on ways to maximize profits. They often work on teams, acting as business advisors to top executives.

TITLE(S)	Site / Plant Manager
MINIMUM EDUCATION REQUIREMENTS	Bachelor degree – Engineering (Mechanical. Electrical or Chemical) and 5+ years related on job experience
SALARY	$120,000 - $200,000 See SEEK – Salary Lookup for more information
JOB SKILLS	- Concentration skills. Power plant operators, distributors, and dispatchers must be careful, attentive, and persistent. They must be able to concentrate on a task, such as monitoring the temperature of reactors over a certain length of time without being distracted. - Detail oriented. Power plant operators, distributors, and dispatchers must monitor complex controls and intricate machinery to ensure that everything is operating properly. - Dexterity. Power plant operators, distributors, and dispatchers must use precise and repeated motions when working in a control room. - Mechanical skills. Power plant operators, distributors, and dispatchers must know how to work with machines and use tools. They must be familiar with how to operate, repair, and maintain equipment. - Problem-solving skills. Power plant operators, distributors, and dispatchers must find and quickly solve problems that arise with equipment or controls.
JOB DUTIES	Power plant operators, distributors, and dispatchers typically do the following: - Control power-generating equipment, which may use any one type of fuel, such as coal, nuclear fuel, or natural gas - Read charts, meters, and gauges to monitor voltage and electricity flows - Check equipment and indicators to detect evidence of operating problems - Adjust controls to regulate the flow of power - Start or stop generators, turbines, and other equipment as necessary
JOB PROFILE	Electricity is one of our nation's most vital resources. Power plant operators, distributors, and dispatchers control power plants and the flow of electricity from plants to substations, which distribute electricity to businesses, homes, and factories. Electricity is generated from many sources, including coal, gas,

	nuclear energy, hydroelectric energy (from water sources), and wind and solar power.

TITLE(S)	Economist
MINIMUM EDUCATION REQUIREMENTS	Master's degree
SALARY	$80,000 - $120,000 See SEEK – Salary Lookup for more information
JOB SKILLS	- Analytical skills. Economists must be able to review data, observe patterns, and draw logical conclusions. For example, some economists analyze historical employment trends to make future projections on jobs. - Communication skills. Economists must be able to explain their work to others. They may give presentations, explain reports, or advise clients on economic issues. They may collaborate with colleagues and sometimes must explain economic concepts to those without a background in economics. - Critical-thinking skills. Economists must be able to use logic and reasoning to solve complex problems. For instance, they might identify how economic trends may affect an organization. - Detail oriented. Economists must pay attention to details. Precise data analysis is necessary to ensure accuracy in their findings. - Math skills. Economists use the principles of statistics, calculus, and other advanced topics in mathematics in their economic analyses. - Writing skills. Economists must be able to present their findings clearly. Many economists prepare reports for colleagues or clients; others write for publication in journals or for news media.
JOB DUTIES	Economists typically do the following: - Research and analyze economic issues - Conduct surveys and collect data - Analyze data using mathematical models and statistical techniques - Prepare reports, tables, and charts and present research results - Interpret and forecast market trends - Advise businesses, governments, and individuals on economic topics - Design policies or make recommendations for solving economic problems - Write articles for publication in academic journals and other media sources

JOB PROFILE	Economists study the production and distribution of resources, goods, and services by collecting and analyzing data, researching trends, and evaluating economic issues. Economists apply economic analysis to issues within a variety of fields, such as education, health, development, and the environment. Some economists study the cost of products, healthcare, or energy. Others examine employment levels, business cycles, exchange rates, taxes, inflation, or interest rates. Economists often study historical trends and use them to make forecasts. They research and analyze data using a variety of software programs, including spreadsheets, statistical analysis, and database management programs. They sometimes give a presentation of their research to various audiences.

TITLE(S)	Regulatory Expert, Government Regulatory Expert, Utility Regulatory Expert, Policy & Regulatory Specialist, Policy Analyst, Public Affairs, Legislative Liaison, Government Relations, Government Affairs, Lobbyist
MINIMUM EDUCATION REQUIREMENTS	Bachelor's degree – Economics, Business, Politics, Law
SALARY	$100,000 - $150,000 See SEEK – Salary Lookup for more information
JOB SKILLS	- Analytical skills. Regulatory experts often use qualitative and quantitative research methods. They rely on their analytical skills when they collect, evaluate and interpret data. - Critical-thinking skills. Regulatory experts must be able to examine and process available information and draw logical conclusions from their findings. - Intellectual curiosity. Regulatory experts must continually explore new ideas and information in order to make new and appropriate recommendations. They must stay current on regulatory issues and come up with new ways to think about and address these issues. - Communication skills. Regulatory experts must be able to clearly explain policies, policy impacts, and recommendations in both spoken and written formats to many different audiences, including colleagues in their company, external stakeholders, team members and policy makers. - Knowledge of energy markets. Especially transmission and trading.
JOB DUTIES	- Regulatory experts have a strong understanding of existing legislative and regulatory issues, but more importantly, they keep up to date on various policy issues within the energy industry. They research potential changes in rules, regulations, and legislation at the state and federal levels. Using their knowledge and research, they provide information and recommendations to internal company stakeholders that can assist in strategic business planning. A regulatory expert serves on various stakeholder committees or assists in lobbying type functions during State and Federal rule making procedures associated with transmission and interconnection issues, energy market issues, state Renewable Portfolio Standards, siting/permitting, land use, and taxes. They communicate with various stakeholders to determine issues and potential

	outcomes, testify at state and regional, such as with Public Utility Commissions or legislative committee hearings. They may also draft and edit new regulatory language.
JOB PROFILE	Regulatory experts research and keep current on various regulatory issues within the energy industry. They develop positions on policy issues, analyze how policy issues will impact business opportunities, and provide updates and strategy recommendations to senior management, sales, project development teams and other internal stakeholders. This role often serves on various stakeholder committees, such as industry trade associations, or assists in lobbying functions during state and federal rule making procedures associated with transmission and interconnection issues, energy market issues, state Renewable Portfolio Standards, land use, siting/permitting, and taxes.

TITLE(S)	Energy or Environmental Lawyer
MINIMUM EDUCATION REQUIREMENTS	Doctoral or professional degree - Law, completed bar examination
SALARY	$120,000 - $200,000 See SEEK – Salary Lookup for more information
JOB SKILLS	- Analytical skills. Lawyers help their clients resolve problems and issues. As a result, they must be able to analyze large amounts of information, determine relevant facts, and propose viable solutions. - Interpersonal skills. Lawyers must win the respect and confidence of their clients by building a trusting relationship, so that clients feel comfortable enough to share personal information related to their case. - Problem-solving skills. Lawyers must separate their emotions and prejudice from their clients' problems and objectively evaluate the matter. Therefore, good problem-solving skills are important for lawyers, to prepare the best defense and recommendation. - Research skills. Preparing legal advice or representation for a client commonly requires substantial research. All lawyers need to be able to find what applicable laws and regulations apply to a specific matter. - Speaking skills. Clients hire lawyers to speak on their behalf. Lawyers must be able to clearly present and explain their case to arbitrators, mediators, opposing parties, judges, or juries. - Writing skills. Lawyers need to be precise and specific when preparing documents, such as wills, trusts, and powers of attorney.
JOB DUTIES	Lawyers typically do the following: - Advise and represent clients in courts, before government agencies, and in private legal matters - Communicate with their clients, colleagues, judges and others involved in the case - Conduct research and analysis of legal problems - Interpret laws, rulings, and regulations for individuals and businesses

	- Present facts in writing and verbally to their clients or others and argue on behalf of their clients - Prepare and file legal documents, such as lawsuits, appeals, wills, contracts, and deeds
JOB PROFILE	Lawyers advise and represent individuals, businesses, and government agencies on legal issues and disputes. Lawyers, also called attorneys, act as both advocates and advisors. As advocates, they represent one of the parties in criminal or civil trials by presenting evidence and arguing in support of their client. As advisors, lawyers counsel their clients about their legal rights and obligations and suggest courses of action in business and personal matters. All attorneys research the intent of laws and judicial decisions and apply the laws to the specific circumstances that their clients face. Environmental lawyers deal with issues and regulations that are related to the environment. They may represent advocacy groups, waste disposal companies, and government agencies to make sure they comply with the relevant laws.

HOT RUBBLE

TITLE(S)	Project Developer
MINIMUM EDUCATION REQUIREMENTS	Bachelor's degree - Engineering
SALARY	$80,000 - $120,000 See SEEK – Salary Lookup for more information
JOB SKILLS	- Networking, organizing, finance and people skills - Leadership and management - Advanced cost/benefit analysis skills - Using IT to streamline work processes - Flexibility and multitasking - Extensive negotiating skills - Work with colleagues at all levels - Acute attention to detail - Active learning - Excellent oral and written communication - Entrepreneurial skill
JOB DUTIES	As part of the clean energy economy, project developers are responsible for all aspects of energy project development, including: - Securing land rights, interconnection rights, building permits, and property tax agreements - Working closely with engineering, finance and commercial teams when a project moves successfully to the 'pre construction' phase - Acting as lead project sponsor for the successful financing and construction of the project
JOB PROFILE	Successful developers maintain current knowledge of emerging energy technologies as well as relevant energy market and policy developments. Combining the best sites and technologies to produce the most effective energy solutions for their clients, project developers provide a critical link between engineering, procurement, and construction.

TITLE(S)	Finance Manager, Senior Financial Analyst
MINIMUM EDUCATION REQUIREMENTS	Bachelor's degree – Finance, Business, Economics, Accounting
SALARY	$100,000 - $150,000 See SEEK – Salary Lookup for more information
JOB SKILLS	- Analytical skills. Financial managers increasingly are assisting executives in making decisions that affect their organization, a task which requires analytical ability. - Communication skills. Excellent communication skills are essential because financial managers must explain and justify complex financial transactions. - Detail oriented. In preparing and analyzing reports such as balance sheets and income statements, financial managers must be precise and attentive to their work in order to avoid errors. - Math skills. Financial managers must be skilled in math, including algebra. An understanding of international finance and complex financial documents also is important. - Organizational skills. Financial managers deal with a range of information and documents and so they must stay organized to do their jobs effectively.
JOB DUTIES	Financial managers typically do the following: - Prepare financial statements, business activity reports, and forecasts - Monitor financial details to ensure that legal requirements are met - Supervise employees who do financial reporting and budgeting - Review company financial reports and seek ways to reduce costs - Analyze market trends to maximize profits and find expansion opportunities - Help management make financial decisions
JOB PROFILE	Financial managers are responsible for the financial health of an organization. They produce financial reports, direct investment activities, and develop strategies and plans for the long-term financial goals of their organization. The role of the financial manager, particularly in business, is changing in response to technological advances that have substantially reduced the amount of time it takes to produce financial reports. Financial managers' main responsibility used

to be monitoring a company's finances, but they now do more data analysis and advise senior managers on ways to maximize profits. They often work on teams, acting as business advisors to top executives.

HOT RUBBLE

Research and Development, Engineering and Manufacturing

TITLE(S)	Engineering Manager
MINIMUM EDUCATION REQUIREMENTS	Bachelor's degree – Engineering, 5+ years
SALARY	$120,000 - $200,000 See SEEK – Salary Lookup for more information
JOB SKILLS	- Analytical skills. Engineering managers must evaluate information carefully and solve complex problems. - Communication skills. Engineering managers oversee staff and work together with other levels of management. They must communicate orders effectively and lead teams to meet goals. - Detail oriented. Engineering managers must pay attention to detail. Their duties require an understanding of complex systems since a minor error can cause major problems. - Math skills. Engineering managers use calculus and other advanced mathematics to develop new products and processes. - Organizational skills. Engineering managers keep track of many workers, schedules, and budgets simultaneously.
JOB DUTIES	Architectural and engineering managers typically do the following: - Make detailed plans for the development of new products and designs - Determine staff, training, and equipment needs - Propose budgets for projects and programs - Hire and supervise staff - Lead research and development projects to produce new products, processes, or designs - Check the technical accuracy of their staff's work - Ensure the soundness of methods their staff uses - Coordinate work with other staff and managers
JOB PROFILE	Architectural and engineering managers plan, direct, and coordinate activities in architectural and engineering companies. In addition, architectural and engineering managers must know how to prepare budgets, hire staff, and

supervise employees. They propose budgets for projects and programs and determine staff, training, and equipment needs. These managers must also hire people and assign them specific parts of each project to carry out. Architectural and engineering managers supervise the work of their employees, set schedules, and create administrative procedures.

New and Emerging Jobs

Emerging jobs, and expected education and training requirements in the hydrogen and fuel cell industries have been identified in The Hydrogen Economy and Jobs of the Future report. (R Bezdek, Cavendish Energy LLC. 2018), as listed in Hydrogen Occupations table below.

Hydrogen Occupations Table

Occupation title	Minimum educational requirements
Director of hydrogen energy development	Bachelor's (Business)
Hydrogen fueling station manager	Bachelor's (Chemical Engineering)
Hydrogen/fuel cell R&D director	Doctoral
Hydrogen fuel cell system technician	Yr 12 or equivalent/On Job Training/TS/apprenticeship
Junior hydrogen energy technician	Yr 12 or equivalent/On Job Training/TS/apprenticeship
Fuel cell engineering intern	Yr 12 or equivalent/On Job Training/apprenticeship
Fuel cell manufacturing technician	Associate's
Fuel cell fabrication and testing technician	Associate's
Hydrogen power plant installation, operations, engineering, and management	Bachelor's (Electrical Engineering, Mechanical Engineering, Chemical Engieering)
Hydrogen energy systems designer	Apprenticeship/TS
Fuel cell plant manager	Bachelor's (Electrical Engineering, Mechanical Engineering)
Hydrogen energy system operations engineer	Yr 12 or equivalent
Hydrogen fueling station designer & project engineer	Bachelor's (Engineering)
Hydrogen fuel transporter – trucker	On Job Training
Hydrogen fueling station operator	On Job Training
Hydrogen fuels policy analyst & business sales	Bachelor's (Business)
Hydrogen systems program manager	Bachelor's (Engineering)
Emissions accounting & reporting consultant	Bachelor's (various)
Fuel cell quality control manager	Master's (Science/Engineering)
Hydrogen pipeline construction worker	Yr 12 or equivalent/GED/On Job Training/TS/apprenticeship
Fuel cell designer	Master's (Science)
Hydrogen energy engineer	Bachelor's (Engineer)
Fuel cell power systems engineer	Master's (EE)
Fuel cell fabrication technician	Yr 12 or equivalent/On Job Training/TS/apprenticeship
Hydrogen systems & retrofit designer	Bachelor's
Fuel cell retrofit installer	Yr 12 or equivalent/On Job Training/TS apprenticeship
Fuel cell retrofit manufacturer plant labor	Yr 12 or equivalent

Occupation title	Minimum educational requirements
Hydrogen vehicle electrician	Yr 12 or equivalent/On Job Training/TS apprenticeship
Fuel cell vehicle development engineer	Bachelor's (Engineering)
Hydrogen systems safety investigator – cause analyst	Bachelor's (various)
Hydrogen lab technician	Associate's
Hydrogen energy system installer helper	Yr 12 or equivalent
Hazardous materials management specialist	Bachelor's (Science)
Hydrogen energy system installer	Yr 12 or equivalent/On Job Training/TS apprenticeship
Fuel cell power systems operator and instructor	Yr 12 or equivalent/On Job Training/TS apprenticeship
Fuel cell backup power system technician	Yr 12 or equivalent/GED/On Job Training/TS apprenticeship
Senior automotive fuel cell power electronics engineer	Bachelor's (Electrical Engineering)
Emissions reduction credit portfolio manager	Bachelor's (Business)
Emissions reduction project developer specialist	Bachelor's (various)
Emissions reduction project manager	Bachelor's (various)
Hydrogen systems sales consultant	Bachelor's (Business)
Hydrogen plant operations manager	Bachelor's (Electrical Engineering, Mechanial Engineering)

Source: The Hydrogen Economy and Jobs of the Future report. (R Bezdek, Cavendish Energy LLC. 2018)

HOT RUBBLE

Salary Table

The salary table below provides an indication of the salary range for the occupations identified based on job vacancies listed through www.seek.com.au.

Entry Level	**Salary Indicator From - To**	
Educational Aide	$50,000	$70,000
Transportation Worker	$50,000	$70,000
Construction Worker	$50,000	$70,000
Trade Worker	$80,000	$120,000
Salesperson	$72,499*	
Legal Assistant	$60,000	$80,000
Industrial Equipment Mechanic	$79,999*	
Plant Operator	$50,000	$70,000
Computer Numerical Controlled Machine Operator	$79,999	
Assembler and Fabricator	$50,000	$70,000
Advanced Manufacturing Technician	$50,000	$70,000
Instrumentation and Electronics Technician	$70,000	$90,000
Electrician	$60,000	$80,000

Mid - Level	Salary Indicator From - To	
Writer	$80,000	$120,000
Editor	$77,499*	
Public Affairs Specialist	$60,000	$80,000
Logistician	$100,000	$150,000
Power Marketer	$70,000	$90,000
Sales Engineer	$80,000	$120,000
Power Systems Transition Engineer	$80,000	$120,000
Industrial Engineer	$60,000	$80,000
Buyer (Supply Chain Manager)	$100,000	$150,000
Computational Scientist (Data Scientist)	$100,000	$150,000
Safety and Occupational Health Specialist	$80,000	$120,000
Project Manager	$120,000	$200,000
Mechanical Engineer	$80,000	$120,000
Electrical Engineer	$80,000	$120,000
Environmental Engineer	$100,000	$140,000
Research Engineer	$85,000	$110,000
Civil Engineer	$80,000	$120,000
Software Engineer	$80,000	$120,000
Environmental Scientist	$60,000	$80,000
Materials Scientist	$60,000	$80,000
Chemical Engineer	$80,000	$120,000

Mid - Level	Salary Indicator From - To	
Professor	$80,000	$120,000
Communications Manager	$100,000	$150,000
Budget Analyst	$80,000	$120,000
Asset Manager	$120,000	$200,000
Site / Plant Manager	$120,000	$200,000
Economist	$80,000	$120,000
Regulatory Expert	$100,000	$150,000
Lawyer	$120,000	$200,000
Project Developer	$80,000	$120,000
Finance Manager	$100,000	$150,000
Engineering Manager	$120,000	$200,000

Source: Salary range: SEEK – Salary Lookup, August 2021

*Indicates median salary for occupation.

HOT RUBBLE

Useful Links

SEEK - Salary Lookup

You can access the Seek – Career Advice Salary Guide to find out more about occupations and salary indicators.

Hydrogen and Fuel Cells Career Map

This document has been adapted from the US Office of Energy Efficiency & Renewable Energy, Hydrogen and Fuel Cell Technologies Office online interactive Hydrogen and Fuel Cells Career Map

Australia's Hydrogen Opportunities Tool

To find out more about hydrogen projects explore the Hydrogen Opportunities tool, Geoscience Australia, AusH2

The Hydrogen Economy and Jobs of the Future

Roger H. Bezdek
Renew. Energy Environ. Sustain., 4 (2019) 1

HOT RUBBLE

Publication

Published August 2021 by:
Resources and Engineering Skills Alliance
Suite 4, 242A Port Road, Hindmarsh
South Australia 5007
Telephone: +61 (0)438 829 000
www.resa.org.au

For further information regarding this report:

Jodie Badcock
Chief Executive Officer
Resources and Engineering Skills Alliance
e info@resa.org.au
w www.resa.org.au