

GREEN JOBS GUIDEBOOK

EXECUTIVE SUMMARY

The **Green** Jobs Guidebook is a resource for job seekers, students, guidance counselors, career advisors, policy makers and anyone else interested in knowing about the tremendous potential of California's existing and growing **green** jobs marketplace. The Guidebook is an expansive listing of **green** jobs throughout the California economy that includes job descriptions, salary information, minimum education requirements, potential certifications, employer types, job market growth potential, and much more.

Included in the **Green Jobs Guidebook**:

- ✱ A comprehensive, easy-to-follow **map** of the California **green** economy
- ✱ **Profiles of over 200 of green jobs** currently in California and expected to be open for the next generation of workers, with growth projections from the California Economic Development Department (EDD)
- ✱ Details on 45 job types available to individuals with only a high school diploma, many paying **over \$ 25 per hour**, and 37 more job types available to those with a community college or trade school degree, many paying **over \$ 40 per hour**
- ✱ Information on **cutting edge green job training and placement** programs
- ✱ Listings of valuable **green job apprenticeship programs** sponsored by labor unions and private companies
- ✱ Information on over **260 community college green job programs**
- ✱ A useful **career and education pathways map** to guide job seekers and current employees looking to join and advance in the **green** economy.

Also available at www.edf.org/cagreenjobs

Authored by:



ENVIRONMENTAL DEFENSE FUND

finding the ways that work

In partnership with:



With endorsement from:



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An Introduction to the Green Jobs Guidebook

"The Green Jobs Guidebook helps navigate the intersection of two top California priorities: bettering our environment and preparing our young people for the productive green jobs of the future. We need to make high school students aware of job opportunities in the new green economy, and even more important, we must give them the skills and knowledge to take their place in it."

- Darrell Steinberg, Senate President pro Tempore-elect
California State Senate, District 06

New environmental initiatives on renewable energy, energy efficiency, and greenhouse gases will spur tremendous job growth in the coming decades. According to analysis from the California Air Resources Board, at least 100,000 new jobs will be created in California alone because of the state's 2006 global warming solutions law (AB32).¹ Despite these encouraging projections, many Californians are unfamiliar with the opportunities offered by the burgeoning clean-tech economy. This book is a navigational tool for anyone interested in joining or learning more about the clean economy of the future.



*Assembly line worker at a Toyota Prius plant
Source: Corbis Photo*



*Green building designers meet with clients
Source: Corbis Photo*

A large portion of the green jobs profiled in the Guidebook are found in the traditional employment sectors of manufacturing, installation, fabrication and operations. Other opportunities exist in both urban and rural settings within industry sectors like green buildings, renewable energies, energy efficient auditing, power plant operations, facilities management, and farming. These jobs pay workers affordable living wages, grant them access to healthy and safe working conditions, and provide opportunities for advancement. Tools like basic job training, job placement assistance, high school youth services and hands-on apprenticeship programs offered through unions, colleges and private companies can help people with little or no experience reach professional goals within a few years.

¹ Source: California Air Resources Board AB 32 Scoping Plan Supplemental Evaluation: Economic Analysis, September 2008

Getting hired into a green job can pave the way for a successful career. Through apprenticeship and job placement programs, entry level workers can begin by assisting an engineer or repairman while gaining hands-on experience and working towards certification and journey-level status within a few years. This is an opportunity for someone who hasn't attended college to make more than \$30 an hour in a secure field. Opportunities expand from there.

Right: Workers install emissions control equipment at an industrial facility to reduce escaping gas and improve plant efficiency. Source: Bay Area Air Quality Management District



Richmond BUILD program graduates install solar panels on the home of a low-income Richmond resident. Along with its solar partners, Solar Living Institute, Solar Richmond and GridAlternatives, RichmondBUILD prepares trainees to be tomorrow's green-collar workers in the solar industry. Richmond BUILD also prepares their students for the construction industry as well. Source: RichmondBUILD

While researching the Guidebook, we identified many great organizations that are taking action to connect prospective workers to green job opportunities. The Ella Baker Center for Human Rights has partnered with employment advocates such as Dr. Raquel Pinderhughes of San Francisco State University to develop programs including the Green Jobs Corps that provide young adults in Oakland with life skills, education, and on-the-job training to get them on a pathway out of poverty and into green careers. RichmondBUILD sponsors an intensive 10-week solar installation program that trains youth while providing free installations in local residents' homes. Organization such as the Apollo Alliance and Green for All focus on bringing employment training and sustainable development to local communities by inspiring teenagers and young adults to continue pursuing an education while gaining the hands-on skills needed to enter green industry.

The programs listed above are just a few that are bringing about positive change in the workforce by providing a connection between prospective workers and high quality jobs. This Guidebook is intended to be a resource for the next generation of workers that will be the foundation of California's emerging clean economy.

Happy job hunting,

Timothy J. O'Connor*
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Environmental Defense Fund

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How green jobs were selected for the Guidebook

Since the range of opportunities to work in the green economy is continuing to expand and the ultimate size and scope of the green job market is still unknown, there is no commonly accepted definition of the term “green job.” This book classifies green jobs on the basis of whether they are related to either preventing or adapting to climate change. Climate change-related jobs were chosen because of the breadth of environmental issues (air, water, wildlife, waste, etc.) and economic sectors (energy, buildings, transportation, etc.) involved.

This book builds off a modified version of an economic organization map under development by Environmental Business International’s Climate Change Business Journal (CCBJ).² In addition to the economic sectors identified by the CCBJ, this Guidebook adds public sector positions, conservation-based jobs in the waste management and diversion industry, and climate change-related jobs in the non-profit sector. Other organizations such as the California Economic Development Department (EDD) may include industries such as natural and sustainable product manufacturing within their definition of green jobs. Where information on those economic sectors and industries was available, they were included in the Guidebook.

Green Job Industry Segments³	Included within Industry Segment
1. Low Carbon Power & Renewable Power	Renewable/conventional equipment & power sales, project design & development
2. Carbon Capture & Storage (CCS)	Systems, equipment
3. Energy Storage: Equipment & Systems ⁴	Equipment & systems (batteries, hydrogen, etc.)
4. Energy Efficiency and Demand Response ⁵	Systems, equipment & appliances, audits & studies
5. Green Buildings	Design & development, building materials
6. Transportation	Vehicles, fuels & systems
7. Carbon Markets: Trading & Projects ⁶	Carbon trading, project development & operation
8. Climate Change Adaptation	Risk assessment, planning, engineering & construction
9. Public-sector / Government ⁷	Conservation & pollution prevention, rules & enforcement
10. Consulting & Research	Consulting & engineering, climate science
11. Waste Reduction & Management ⁷	Recycling & waste treatment
12. Non-Profit Sector ⁷	Policy analysis & advocacy

² Use of the CCBJ industry sector organization does not represent explicit support of approval of the definition of Green Jobs in other forums, uses or publications.

³ Source: Climate Change Business Journal; Environmental Business International, Inc., San Diego, Calif.

⁴ Not discussed in the jobs profile section of this guidebook

⁵ Not discussed in detail within the jobs profile section of this guidebook

⁶ Not discussed in the jobs profile section of this guidebook

⁷ Not included in the CCBJ industry segments

Index of California green jobs⁸

I. Low Carbon Power & Renewable Power Generation

SOLAR POWER & PHOTOVOLTAIC (PV) SYSTEMS

Harnessing the power of the sun to heat water or charge battery cells

Solar Development & Manufacturing

1. Solar Fabrication Technician
2. Solar Lab Technician
3. Solar Hot Water Heater Manufacturing Technician
4. PV Fabrication and Testing Technician

Solar Installation & Maintenance

5. Solar Energy System Installer Helper
6. Solar Energy System Installer
7. Solar and PV Installation: Roofer
8. Solar Residential Installation Electrician
9. Solar Commercial Installation Electrician
10. ICE Technician – (Instrumentation/ Controls/Electrical Systems)
11. Solar Commercial Installation Engineering Technician
12. Solar Residential Installation Electrician Foreman
13. Solar Commercial Installation Electrician Foreman
14. Solar Commercial Installation Engineer

Solar Engineering, Design & Project Management

15. Solar Energy Systems Designer
16. Solar Thermoelectric Plant Manager
17. Solar Operations Engineer
18. PV Solar Cell Designer
19. Solar Energy Engineer
20. PV Power Systems Engineer

Solar Sales & Marketing

21. Residential/Commercial Solar Sales Consultant

WIND POWER

Erecting windmills to generate power in wind turbines

Wind Development & Manufacturing

22. Wind Turbine Machinist
23. Wind Turbine Sheet Metal Worker
24. Wind Turbine Engineering Intern
25. Wind Farm Electrical Systems Designer
26. Wind Turbine Electrical Engineer
27. Wind Turbine Mechanical Engineer

Wind Power Installation & Maintenance

28. Wind Field Technician
29. Junior Renewable Energy Technician
30. Wind Generating Installer
31. Electro-Mechanical Wind Turbine Technician
32. Wind Field Operations Manager for Commercial
33. Wind Field Service Technician

Wind Power Engineering, Design & Project Management

34. Wind Power Plant Project Engineer
35. Director of Wind Development

HYDRO-ELECTRIC POWER

Energy created when dammed water drives a water turbine and generator

Hydro-Electric Power Operation Development & Manufacturing

36. Hydro-Electric Component Machinist
37. Hydro-Electric Construction Sheet Metal Worker

Hydro-Electric Installation & Maintenance

38. Hydro-Electric Operations Maintenance Worker
39. Hydro-Electric Plant Efficiency Operator
40. Hydro-Electric Plant Installation Technician
41. Hydro-Electric Plant Electrical Operations Supervisor
42. Hydro-Electric Power Generation Engineer

Hydro-Electric Engineering, Design & Project Management

43. Hydro-Electric Engineering Intern
44. Hydrogeologist
45. Marine and Fish Biologists Hydro-Electric Mechanical Engineer
46. Hydro-Electric Electrical Engineer
47. Hydro-Electric Structural Engineer
48. Fisheries Biologist

GEOHERMAL POWER

Energy from the earth's core – volcanoes, geysers, and hot springs are naturally occurring examples of geothermal energy

Geothermal Power Plants Development & Manufacturing

49. Geothermal Heat Pump Machinist
50. Geothermal Sheet Metal Worker
51. Geothermal Engineering Intern
52. Geothermal Electrical Engineer

- 53. Geothermal Power Generation (Mechanical) Engineer

Geothermal Installation & Maintenance

- 54. Geothermal Plant Installation Technician
- 55. Geothermal Plant Efficiency Operator
- 56. Geothermal Operations Engineer

Geothermal Engineering, Design & Project Management

- 57. Geothermal Engineering Intern
- 58. Hydrogeologist
- 59. Geothermal Mechanical Engineer
- 60. Geothermal Electrical Engineer
- 61. Geothermal Power Plant Structural Engineer

BIOGAS & BIOMETHANE GENERATED POWER

Making power by burning gas coming off waste

Landfill Gas Collection Operations

- 62. Landfill Gas Collection System Operator
- 63. Landfill Gas System Technician

Landfill Gas to Energy (LGE) Plant Operations

- 64. LGE Plant Installation, Operations, Engineering & Management

Animal Waste to Energy

- 65. Animal Waste Biomethane Gas Collection System technician

BIOMASS POWER

Converts a wide array of organic materials into heat and electricity by burning or chemical conversion to methane and/or cellulosic ethanol and biodiesel

Biomass Collection and Processing

- 66. Biomass Collection, Separation and Sorting (see also 146 – 151)

Biomass Power Plants

- 67. Biomass Plant Operations, Engineering and Maintenance

HYDROGEN ENERGY GENERATION

- 68. Hydrogen Power Plant Installation, Operations, Engineering and Management – General
- 69. Hydrogen Plant Operator and Operations Manager

II. Carbon Capture and Storage (CCS)

GEOLOGIC SEQUESTRATION

Captures carbon from industrial exhaust and injects it underground to trap it before it enters the atmosphere

- 70. Carbon Capture Power Plant Installation, Operations, Engineering & Management
- 71. Carbon Sequestration Plant Installation, Operations, Engineering & Management
- 72. Geologist and Hydrogeologist
- 73. GIS Specialist

POWER GENERATION & CCS PLANT STAFF

Plant Environmental, Health & Safety

- 74. Environmental, Health & Safety Engineering Manager
- 75. Environmental Health & Safety Lead
- 76. Plant Technical Specialist – Instrument Repair Technician
- 77. Safety Investigator/Cause Analyst
- 78. Plant Supervising Technical Operator
- 79. Plant Safety Engineer

TERRESTRIAL SEQUESTRATION

Uses strategies to increase carbon stored in soils and also to protect soils from erosion

Soil Conservation

- 80. Soil Conservation Technician
- 81. Soil Conservationist

Forestry

- 82. Forestry Conservation Worker
- 83. Conservation Forestry Consultant
- 84. Forestry Supervisor
- 85. Restoration Planner

III. Energy Storage: Equipment & Systems

ENERGY STORAGE EQUIPMENT

Battery Manufacturing & Distribution

- 86. Battery Design Engineer
- 87. Battery Testing Technician
- 88. Battery Manufacturing Technician

IV. Energy Demand Response

Government Staff

- 89. Energy Commission Specialist
- 90. Smart Grid Engineer
- 91. Power System Operator

V. Green Buildings

GREEN BUILDING PRACTICES FOR NEW STRUCTURES & RETROFIT OF EXISTING STRUCTURES

Using energy efficient methods and green materials for new buildings and for updating existing structures

Green Building Project Design & Development

- 92. Field Energy Consultant
- 93. Energy Conservation Representative
- 94. Energy Manager & Analyst
- 95. Energy Efficiency Finance Manager
- 96. Environmental Compliance Specialist

Green Building Design & Engineering

- 97. Engineering Intern
- 98. Water Systems Designer and Engineer
- 99. Site Supervising Technical Operator
- 100. Environmental Compliance Specialist
- 101. Refrigeration Engineer
- 102. Lighting & HVAC Engineer
- 103. Civil Engineer
- 104. HV AC Engineer
- 105. Electrical Engineer
- 106. Residential Green Building and Retrofit Architect
- 107. Commercial Green Building and Retrofit Architect
- 108. Indoor & Outdoor Landscape Architect
- 109. Industrial Green Systems & Retrofit Designer
- 110. Senior HVAC Engineer
- 111. Environmental Construction Engineer
- 112. Energy Engineer
- 113. Structural Design Engineer

Installation & Green Building Operations

- 114. Home Improvement Retrofit Trainee
- 115. Residential Air Sealing Technician
- 116. Insulation Installer
- 117. HVAC Maintenance/Repair Trainee
- 118. Water Purification Systems Service Technician
- 119. Building Maintenance Engineer
- 120. Machinist
- 121. Welder
- 122. Carpenter
- 123. Electrical System Installer
- 124. Field Technician
- 125. Green Plumber and Pipefitter
- 126. HVAC Service Technician
- 127. Roofing and Skylight Installer
- 128. Weatherization Operations Manager

Energy Efficiency Services

- 129. Residential Energy Field Auditor
- 130. Commercial Energy Field Auditor

- 131. Industrial Energy Field Auditor
- 132. Auditing Services Sales Consultant
- 133. Renewable Energy Consultant

VI. Transportation Vehicles, Fuels & Systems

TRANSPORTATION VEHICLES

Automotive Plant Operations - Vehicle Production & Modification

- 134. Automotive Plant Assembly
- 135. Diesel Retrofit Installer
- 136. Diesel Retrofit Manufacturer Plant Labor
- 137. Electric Vehicle Electrician
- 138. Hybrid Powertrain Development Engineer
- 139. Powertrain Control Systems & Software Engineer
- 140. Air Pollution Specialist
- 141. Senior Automotive Power Electronics Engineer
- 142. Diesel Retrofit Designer

Efficient Mass Transit Vehicle Operations

- 143. Bus System Operator
- 144. Train System Operator
- 145. Electric Shipyard Operator

TRANSPORTATION FUEL

Fuel Production - Electricity

Low carbon power generation above (1 - 61)

Fuel Production - Biogas

Biogas power production above (62 - 65)

Fuel Production - Hydrogen

Hydrogen power production above (68, 69)

Fuel Production - Natural Gas/Propane

Natural gas power production profiled by way of other power production activities

Fuel Production - Biofuel

- 146. Biofuel Plant Field and Operations Engineer
- 147. Biofuel Plant Field Technician
- 148. Biodiesel/Biofuel Technology & Product Development Manager
- 149. Alternative Fuels Policy Analyst and Business Sales
- 150. Agricultural/Farm Worker
- 151. Civil Engineer - Agriculture/Irrigation/Water Supply

TRANSPORTATION SYSTEMS

Fuel Delivery System

- 152. Fueling Station Designer & Project Engineer
- 153. Fuel Transporter - Trucker
- 154. Alternative Fueling Station Operations
- 155. Hydrogen Pipeline Construction

Transportation System Design

- 156. Program Manager, Environmental Construction
- 157. Urban Planner
- 158. Environmental Engineering Manager
- 159. Environmental Planner
- 160. Civil Engineer
- 161. Energy Infrastructure Engineer
- 162. Environmental Engineer

VII. Carbon Markets Trading & Projects

Carbon Markets Analysis, Credit Banking & Trading

- 163. Power Marketing Specialist
- 164. Energy Trading Specialist
- 165. Carbon Emissions Specialist
- 166. Market & Rate Analyst
- 167. Economist
- 168. Emission Reduction Credit Marketer & Market Analyst
- 169. Emission Reduction Credit Portfolio Manager

Carbon Reduction Projects

- 170. Emission Reduction Project Developer Specialist
- 171. Emission Reduction Project Manager

VIII. Climate Change Adaptation

Climate Studies

- 172. Environmental Sampling Technician
- 173. Climatologist
- 174. Environmental Scientist
- 175. Environmental Engineer/Scientist Intern

IX. Public Sector / Government

Conservation and Pollution Prevention

- 176. Biologist – Marine/Fisheries
- 177. Water Resource Engineer
- 178. Environmental Research Manager
- 179. GIS Specialist
- 180. Engineering Geologist
- 181. Urban Planner
- 182. Urban Renewal Planner
- 183. Conservation of Resources Commissioner

- 184. Power System Operator and Instructor

Pollution Prevention, Rule development and Enforcement

- 185. Air Quality Specialist and Enforcement Officer
- 186. Air Emissions Permitting Engineer
- 187. Chemist
- 188. Economist

X. Consulting & Research

Environmental Consultant

- 189. Environmental Technician
- 190. Air Quality Control Engineer
- 191. Greenhouse Gas Emissions Permitting Consultant
- 192. Air Pollution Specialist
- 193. Air Resource Engineer
- 194. Emissions Accounting & Reporting Consultant
- 195. Greenhouse Gas Emissions Report Verifier
- 196. Water/Wastewater Quality Consultant
- 197. Water Resource Consultant
- 198. Senior Environmental Consultant
- 199. Waste Reduction Consultants/ Energy Efficiency Consultant / Expert
- 200. Renewable Energy Consultant

XI. Waste Reduction & Management

Municipal Waste & Recycling Operations

- 201. Recycling Collections Driver
- 202. Recycling Center Operator
- 203. Hazardous Materials Removal Worker
- 204. Hazardous Waste Management Specialist
- 205. Solid Waste (Energy) Engineer
- 206. Nuclear Waste Management Engineer

Wastewater Treatment & Management

- 207. Operations Maintenance Worker for Water Services
- 208. Associate Engineer – Wastewater Treatment
- 209. Wastewater Engineer in Refinery
- 210. Wastewater Plant Civil Engineer

XII. Non-Profit Sector

Non-Profit Sector

- 211. Conservation Policy Analyst & Advocate
- 212. Climate Change & Energy Policy Specialist & Advocate
- 213. Water Resource Policy Specialist & Advocate

Solar power installation, maintenance, development & manufacturing

Solar Energy System Installer Helper

Description: Assists solar energy system installer in installing and repairing solar energy systems for residential, commercial or industrial use

Salary: \$10-\$15/hour

Min. Educational Req.: HS Diploma/GED

Experience Needed: Entry Level

Growth Potential: Current growth rates show California will provide over ½ of national solar energy by 2011

Employer Type: Private Firms, Government, Power Plants/Facilities

Related Careers:

1. Solar Fabrication Technician
2. Solar Energy System Installer

PV Fabrication & Testing Technician

Description: Device fabrication, and testing of flexible, translucent plastic solar cells which generate energy from the sun

Salary: \$22-\$27/hour

Min. Educational Req.: Associate's Degree in Electronics/ Electrical Engineering, Material Science, Physics, Chemistry or related discipline OR equivalent training and work experience

Recommended College Coursework: Electronics, Electrical Engineering, Chemistry, Solar, Physics, Material Science

Experience Needed: Entry Level
2 years work experience in a laboratory environment is highly desirable

Growth Potential: High growth alongside the rest of the solar energy sector

Employer Type: Private consulting, Government, Power Plants/Facilities

Related Careers:

1. Solar Lab Technician
2. Solar Energy Systems Designer

Solar Energy System Installer

Description: Installs and repairs solar energy systems designed to collect, store and circulate solar-heated water or other medium for residential, commercial or industrial use

Salary: \$14-\$20/hour

Min. Educational Req.: HS Diploma/GED

Certification: Solar Thermal Installer recommended

Experience Needed: Entry Level
A combination of more than 2 years of directly related training

Growth Potential: Current growth rates show California will provide over ½ of national solar energy by 2011

Employer Type: Private Firms, Government, Power Plants/Facilities

Related Careers:

1. Solar Cell Device Technician
2. Electrician

Solar Lab Technician

Description: Performs a variety of tests on solar devices, examines test samples and reads blueprints, diagrams, instruments and operational instructions.

Salary: \$19-\$25/hour

Min. Educational Req.: Associate's Degree in related field

Recommended College Coursework: Physics, Chemistry, Mechanical/Electrical Engineering, Solar

Experience Needed: Entry Level
Demonstrate ability to perform all common laboratory tests, record lab results, and provide feedback

Growth Potential: High growth alongside the rest of the solar energy sector

Employer Type: Private Firms, Government, Power Plants/Facilities

Related Careers:

1. Solar Energy Systems Designer
2. PV Power Systems Designer

Solar Hot Water Heater Manufacturing Technician

Description: Manufactures solar hot water heaters.

Salary: \$22-\$27/hour

Min. Educational Req.: Associate's Degree in Electronics/ Electrical Engineering, Material Science, Physics, Chemistry or related discipline OR equivalent training and work experience

Recommended College Coursework: Engineering, Sciences, Solar Technology

Experience Needed: Entry Level

Growth Potential: High growth alongside the rest of the solar energy sector

Employer Type: Private Firms, Government, Power Plants/Facilities

Related Careers:

1. PV Fabrication and Testing Technician
2. Solar Energy Systems Installer

Solar Fabrication Technician

Description: Fabricates and assembles solar panels and arrays using machine shop tools and equipment

Salary: \$10-\$15/hour

Min. Educational Req.: HS Diploma/GED

Experience Needed: Entry Level
A combination of 3 – 6 months of directly related training and/or experience is typically required

Growth Potential: Current growth rates show California will provide over ½ of national solar energy by 2011

Employer Type: Private Firms, Government, Power Plants/Facilities

Related Careers:

1. Solar Energy System Installer
2. Solar and PV installation: Roofer

Solar power installation, maintenance, development & manufacturing

Solar & PV Installation: Roofer

Description: Installs solar systems on roof while making sure that it is air-tight and does not compromise the structural integrity of building

Salary: \$15- \$23/hour

Min. Educational Req.: HS Diploma/GED

Experience Needed: Entry Level
1-3 years related on-the-job experience

Desired Education: Trade School or Apprenticeship

Growth Potential: High growth alongside the rest of the solar energy sector

Employer Type: Private Firms, Government, Power Plants/Facilities

Related Careers:

1. Construction

ICE Technician (Instrumentation/Controls/Electrical Systems)

Description: Monitors and repairs the instrumentation, controls, and electrical systems in a utility scale solar power generating facility

Salary: \$16-\$22/hour

Min. Educational Req.: HS Diploma/GED

Experience Needed: Mid-Level
2-3 years experience with increasing responsibilities in troubleshooting and repair of plant instruments

Growth Potential: High growth alongside the rest of the solar energy sector

Employer Type: Private Firms, Government, Power Plants/Facilities

Related Careers:

1. Installation Engineer

Solar Residential Installation Electrician

Description: Responsible for hardwiring the PV energy system to the power grid

Salary: \$17- \$31/hour

Min. Educational Req.: HS Diploma/GED

Certification: North American Board of Certified Energy Practitioners (NABCEP) Certified Solar PV Installer

Experience Needed: Entry to Mid-Level
Assumes Journey level Electrician but does not need solar experience

Desired Education: Associate's Degree, Trade School or Apprenticeship

Growth Potential: High growth alongside the rest of the solar energy sector

Employer Type: Private Firms, Government

Related Careers:

1. Electrician

Solar Commercial Installation Electrician

Description: Installs solar electric generating systems at commercial customer sites

Salary: \$17- \$31/hour

Min. Educational Req.: HS Diploma/GED

Certification: North American Board of Certified Energy Practitioners (NABCEP) Certified Solar PV Installer (recommended)

Experience Needed: Entry to Mid-Level
Journey level status expected

Growth Potential: High growth alongside the rest of the solar energy sector. Current growth rates show California will provide over ½ of national solar energy by 2011

Employer Type: Private Firms, Government, Power Plants/Facilities

Related Careers:

1. Residential Installation Electrician
2. Energy Efficiency Electrician

Solar Residential Installation Electrician Foreman

Description: Coordinates, directs and manages solar electric generating systems installations at residential customer sites

Salary: \$25-\$38/hour

Min. Educational Req.: HS Diploma/GED

Certification: North American Board of Certified Energy Practitioners (NABCEP) Certified Solar PV Installer is recommended.

Experience Needed: Mid to High Level
Journey Level Attained - Minimum 3-5 years of Solar Installation

Desired Education: Associate's Degree or equivalent from Trade School or Apprenticeship

Growth Potential: High growth alongside the rest of the solar energy sector

Employer Type: Private Firms, Government, Power Plants/Facilities

Related Careers:

1. Solar Energy System Installer
2. Commercial Installation Electrician

Solar Commercial Installation Engineering Technician

Description: Provides technical support and assistance to field technicians and engineers

Salary: \$20-\$31/hour

Min. Educational Req.: Associate's degree or equivalent from Trade School or Apprenticeship

Recommended College Coursework: Solar Installation, Electrical Engineering

Experience Needed: Mid-Level

Growth Potential: High growth alongside the rest of the solar energy sector

Employer Type: Private Firms, Government, Power Plants/Facilities

Related Careers:

1. Solar Lab Technician
2. Commercial Installation Engineer

Solar power installation, maintenance, development, manufacturing, design & project management

Solar Commercial Installation Electrician Foreman

Description: Coordinates, directs and manages solar electric generating systems installations at commercial customer sites

Salary: \$25-\$38/hour

Min. Educational Req.: Trade School or Apprenticeship

Recommended College Coursework: Solar or Renewable Energy Classes

Certification: North American Board of Certified Energy Practitioners (NABCEP) Certified Solar PV Installer

Experience Needed: Mid to High Level
Journey Level Attained - 3 -5 years direct experience in a construction environment in a similar capacity and carpentry and/or roofing experience is required

Growth Potential: High growth alongside the rest of the solar energy sector

Employer Type: Private Firms, Government, Power Plants/Facilities

Related Careers:

1. Residential Installation Electrician

Solar Thermoelectric Plant Project Manager

Description: Command an entire solar thermoelectric plant

Salary: \$74,000 - \$88,000/year

Min. Educational Req.: Trade School, Apprenticeship or Bachelor's Degree

Recommended College Coursework: Electrical, Electronic and/or Energy Engineering

Certification: Professional Engineer (P.E.)

Experience Needed: Mid to High Level
Minimum 2 years working experience, familiarity with thermoelectric technology as well as the solar energy market

Growth Potential: High growth alongside the rest of the solar energy sector

Employer Type: Power Plants/Facilities

Related Careers:

1. Solar Operations Engineer

Solar Commercial Installation Engineer

Description: Responsible for installing solar panel systems on commercial structures. Works with blueprints and technical concerns in installation

Salary: \$31-\$50/hour

Min. Educational Req.: Bachelor's Degree in Electrical Engineering

Recommended College Coursework: Solar, Electrical Engineering

Certification: North American Board of Certified Energy Practitioners (NABCEP) Certified Solar PV Installer recommended

Experience Needed: High Level
Established Engineer with experience in Solar Installation

Growth Potential: High growth alongside the rest of the solar energy sector

Employer Type: Private Firms, Government, Power Plants/Facilities

Related Careers:

1. Residential Installation Engineer
2. Electrical Engineer

Solar Operations Engineer

Description: Work with integration partners to design solar facilities and be an expert on solar technology and innovation

Salary: \$90,000 - \$100,000/year

Min. Educational Req.: HS Diploma/GED

Recommended College Coursework: Electrical Engineering, Solar Operations

Certification Required: Professional Engineer (P.E.) NABCEP certificate and/or Electrical Contractors licenses are a plus

Experience Needed: High Level
Have experience designing and building PV electrical generation systems

Desired Education: Bachelor's Degree in Electrical Engineering Preferred

Growth Potential: High growth alongside the rest of the solar energy sector

Employer Type: Private Firms, Government, Power Plants/Facilities

Related Careers:

1. Solar PV Designer

Solar Energy Systems Designer

Description: Designs solar domestic hot water and space heating systems for new and existing structures, applying knowledge of energy requirements of structure, local climatological conditions, solar technology and thermodynamics

Salary: \$22 - \$29/hour

Min. Educational Req.: Trade School or Apprenticeship

Recommended College Coursework: Shop Math, Mechanical Drawing, Physics, Electronics, Solar Theory, Design

Experience Needed: Mid to High Level
Knowledge of solid-state equipment controls, microelectronics, plumbing and electrical training

Growth Potential: Current growth rates show California will provide over 1/2 of national solar energy by 2011

Employer Type: Private Firms, Government, Power Plants/Facilities

Related Careers:

1. Geothermal Designer

PV Solar Cell Designer

Description: Design concentrated photovoltaic solar cells for mass production

Salary: \$77,000 - \$91,000/year

Min. Educational Req.: Advanced Degree in Electrical Engineering, Materials Science, Chemistry, Physics or related

Recommended College Coursework: Engineering, Sciences, Renewable Energies

Experience Needed: High Level
Minimum 5 years of industry experience, solar experience not required.

Growth potential: Solar industry growth will create the need for skilled designers and engineers

Employer Type: Private Firms, Power Plants/Facilities

Related Careers:

1. Solar Energy Systems Designer
2. Electrical Engineer

Solar power design, project management, sales & marketing

Solar Energy Engineer

Description: Perform site-specific engineering analysis and evaluation of energy efficiency and solar projects involving residential, commercial and industrial customers by utilizing building simulation software

Salary: \$75,000 - \$80,000/year

Min. Educational Req.: Bachelor's Degree in an Engineering discipline

Recommended College Coursework: Engineering, Physics

Certification: Professional Engineer, Engineer-In-Training, and/or Certified Energy Manager (CEM) are desired

Experience Needed: High Level
3-10 years related experience/training
3-5 years of facility-related engineering experience
2-5 years of experience within the green building, energy efficiency, building science or related field.

Desired Education: Master's degree a plus

Growth Potential: Current growth rates show California will provide over ½ of national solar energy by 2011

Employer Type: Private Firms

Related Careers:

1. Electrical Engineer

PV Power Systems Engineer

Description: Drive the development and implementation of highly efficient grid-connected systems for Concentrated PV technologies

Salary: \$76,000 - \$88,000/year

Min. Educational Req.: Master's in Electric Power Engineering or Energy Efficiency OR Bachelor's with strong work experience.

Recommended College Coursework: Electrical Engineering, Renewable Energies, Physics

Experience Needed: High Level
3-8 years experience including large-scale grid interconnect systems experience

Growth Potential: High growth alongside the rest of the solar energy sector

Employer Type: Private Firms, Government, Power Plants/Facilities

Related Careers:

1. Solar Systems Designer
2. Photovoltaic Engineer
3. Energy Engineer

Residential/Commercial Solar Sales Consultant

Description: Establish sales plans, prepare proposals and close client deals

Salary: \$45,000 - \$85,000/year – range due to commission

Min. Educational Req.: Bachelor's Degree

Recommended College Coursework: Marketing, Sales, Sciences

Experience Needed: Mid-Level
2-5 years experience in commercial and/or in-home sales.

Growth Potential: Grows with, and helps propel, the solar industry

Employer Type: Private Firms

Related Careers:

1. Energy Conservation Representative

Wind development & manufacturing

Wind Turbine Machinist

Description: Make precision metal or plastic parts, use computer numerically controlled machine tools and set up and operate all of the basic machine tools and many specialized variations for wind turbine production

Salary: \$12 - \$21/hour

Min. Educational Req.: Apprenticeship or Trade School

Recommended College Coursework: Metalworking, Drafting, Math, and Computer courses

Experience Needed: Entry to Mid-Level Journey level status

Growth Potential: EDD projects 3,500 new machinist jobs in California by 2016

Employer Type: Power Plants/Facilities

Related Careers:

1. Welder
2. Sheet Metal Worker

Wind Farm Electrical Systems Designer

Description: Design underground and overhead wind farm collector systems and prepare and develop site specifications.

Salary: \$50,000 - \$80,000/year

Min. Educational Req.: Bachelor's Degree

Recommended College Coursework: Electrical Systems, Wind Turbine Design

Experience Needed: High Level
Minimum 5 years experience including wind farm collector systems and/or electric utility distribution

Growth Potential: Need for new electrical systems will progress with growth in wind development

Employer Type: Private Firms, Power Plants/Facilities

Related Careers:

1. Electrical Engineer

Wind Turbine Sheet Metal Worker

Description: Perform all operations necessary to make, install and repair a wide variety of sheet-metal products related to wind turbine production

Salary: \$14 - \$22/hour

Min. Educational Req.: Apprenticeship or Trade School

Recommended College Coursework: Math, Mechanical Drawing, Metal Shop, Welding, Heating and Air-Conditioning

Experience Needed: Entry to Mid-Level Journey level status

Growth Potential: EDD predicts 1,800 new sheet metal worker jobs by 2016

Employer Type: Private Firms, Power Plants/Facilities

Related Careers:

1. Machinist
2. Welder

Wind Turbine Electrical Engineer

Description: Responsible for design, development and testing of all aspects of electrical components and equipment.

Salary: \$90,000/year or more

Min. Educational Req.: Bachelor's Degree in Electrical Engineering

Recommended College Coursework: Electrical Engineering, Renewable Energies

Certification: Professional Engineer (P.E.)

Experience Needed: High Level
5 years with similar responsibilities

Growth Potential: EDD predicts there will be 1,100 new electrical engineering jobs by 2016

Employer Type: Private Firms, Government, Power Plants/Facilities

Related Careers:

1. Energy Engineer
2. Photovoltaic Design Engineer

Wind Turbine Engineering Intern

Description: Assist Engineers while gaining hands-on experience with wind turbines

Salary: Nominal or school credits

Min. Educational Req.: HS Diploma/GED, Some College

Recommended College Coursework: Physics, Electrical Engineering

Experience Needed: Entry Level
Hands-on laboratory experience with electronics equipment, physics laboratory, optical equipment and electronics fabrication

Desired Education: Working for B.S. or M.S. degree in Physics or Electrical Engineering

Growth Potential: As demand for jobs grows so does the demand for internships

Employer Type: Private Firms, Power Plants/Facilities

Wind Turbine Mechanical Engineer

Description: Responsible for design, development, testing of all aspects of mechanical components, equipment and machinery.

Salary: \$90,000/year or more

Min. Educational Req.: Bachelor's Degree in Mechanical Engineering

Recommended College Coursework: Mechanical Engineering, Metal Shop, Machinery

Certification: Professional Engineer (P.E.)

Experience Needed: High Level
5 years with similar responsibilities

Growth Potential: EDD predicts there will be 1,800 new mechanical engineering jobs by 2020

Employer Type: Private Firms, Government, Power Plants/Facilities

Related Careers:

1. Energy Engineer

Wind power development, manufacturing, installation & maintenance

Wind Field Technician

Description: Troubleshoot and repair complex problems on variable speed/variable pitch wind turbines

Salary: \$13 - \$15/hour

Min. Educational Req.: HS Diploma/GED

Experience Needed: Entry Level
1-2 years experience desired

Desired Education: Basic math skills in all units of measure using whole numbers, common fractions and decimals

Growth Potential: Wind field operations will increase in demand as installations grow in number

Employer Type: Private Firms, Government, Power Plants/Facilities

Related Careers:

1. Electro-Mechanical Wind Turbine Technician
2. Wind Generating Installer

Electro-Mechanical Wind Turbine Technician

Description: Responsible for the installation, maintenance and commissioning of wind turbines

Salary: \$17 - \$21/hour

Min. Educational Req.: Associate's degree or equivalent from Trade School
OR, Six months to one year related experience and/or training
OR, equivalent combination of education and experience

Recommended College Coursework: Electrical/ Mechanical Engineering

Experience Needed: Entry to Mid-Level

Growth Potential: Growing as wind power expands

Employer Type: Private Firms, Government, Power Plant/Facilities

Related Careers:

1. Wind Generating Installer
2. Wind Field Technician

Junior Renewable Energy Technician

Description: Perform wind turbine resets and site call outs and act as a central safety call-in for project managers performing high voltage switching, while receiving on-site training

Salary: \$15 - \$17/hour

Min. Educational Req.: No degree required

Recommended College Coursework: Electro-Mechanical, Wind Power Generation

Experience Needed: Entry Level
Previous operations experience of wind plants or currently attending school for this particular field

Desired Education: Trade School or Apprenticeship

Growth Potential: Wind field operations will increase in demand as installations grow in number

Employer Type: Power Plants/Facilities

Related Careers:

1. Wind Field Technician
2. Electro-Mechanical Wind Turbine Technician

Wind Field Operations Manager for Commercial

Description: Provide overall leadership to aggressively drive execution of all site activities in region - Receiving, Installation & Commissioning, maintain expertise in Field EHS and Quality Procedures and drive project requirements in region including cost, schedule and performance

Salary: \$24 - \$28/hour

Min. Educational Req.: Bachelor's Degree

Recommended College Coursework: Renewable Energies, Engineering, Industrial Operations

Experience Needed: Mid to High Level
Minimum 3 years in field management of wind farms plus 1-2 years direct technical experience on wind farms

Growth Potential: Wind power is one of the fastest growing renewable energy sectors

Employer Type: Private Firms, Power Plants/Facilities

Related Careers:

1. Plant Operations Manager

Wind Generating Installer

Description: Assembles, installs, and maintains electrical and mechanical parts, such as alternators, generators, and rotors of electric power generating windmills, according to production specifications

Salary: \$14 - \$20/hour

Min. Educational Req.: HS Diploma/GED

Experience Needed: Entry to Mid-Level
A combination of more than 4 years of directly related training and/or experience is typically required

Growth Potential: Wind field installation positions will increase in demand as new installations grow in number

Employer Type: Private Firms, Government, Power Plants/Facilities

Related Careers:

1. Electro-Mechanical Wind Turbine Technician
2. Wind Field Technician

Wind Field Service Technician

Description: Perform status checks on turbines and repair the problems

Salary: \$22 - \$26/hour

Min. Educational Req.: Trade School or Apprenticeship

Recommended College Coursework: Iron and/or Metal shop, Mechanical/Electrical Engineering, Renewable Energy Studies

Experience Needed: Mid-Level

Growth Potential: Wind power is one of the fastest growing renewable energy sectors

Employer Type: Power Plants/Facilities

Related Careers:

1. Electro-Mechanical Wind Turbine Technician

Wind power engineering, design & project management

Wind Power Plant Project Engineer

Description: Responsible for overseeing all aspects of the technical specialties at plants including electrical engineering, turbine selection & procurement, revenue generation, expense management and budgets, as well as conducting conceptual engineering and design of wind field processes and facilities

Salary: \$60,000 - \$90,000/year

Min. Educational Req.: Bachelor's degree in Mechanical or Electrical Engineering.

Recommended College Coursework: Mechanical and/or Electrical Engineering, Renewable Energies

Experience Needed: High Level
5-10 years of experience with power plant design, maintenance and operations

Growth Potential: Huge potential for growth as wind power expands

Employer Type: Power Plants/Facilities

Related Careers:

1. Director of Wind Development

Director of Wind Development

Description: Leads and manages the development and evaluation of potential wind energy business opportunities, identifies and analyzes wind energy investment opportunities and leads projects through the research, analysis, modeling, recommendation and negotiating phases

Salary: \$130,000 - \$170,000/year

Min. Educational Req.: Bachelor's degree in Accounting, Finance, Economics, or related field

Recommended College Coursework: Finance, Economics, Accounting, Management

Experience Needed: High Level
4-6 years wind developer experience with large company or consulting firm.

Desired Education: MBA, CPA, CMA

Growth Potential: Wind development managers needed in increasing numbers as more wind power comes on line

Employer Type: Private Firms, Power Plants/Facilities

Related Careers:

1. Top Environmental Officer

Hydro-electric power operation development & manufacturing

Hydro-Electric Component Machinist

Description: Make precision metal or plastic parts, use computer numerically controlled machine tools and set up and operate all of the basic machine tools and many specialized variations for hydro-electric power generation

Salary: \$12 - \$21/hour

Min. Educational Req.: Apprenticeship Trade School

Recommended College Coursework: Metalworking, Drafting, Math, and Computer courses

Experience Needed: Entry to Mid-Level
Journey level status

Growth Potential: EDD projects 3,500 new machinist jobs in California by 2016. Hydro industry growth may be less than other economic sectors

Employer Type: Power Plants/Facilities

Related Careers:

1. Welder
2. Sheet Metal Worker

Hydro-Electric Construction: Sheet Metal Worker

Description: Perform all operations necessary to make, install, and repair a hydro-electric generator

Salary: \$14 - \$22/hour

Min. Educational Req.: Apprenticeship or Trade School

Recommended College Coursework: Math, Mechanical Drawing, Metal shop, Welding, Heating and Air-Conditioning

Experience Needed: Entry to Mid
Journey level status

Growth Potential: EDD predicts 1,800 new sheet metal workers by 2016. Hydro industry growth may be less than other economic sectors

Employer Type: Private Firms, Power Plants/Facilities

Related Careers:

1. Machinist
2. Welder

Hydro-Electric Engineering Intern

Description: Assists Engineer with electrical aspects of hydro-electric power generation

Salary: Nominal or school credits

Min. Educational Req.: HS Diploma/GED, Some College

Recommended College Coursework: Physics, Electrical Engineering

Experience Needed: Entry Level
Hands-on laboratory experience with electronics equipment, physics laboratory, optical equipment and electronics fabrication

Desired Education: Working for B.S. or M.S. degree in Physics or Electrical Engineering

Growth Potential: As demand for jobs grows so does demand for internships

Employer Type: Private Firms, Power Plant/Facilities

Hydro-electric power operation development, manufacturing, installation & maintenance

Hydro-Electric Plant Mechanical Engineer

Description: Responsible for design, development and testing of all aspects of mechanical components, equipment and machinery associated with hydro-electric plants

Salary: \$90,000/year or more

Min. Educational Req.: Bachelor's Degree in Mechanical Engineering

Recommended College Coursework: Hydro-electric power, Mechanical Engineering

Certification: Professional Engineer (P.E.)

Experience Needed: High Level
5 years with similar responsibilities

Growth Potential: EDD predicts there will be 1,800 new mechanical engineering jobs by 2016. Hydro industry growth may be less than other economic sectors

Employer Type: Private Firms, Government, Power Plants/Facilities

Related Careers:

1. Electrical Engineer
2. Energy Engineer

Hydro-Electric Operations Maintenance Worker

Description: Wide variety of tasks in support of Hydroelectric Power Generation systems

Salary: \$21 - \$27/hour

Min. Educational Req.: HS Diploma/GED

Recommended College Coursework: Plant Operations and Maintenance

Experience Needed: Entry Level
2 years experience in related field if no higher education, Six months required if have Trade School or Apprenticeship experience.

Desired Education: Trade School or Apprenticeship

Growth Potential: Although general hydro industry growth may be less than other economic sectors, plant efficiency and operations workers will be in consistent demand

Employer Type: Private Firms, Power Plants/Facilities

Related Careers:

1. Systems Service Technician

Hydro-Electric Plant Electrical Engineer

Description: Electrical engineering and design of hydro-electric plants, including preparation of drawings, specifications and supporting calculations, and design of electrical controls, SCADA communications and power system relay protection for hydroelectric power generation facilities

Salary: \$90,000/year or more

Min. Educational Req.: Bachelor's Degree in Electrical Engineering

Recommended College Coursework: Power Engineering, Electrical Design, Hydrology

Certification: Professional Engineer (P.E.)

Experience Needed: High Level
5 years with similar responsibilities

Growth Potential: EDD predicts there will be 1,100 new electrical engineering jobs by 2016. Hydro industry growth may be less than other economic sectors

Employer Type: Private Firms, Government, Power Plants/Facilities

Related Careers:

1. Energy Engineer
2. Photovoltaic Design Engineer

Hydro-Electric Plant Efficiency Operator

Description: Responsible for maintaining and monitoring plant equipment for efficient and safe plant operations and planning and handling all hazardous materials and wastes in a safe and environmentally sensitive manner

Salary: \$23 - \$26/hour

Min. Educational Req.: HS Diploma/GED

Certification: HAZMAT cert.

Experience Needed: High Level
Minimum 5 years of power plant operating experience

Growth Potential: As efficiency becomes a concern of more and more businesses this position will see tremendous growth

Employer Type: Government, Power Plants/Facilities

Related Careers:

1. Weatherization Operations Manager

Hydro-Electric Plant Structural Engineer

Description: Design Hydro-Electric Plants

Salary: \$65,000 - \$95,000/year

Min. Educational Req.: Bachelor's Degree in Civil Engineering or Structural Engineering

Recommended College Coursework: Civil/Structural Engineering, Renewable Energies, Hydro Generation

Certification: Professional Engineer (P.E.)

Experience Needed: High Level
10 years Engineering experience plus any hydrology or hydraulic analysis experience

Growth Potential: Will grow alongside hydroelectric production

Employer Type: Private Firms, Power Plants/Facilities

Related Careers:

1. Mechanical Engineer
2. Civil Engineer

Hydro-Electric Plant Installation Technician

Description: Performs journey level mechanical installation and maintenance duties in a hydroelectric power plant and performs preventive maintenance, welding, pipefitting, machining and rigging incidental to journeyman mechanical maintenance work

Salary: \$35/hour

Min. Educational Req.: Trade School or Apprenticeship

Recommended College Coursework: Plumbing, Pipefitting, Operations & Maintenance, Hydrology

Experience Needed: Mid to High Level
Journey level status

Growth Potential: Will grow alongside hydroelectric power generation

Employer Type: Private Firms, Government, Power Plants/Facilities

Related Careers:

1. Power generation plant Mechanics

Hydro-electric power installation, maintenance, engineering, design & project management

Hydro-Electric Plant Electrical Operations Supervisor

Description: Responsible for establishing maintenance priorities and diagnosing power plant electrical problems

Salary: \$78,000 - \$92,000/year

Min. Educational Req.: Associate's Degree in Business or Technical discipline.

Recommended College Coursework: Business Relations, Electrical Engineering, Power generation systems

Experience Needed: Mid to High Level
Journey level status

Minimum 5 years performing or supervising the functions of electrical systems/equipment maintenance directly associated with a large generating facility

Growth Potential: Although general hydro industry growth may be less than other economic sectors, plant efficiency and operations workers will be in consistent demand

Employer Type: Power Plants/Facilities

Related Careers:

1. Hydro-Electric Power Generation Engineer

Hydrogeologist and Hydrologist

Description: Work with other hydrogeologists on field-related activities connected to the groundwater monitoring duties and collect water level measurements and water quality samples from production and monitoring wells

Salary: \$58,500 - \$78,200/year

Min. Educational Req.: Bachelor's Degree in the field of Geology, Hydrogeology, Earth Science or related field

Recommended College Coursework: Hydrogeology, Earth Sciences, Geology

Experience Needed: Mid-Level
Some experience in groundwater sampling activities and hydrogeologic data presentation is a plus

Growth Potential: EDD projects 30% more hydrologist jobs by 2016

Employer Type: Private Firms, Government, Power Plants/Facilities

Related Careers:

1. Water Purification Systems Service Technician

Hydro-Electric Power Generation Engineer

Description: Involved with plans in preparation of specifications, performance modeling and analysis, cost estimations and negotiation of supply and service contracts for a hydro-electric power generation facility

Salary: \$90,000 - \$140,000/year

Min. Educational Req.: Bachelor's degree in Mechanical Engineering

Recommended College Coursework: Mechanical Engineering, Renewable Energies

Certification: Professional Engineer (P.E.)

Experience Needed: High Level
5 years experience with boilers and steam turbines, vessels, piping, valves, control systems, equipment and piping supports systems

Growth Potential: Although general hydro industry growth may be less than other economic sectors, plant efficiency and operations workers will be in consistent demand

Employer Type: Power Plants/Facilities

Related Careers:

1. PV Power Systems Engineer
2. Director of Wind Development

Hydro-Electric Mechanical Engineer

Description: Responsible for design, development, testing of all aspects of mechanical components, equipment and machinery.

Salary: \$90,000/year or more

Min. Educational Req.: Bachelor's Degree in Mechanical Engineering

Recommended College Coursework: Mechanical Engineering, Metal shop

Certification: Professional Engineer (P.E.)

Experience Needed: High Level
5 years with similar responsibilities

Growth Potential: EDD predicts there will be 1,800 new mechanical engineering jobs by 2020

Employer Type: Private Firms, Government, Power Plants/Facilities

Related Careers:

1. Electrical Engineer

Hydro-Electric Engineering Intern

Description: Assists Engineer on-site while learning about hydro-electric power generators

Salary: Nominal or school credits

Min. Educational Req.: HS Diploma/GED, Some College

Recommended College Coursework: Physics, Electrical Engineering

Experience Needed: Entry Level
Hands-on laboratory experience with electronics equipment, physics laboratory, optical equipment and electronics fabrication

Desired Education: Working for B.S. or M.S. degree in Physics or Electrical Engineering

Growth Potential: As demand for jobs grows so does demand for internships

Employer Type: Private Firms, Power Plant/Facilities

Hydro-Electric Electrical Engineer

Description: Responsible for design, development, testing of all aspects of electrical components and equipment of hydro-electric power generation facilities

Salary: \$90,000/year or more

Min. Educational Req.: Bachelor's Degree in Electrical Engineering

Recommended College Coursework: Electrical Engineering, Power Generation

Certification: Professional Engineer (P.E.)

Experience Needed: High Level
5 years with similar responsibilities

Growth Potential: Great potential for growth

Employer Type: Private Firms, Government, Power Plants/Facilities

Related Careers:

1. Photovoltaic Design Engineer

Hydro-electric power engineering & project management

Hydro-Electric Structural Engineer

Description: Carries out analyses and design of structures associated with hydroelectric projects, such as concrete dams, intakes, powerhouses, spillways and foundations. Work involves all stages of projects, from feasibility to final detailed design

Salary: \$80,000 - \$93,000/year

Min. Educational Req.: Bachelor's degree in Civil/ Structural Engineering

Recommended College Coursework: Civil/ Structural Engineering, Hydraulics, GIS

Certification: Professional Engineer (P.E.)

Experience Needed: High Level
10 years experience with layout and structural design of hydroelectric power generators

Desired Education: Master's or PhD

Growth Potential: Although general hydro industry growth may be less than other economic sectors, plant operations and engineering will be in consistent demand

Employer Type: Private Firms, Government, Power Plants/Facilities

Related Careers:

1. Electrical Engineer

Geothermal Sheet Metal Worker

Description: Perform all operations necessary to make, install, and repair geothermal power generators

Salary: \$14 - \$22/hour

Min. Educational Req.: Apprenticeship or Trade School

Recommended College Coursework: Math, Mechanical Drawing, Metal shop, Welding, Heating and Air-Conditioning

Experience Needed: Entry to Mid-Level
Journey level status

Growth Potential: EDD predicts 1,800 new sheet metal workers by 2016. Geothermal industry expected to be in higher growth than some other renewable power sectors

Employer Type: Private Firms, Power Plants/Facilities

Related Careers:

1. Machinist
2. Welder

Biologist – Marine/Fisheries

Description: Plan and conduct evaluations of factors affecting California's fish populations and provide oversight of fisheries monitoring programs

Salary: \$25 - \$32/hour

Min. Educational Req.: Bachelor's degree in Biology or related field

Recommended College Coursework: Biology, Marine Biology

Experience Needed: Mid to High Level

Growth potential: Huge potential for growth

Employer Type: Private Firms

Related Careers:

1. Environmental Scientist

Geothermal Engineering Intern

Description: Help design, build and implement geothermal power strategies

Salary: Nominal or school credits

Min. Educational Req.: HS Diploma/GED, Some College

Recommended College Coursework: Physics, Electrical Engineering

Experience Needed: Entry Level

Hands-on laboratory experience with electronics equipment, physics laboratory, optical equipment and electronics fabrication

Desired Education: Working for B.S. or M.S. degree in Physics or Electrical Engineering

Growth Potential: As demand for jobs grows so does demand for internships

Employer Type: Private Firms, Power Plant/Facilities

Geothermal power plant development & manufacturing

Geothermal Heat Pump Machinist

Description: Make precision metal or plastic parts for geothermal heat pumps, use computer numerically controlled machine tools and set up and operate all of the basic machine tools and many specialized variations

Salary: \$12 - \$21/hour

Min. Educational Req.: Apprenticeship or Trade School

Recommended College Coursework: Metalworking, Drafting, Math, and Computer courses

Experience Needed: Entry to Mid-Level
Journey level status

Growth Potential: High potential for growth as technology advances

Employer Type: Private Firms, Power Plants/Facilities

Related Careers:

1. Welder
2. Sheet Metal Worker

Geothermal Electrical Engineer

Description: Responsible for design, development and testing of all aspects of electrical components and equipment

Salary: \$90,000/year or more

Min. Educational Req.: Bachelor's Degree in Electrical Engineering

Recommended College Coursework: Electrical Engineering, Renewable Energies, Geology

Certification: Professional Engineer (P.E.)

Experience Needed: High Level
5 years with similar responsibilities

Growth Potential: Geothermal industry expected to have higher growth rate than some other renewable power sectors

Employer Type: Private Firms, Government, Power Plants/Facilities

Related Careers:

1. Energy Engineer
2. PV Systems Design Engineer

Geothermal power plant installation, engineering, & management

Geothermal Power Generation (Mechanical) Engineer

Description: Involved with preparing of specifications, performance modeling and analysis, cost estimations and negotiation of supply and service contracts for a company that generates renewable electric power

Salary: \$90,000 - \$140,000/year

Min. Educational Req.: Bachelor's degree in Mechanical Engineering

Recommended College Coursework: Mechanical Engineering, Renewable Energies

Certification: Professional Engineer (P.E.)

Experience Needed: High Level
5 years experience with boilers and steam turbines, vessels, piping, valves, control systems, equipment and piping supports systems

Growth Potential: EDD predicts there will be 1,800 new mechanical engineering jobs by 2020

Employer Type: Power Plants/Facilities

Related Careers:

1. Geothermal Electrical Engineer

Geothermal Engineering Intern

Description: Assists Engineer in various aspects of geothermal power production

Salary: Nominal or school credits

Min. Educational Req.: HS Diploma/GED, Some College

Recommended College Coursework: Physics, Electrical Engineering

Experience Needed: Entry Level
Hands-on laboratory experience with electronics equipment, physics laboratory, optical equipment and electronics fabrication

Desired Education: Working for B.S. or M.S. degree in Physics or Electrical Engineering

Growth Potential: As demand for jobs grows so does demand for internships

Employer Type: Private Firms, Power Plant/Facilities

Geothermal Plant Installation Technician

Description: Installs Geothermal projects

Salary: Undetermined

Min. Educational Req.: HS Diploma/GED

Experience Needed: Entry Level
Experience in construction, refrigeration, electrical and/or plumbing installations

Growth Potential: Geothermal industry expected to have higher growth rate than some other renewable power sectors

Employer Type: Private Firms, Power Plants/Facilities

Related Careers:

1. Systems Service Technician

Geothermal Operations Engineer

Description: Collects and processes information on well-field and plant performance, diagnoses well problems and designs procedures to fix them

Salary: \$70,000 - \$80,000/year

Min. Educational Req.: Bachelor's degree or higher in Engineering

Recommended College Coursework: Resource/ Petroleum Engineering, Computer Programming,

Certification: Professional Engineer (P.E.)

Experience Needed: High Level
15 years experience in geothermal resource engineering as well as petroleum engineering

Growth Potential: Geothermal industry expected to have higher growth rate than some other renewable power sectors

Employer Type: Private Firms, Government, Power Plants/Facilities

Related Careers:

1. Mechanical Engineering
2. Power Generation Development

Geothermal Plant Efficiency Operator

Description: Responsible for maintaining and monitoring plant equipment for efficient and safe plant operations and planning and handling all hazardous materials and wastes in a safe and environmentally sensitive manner

Salary: \$26 - \$30/hour

Min. Educational Req.: HS Diploma/GED

Certification: HAZMAT cert.

Experience Needed: High Level
Minimum 5 years of power plant operating experience

Growth Potential: As efficiency becomes a concern of more and more businesses this position will see tremendous growth

Employer Type: Government, Power Plants/Facilities

Related Careers:

1. Weatherization Operations Manager

Hydrogeologist

Description: Work with other hydrogeologists on field-related activities connected to the groundwater monitoring duties and collect water level measurements and water quality samples from production wells and monitoring wells

Salary: \$58,500 - \$78,200

Min. Educational Req.: B.S. Degree in the field of geology, hydrogeology, earth science, or related field

Recommended College Coursework: Hydrogeology, Earth Sciences

Experience Needed: Entry-Level
Some experience in groundwater sampling activities and hydrogeologic data presentation is a plus

Growth Potential: EDD projects 30% growth rate for hydrologists by 2016

Employer Type: Private Firms, Government, Power Plants/Facilities

Related Careers:

1. Water Purification Systems Service Technician

Geothermal power plant engineering, design & project management

Geothermal Mechanical Engineer

Description: Responsible for design, development and testing of all aspects of mechanical components, equipment and machinery

Salary: \$90,000/year or more

Min. Educational Req.: Bachelor's Degree in Mechanical Engineering

Recommended College Coursework: Mechanical Engineering, Earth Sciences, Geothermal production

Certification: Professional Engineer (P.E.)

Experience Needed: High Level
5 years with similar responsibilities

Growth Potential: EDD predicts there will be 1,800 new mechanical engineering jobs by 2020

Employer Type: Private Firms, Government, Power Plants/Facilities

Related Careers:

1. Electrical Engineer
2. Energy Engineer

Geothermal Electrical Engineer

Description: Responsible for design, development and testing of all aspects of electrical components and equipment

Salary: \$90,000/year or more

Min. Educational Req.: Bachelor's Degree in Electrical Engineering

Recommended College Coursework: Electrical Engineering, Geothermal Technology

Certification: Professional Engineer (P.E.)

Experience Needed: High Level
5 years with similar responsibilities

Growth Potential: Geothermal industry expected to have higher growth rate than some other renewable power sectors

Employer Type: Private Firms, Government, Power Plants/Facilities

Related Careers:

1. Energy Engineer
2. Photovoltaic Design Engineer

Geothermal Power Plant Structural Engineer

Description: Designs the geothermal power generating structure

Salary: \$67,000 - \$79,000/year

Min. Educational Req.: Bachelor's Degree in Civil Engineering

Recommended College Coursework: Structural Engineering, Mechanical Systems, Geothermal

Certification: Professional Engineer (P.E.)

Experience Needed: High Level
5 - 15 years of facility and industrial system design with 5 years of power plant design

Growth Potential: Geothermal industry expected to have higher growth rate than some other renewable power sectors

Employer Type: Private Firms, Government, Power Plants/Facilities

Related Careers:

1. Civil Engineer

Biogas & biomass generated energy

Landfill Gas Collection System Operator

Description: Responsible for daily operations, maintenance and repair and extracting landfill gas in a proper, safe, reliable and efficient manner

Salary: \$20 - \$24/hour

Min. Educational Req.: Trade School, Apprenticeship or Associate's Degree

Recommended College Coursework: Power Generation Operation, Landfill Gas Plant Operations, Chemistry

Experience Needed: Mid-Level
Minimum 3 years of equipment operations experience using mechanical, electrical, instrument or control system skills

Growth Potential: High growth expected as regulations require more gas collection

Employer Type: Landfill Facilities, Consultants

Related Careers:

1. Landfill gas collection system technician

Landfill Gas Technician

Description: Responsible for assisting head landfill operator in daily operations, maintenance and repair and performing landfill gas leak checks on recurring basis

Salary: \$10-\$15/hour

Min. Educational Req.: HS Diploma/GED

Experience Needed: Entry Level

Growth Potential: High growth alongside the rest of the landfill gas energy sector

Employer Type: Landfill Facilities, Consultants

Related Careers:

1. Landfill gas collection system operator

Landfill Gas to Energy LGE Plant Installation, Operations, Engineering and Management

Description: Designs, constructs, operates and / or maintains system that delivers landfill gas to energy facilities to produce useable fuel for vehicles

Salary: Expected to be similar to operations, engineering and maintenance personnel at other facilities

Min. Educational Req.: Bachelor's degree or higher in Engineering

Recommended College Coursework: Resource/ Petroleum Engineering, Computer Programming

Certification: Dependent on position sought

Experience Needed: High Level

Growth Potential: Unknown, will grow as technology is proven and developed

Employer Type: Private Firm, Government, Power Plants/Facilities

Biomass collection & power plant

Animal Waste Biomethane Gas Collection System Technician

Description: Responsible for daily operations, maintenance and repair of biomethane equipment at animal waste operations

Salary: \$20 - \$24/hour

Min. Educational Req.: Trade School, Apprenticeship, or Associate's Degree

Recommended College Coursework: Power Generation Operation, Landfill Gas Plant Operations, Chemistry

Experience Needed: Mid-Level
Minimum 3 years of equipment operations experience using mechanical, electrical, instrument or control system skills

Growth Potential: Growth depends on future of industry and regulations development

Employer Type: Agriculture, Consultants, Utilities

Related Careers:

1. Landfill gas collection system technician

Biomass Plant Operations, Engineering & Maintenance

Description: Designs, constructs, operates and / or maintains plants that generate electricity from the combustion of biomass

Salary: Expected to be similar to operations, engineering and maintenance personnel at other facilities

Min. Educational Req.: Bachelor's degree or higher in Engineering

Recommended College Coursework: Resource/Engineering, Computer Programming

Certification: Dependent on position sought

Experience Needed: High Level

Growth Potential: Good potential for growth alongside alternative fuel industry. EDD projects 3,000 new plant operators by 2016, some will be in biomass facilities

Employer Type: Private Firms, Government, Power Plants/Facilities

Biomass Collection, Separation & Sorting

Description: Collects, hauls, sorts and processes biomass waste for distribution to biomass facilities

Salary: Approx \$9 to \$14 per hour (similar to other waste haulers)

Min. Educational Req.: High School, GED

Recommended College Coursework: Resource/Engineering, Computer Programming

Experience Needed: Entry Level

Certification: Commercial Drivers license

Growth Potential: EDD projects 1,000 new materials collection jobs by 2016

Employer Type: Private Firms, Government, Power Plants/Facilities

Hydrogen energy plant installation, operations & management

Hydrogen Power Plant Installation, Operations, Engineering & Management Staff - General

Description: Designs, constructs, operates and / or maintains hydrogen energy generation facilities

Salary: Expected to be similar to operations, engineering and maintenance personnel at other facilities

Min. Educational Req.: Bachelor's Degree in Chemical or Industrial Engineering

Recommended College Coursework: Resource/ Petroleum Engineering, Computer Programming

Certification: Dependent on position sought

Experience Needed: High Level
Minimum 3 years with process and/or chemical engineering experience in a power plant

Growth Potential: Unknown, may grow as technology is proven and developed

Employer Type: Private Firms, Power Plants/Facilities

Carbon Sequestration Plant Installation, Operations, Engineering & Management

Description: Designs, constructs, operates and / or maintains carbon sequestration facilities that inject and store carbon dioxide in geologic formations

Salary: Expected to be similar to operations, engineering and maintenance personnel at other facilities

Min. Educational Req.: Bachelor's degree or higher in Engineering

Recommended College Coursework: Resource/ Petroleum Engineering, Computer Programming

Certification: Dependent on position sought

Experience Needed: High Level

Growth Potential: Unknown, may grow as technology is proven and developed

Employer Type: Private Firms, Government, Power Plants/Facilities

Hydrogen Plant Operator & Operations Manager

Description: Accountable for overall management of operations of a hydrogen energy generating facility

Salary: \$37 - \$65/hour

Min. Educational Req.: Bachelor's Degree in Engineering

Recommended College Coursework: Engineering, Alternative Energies, Chemistry

Experience Needed: High Level
Minimum 3-5 years as a power plant operator

Growth Potential: Good potential for growth alongside alternative fuel industry. EDD projects 3,000 new plant operators by 2016, some will be in hydrogen facilities

Employer Type: Power Plants/Facilities

Related Careers:

1. Geothermal Plant Operations & Maintenance Manager

Geologist & Hydrogeologist

Description: Performs site characterization and analysis on potential and ongoing CCS sites and works with other geologists and hydrogeologists on field-related activities connected to CCS monitoring

Salary: \$58,500 - \$85,000

Min. Educational Req.: B.S. Degree in the field of geology, hydrogeology, earth science or related field, with Master's or Ph.D. likely required for most positions

Recommended College Coursework: Geology, Earth Science, Biology, Chemistry, Physics, Math

Experience Needed: Mid to High -Level, Experience in geology, geologic sequestration, groundwater sampling activities and hydrogeologic data presentation

Growth Potential: This is a new technology and growth dependent on technology adoption and development. EDD projects 30% overall growth in hydrologist jobs by 2016

Employer Type: Private Firms, Government, Power Plants/Facilities

Carbon capture & storage – geologic sequestration

Carbon Capture Power Plant Installation, Operations, Engineering & Management

Description: Designs, constructs, operates and / or maintains carbon capture facilities.

Salary: Expected to be similar to operations, engineering and maintenance personnel at other facilities

Min. Educational Req.: Bachelor's degree or higher in Engineering

Recommended College Coursework: Resource/ Petroleum Engineering, Computer Programming

Certification: Dependent on position sought

Experience Needed: High Level

Growth Potential: Unknown, may grow as technology is proven and developed

Employer Type: Private Firms, Government, Power Plants/Facilities

GIS Specialist

Description: Develop and use advanced Geographic Information Systems programs and methods to create site analysis and carbon migration and monitoring plans

Salary: \$46,000 - \$57,000/year

Min. Educational Req.: Bachelor's Degree in Geography

Recommended College Coursework: GIS courses, Engineering and math

Experience Needed: High Level
5-7 years in related field

Growth Potential: EDD projects 500 new jobs in mapping and surveying by 2016

Employer Type: Private Firms, Government, Power Plants/Facilities

Related Careers

1. Restoration Planner

Plant environmental, health & safety (general facility positions)

Environmental, Health & Safety Engineering Manager

Description: Directs and oversees environmental, health, and safety activities for the operation, and develops, coordinates, and implements programs to maintain safe and healthy working conditions

Salary: \$73,000 - \$93,000/year

Min. Educational Req.: Bachelor's degree in Environmental Science, Health & Safety Management, Environmental Engineering or related discipline

Recommended College Coursework: Engineering, Environmental Health & Safety

Experience Needed: Mid to High Level
Minimum 3 years of related EHS experience with focus in a manufacturing/industrial environment

Growth Potential: EDD projects 13.5% growth in EHS personnel between 2006 and 2016

Employer Type: Private Firms, Government, Power Plants / Facilities

Related Careers:

1. Environmental Engineer

Safety Investigator/Cause Analyst

Description: Receives, investigates, and responds to employees concerns about Plant Safety

Salary: \$88,000 - \$104,000/year

Min. Educational Req.: Bachelor degree in Business or Engineering

Recommended College Coursework: Business, Engineering, Plant Safety

Experience Needed: High Level
Minimum 3 years performing cause analysis, investigations or consulting. Minimum 2 years of power plant experience

Growth Potential: High potential for growth as plants are modified and renewable power generation grows

Employer Type: Power Plants/Facilities

Related Careers:

1. Plant Auditor

Environmental Health & Safety Lead

Description: Ensure compliance of plant operations with federal and state requirements relating to air emissions, solid waste, hazardous waste, waste water treatment and chemical management

Salary: \$81,000 - \$96,000/year

Min. Educational Req.: Master's degree, or equivalent, in Environmental Science, Environmental Management, Environmental Engineering, Chemistry or Biology

Recommended College Coursework: Environmental Studies, Engineering, Sciences

Experience Needed: High Level
1 year plus Master's degree or 3 years plus Bachelor's

Growth Potential: EDD projects 13.5% growth over next 10 years

Employer Type: Private Firms, Government, Power Plants/Facilities

Related Careers:

1. Environmental, Health & Safety Engineering Manager

Plant Maintenance Supervising Technical Operator

Description: Manages and ensures uniform application and technical correctness of the plants maintenance procedures and specifications

Salary: \$27 - \$30/hour

Min. Educational Req.: College degree in engineering or technical related field

Recommended College Coursework: Mechanical/ Electrical Engineering

Experience Needed: High Level
Minimum 5 years experience in a supervisory role

Growth Potential: As more plants are developed the need will increase for personnel, including managerial positions

Employer Type: Government, Power Plants/Facilities

Related Careers:

1. Plant Safety Engineer

Plant Technical Specialist – Safety Equipment Testing

Description: Perform seismic testing of safety-related equipment and other technical surveillances

Salary: \$64,000 - \$76,000

Min. Educational Req.: Bachelor's degree or equivalent combination of education, training and experience

Recommended College Coursework: Plant Safety, Quality Assurance

Experience Needed: High Level
Minimum 5 years technical and/or inspection-related experience.

Growth Potential: Will grow with creation of more power plants

Employer Type: Power Plants/Facilities

Related Careers:

1. Plant Safety Engineer

Plant Safety Engineer

Description: Conduct plant safety meetings and inspections and help your plant to improve safety statistics while working to standardize plant safety regulations for all related plants

Salary: \$90,000 - \$107,000/year

Min. Educational Req.: Bachelor's degree

Recommended College Coursework: Industrial Safety, Occupational Safety/Health, Industrial Hygiene

Certification: Safety Certification

Experience Needed: High Level
5-10 years of industrial safety experience in a power plant environment.

Growth Potential: Potential for growth will increase as power plants adhere to stricter standards

Employer Type: Power Plants/Facilities

Related Careers:

1. Plant Auditor

Terrestrial sequestration & soil conservation

Soil Conservation Technician

Description: Provides technical assistance to land users in planning and applying soil and water conservation practices, utilizing basic engineering and surveying knowledge of agricultural and related sciences

Salary: \$16 - \$24/hour

Min. Educational Req.: Bachelor's Degree in field of specialty or equivalent education and experience

Recommended College Coursework: Agriculture, Agronomy, Soil Conservation, Hydrology

Experience Needed: Mid-Level

Growth potential: As innovative agriculture practices are explored this sector will grow

Employer Type: Private firms

Related Careers:

1. Soil Conservationist
2. Forest Conservation Technicians

Forestry Conservation Consultant

Description: Advisor on all forest and woodland ecosystem management activities, including matters relating to the development prescriptions to support threatened, endangered and special status plants and animals, development of special inventory protocols to support the Wildlife Habitat Relationships Inventory System in California and supervision of the Forest Ecosystem Health and Recovery Fund Salvage program.

Salary: \$31 - \$50/hour

Min. Educational Req.: Associate's Degree in Forestry

Recommended College Coursework: Forest Biology, Management of Renewable Resources, Forests Resource Measurements and Inventory

Experience Needed: Mid to High Level

Desired Education: Bachelor's Degree

Growth Potential: Huge potential for growth as we conserve our forests while dealing with wildfires

Employer Type: Government

Related Careers:

1. Forestry Supervisor

Soil Conservationist

Description: Deals with soil erosion control, moisture conservation and sound land use, and plans soil management practices such as reforestation, terracing and crop rotation

Salary: \$23 - \$32/hour

Min. Educational Req.: Bachelor's Degree in field of specialty

Recommended College Coursework: Agronomy, Soil Science, Forestry, Agriculture, Environmental Studies

Experience Needed: Mid-Level
Applies principles of 2 or more specialized fields, therefore more qualified than technician

Growth potential: EDD projects 10 % growth in soil conservation positions by 2016

Employer Type: Private Firms

Related Careers:

1. Hydrogeologist
2. Environmental Scientist

Forestry Supervisor

Description: Deals with forest management, urban forests, wildlife management, conservation and reclamation of land for forestry use

Salary: \$15 - \$30/hour (some offer up to \$100,000/year)

Min. Educational Req.: Bachelor's degree in Forestry Management

Recommended College Coursework: Forestry, Math, Science, Forest Resource Management

Certification: Forester License for Professionals

Experience Needed: Mid-Level
2-3 years related experience as licensed forester

Growth Potential: EDD projects 300 new forester jobs by 2016

Employer Type: Private Firms, Government

Related Careers:

1. Agricultural Farm Worker

Forestry

Forestry Conservation Worker

Description: Perform manual labor necessary to develop, maintain, or protect forest, forested areas, and woodlands., and build erosion and water control structures and leaching for forest soil

Salary: \$15 - \$22/hour

Min. Educational Req.: HS Diploma/GED

Recommended College Coursework: Forestry, Ecology, Natural Resources

Experience Needed: Entry Level

Desired Education: Associate's Degree

Growth potential: As the starting point for many conservation and forestry careers this will increase with demand. EDD projects 300 new jobs by 2016

Employer Type: Private Firms, Government

Related Careers:

1. Environmental Scientist

Restoration Planner

Description: Collaborate with field and biology staff to oversee the implementation of restoration projects and to develop new projects. Accurately process and synthesize complex scientific data into practical, on-the round strategies for restoration, monitoring, and management.

Salary: \$73,000 - \$84,000/year

Min. Educational Req.: Master's Degree in related discipline.

Recommended College Coursework: Ecology, Biology, Environmental Science, Landscape Architecture, and Planning

Experience Needed: High level
2-4 years relevant work experience including environmental compliance and permitting

Growth Potential: Huge potential for growth as we work towards sustainable forests

Employer Type: Private Firms, Government

Related Careers:

1. Conservationist
2. Forestry

Energy demand response – government programs

Energy Commission Specialist

Description: Coordinate and develop policy programs (for example, the New Solar Home Partnership and the Million Solar Roofs Program)

Salary: \$70,000 - \$83,000/year

Min. Educational Req.: Bachelor's Degree

Recommended College Coursework: Public Policy, Policy Implementation, Energy Generation and Conservation, Environmental Impact Assessment

Experience Needed: High Level

Desired Education: Master's Degree

Growth Potential: Great potential for growth as policies evolve

Employer Type: Government

Related Careers:

1. Air Quality Specialist
2. Air Resources Engineer
3. Renewable Energy Consultant

Smart Grid Engineer

Description: Addresses complex problems in the electric power delivery infrastructure related to grid modernization

Salary: \$91,000 - \$107,000

Min. Educational Req.: Advanced level of capability either through education, PhD/Master's, or equivalent experience

Recommended College Coursework: Electrical Engineering, Systems Control, Computer Science and Information Technology

Experience Needed: High Level
Journey level status plus 2 – 5 years of related experience dealing with the technical aspects of power grids

Growth Potential: This sector has only begun to develop; there is much room for growth

Employer Type: Private Firms, Government, Power Plants/Facilities

Related Careers:

1. Electrical Engineer
2. Power Grids Planner

Power System Operator

Description: Monitor and operate equipment on transmission lines and in transformer and power generation stations, and control the distribution and regulate the flow of electrical power in the transmission network grid

Salary: \$25 - \$30/hour

Min. Educational Req.: HS Diploma/GED

Recommended Coursework: Computer Programming, Electronics

Experience Needed: High Level
3-4 years of a training program, typically in-house

Growth Potential: Huge potential for growth as the power sector expands

Employer Type: Government, Power Plants/Facilities

Related Careers:

1. Hydro-Electric Plant Operator

Green building practices & retrofits - project design, development and engineering

Field Energy Consultant

Description: Field-based energy efficiency consultant who will encourage equipment and energy system retrofits at grocery stores and other retail sites

Salary: \$30 - \$35/hour (some commission)

Min. Educational Req.: HS Diploma/GED

Recommended College Coursework: Marketing & Sales, HVAC, Mechanical Engineering

Experience Needed: Entry Level
1 - 2 years with consultant sales background and experience building a portfolio of businesses

Desired Education: Familiarity with HVAC, lighting and/or refrigeration

Growth Potential: Will grow alongside efficiency sector

Employer Type: Private Firms

Related Careers:

1. Sales Representative

Energy Conservation Representative

Description: Inspects homes of utility customers to identify conditions that cause energy waste and suggests actions to reduce waste

Salary: \$20 - \$32/hour

Min. Educational Req.: HS Diploma/GED

Experience Needed: Entry to Mid-Level
1-3 years related experience

Growth Potential: As more standards are adopted the demand will increase greatly

Employer Type: Private Firms, Government

Related Careers:

1. Environmental Compliance Specialist
2. Energy Control Officer

Energy Procurement Manager & Analyst

Description: Analyzes energy efficient measures and conducts audits in industrial and large commercial facilities

Salary: \$80,000 - \$100,000

Min. Educational Req.: Bachelor's Degree in Energy Analysis, Sciences or Business Administration

Recommended College Coursework: Business Administration, Sciences, Energy Analysis, Energy Efficiency methods

Experience Needed: Mid to High Level
3-5 years as an energy analyst in an energy efficiency technical discipline

Growth Potential: Great potential for growth as building standards change

Employer Type: Private Firms, Power Plants/Facilities

Related Careers:

1. Field Energy Consultant
2. Energy Conservation Representative

Energy Efficiency Finance Manager

Description: Project-management role in energy efficiency projects and policies, also conducts relevant market analysis and research

Salary: \$90,000/year

Min. Educational Req.: Bachelor's Degree in Accounting, Finance, Business Administration

Recommended College Coursework: Economics, Environmental Studies, Public Policy, Finance, Accounting

Experience Needed: High Level
8 or more years in related field with supervisory responsibilities

Desired Education: MBA

Growth Potential: Huge potential for growth as energy efficiency sector expands

Employer Type: Private Firms

Related Careers:

1. Financial Officer

Engineering Intern

Description: Assists Electrical Engineer with LEED certification projects

Salary: Nominal or school credits.

Min. Educational Req.: HS Diploma/GED, Some College

Recommended College Coursework: Physics, Electrical Engineering

Experience Needed: Entry Level
Hands-on laboratory experience with electronics equipment, physics laboratory, optical equipment and electronics fabrication

Desired Education: Working for B.S. or M.S. degree in Physics or Electrical Engineering

Growth Potential: As demand for jobs grows so does demand for internships

Employer Type: Private Firms

Water Systems Designers & Engineers

Description: Design and install energy efficient water systems in residential and commercial settings

Salary: Commensurate with other engineering fields

Min. Educational Req.: Trade School or Apprenticeships

Recommended College Coursework: Plumbing, Pipefitting, Energy Efficiency, Mechanical Engineering

Certification: Professional Engineer (P.E.)

Experience Needed: Mid-Level

Growth Potential: Huge potential for growth as building codes change

Employer Type: Private Firms, Power Plants/Facilities

Related Careers:

1. Plumber

Green building project design & engineering

Site Supervising Technical Operator

Description: Manages and ensures uniform application and technical correctness during construction

Salary: \$23 - \$26/hour

Min. Educational Req.: College degree in Engineering or related field

Recommended College Coursework: Mechanical/ Electrical Engineering

Experience Needed: Mid to High Level
Minimum 5 years experience in a supervisory role

Growth Potential: EDD forecasts 10,300 new construction managers by 2016

Employer Type: Private Firms

Related Careers:

1. Safety Technical Specialist

Lighting & HVAC Energy Engineer

Description: Provides a full range of technical services related to energy efficiency, renewable energy, carbon emissions reductions and cogeneration projects

Salary: \$77,000 - \$91,000/year

Min. Educational Req.: Bachelor's Degree in Engineering or related field

Recommended College Coursework: Engineering, Energy Efficient Building, HVAC and Lighting systems, Green Building Design

Experience Needed: Mid to High Level
Minimum 3 years of energy engineering experience in the identification and evaluation of energy efficient measures

Growth Potential: EDD predicts 2,500 new HVAC and refrigeration mechanic and installer jobs by 2016

Employer Type: Private Firms

Related Careers:

1. Energy Engineer

Environmental Compliance Specialist

Description: Performs environmental compliance assessments, documents compliance status, and makes recommendations on corrective action required to achieve compliance. Develops plans and procedures necessary to achieve and maintain compliance. Develops audit plans and audit surveillance checklists

Salary: \$20 - \$30/hour

Min. Educational Req.: Bachelor's Degree in Science or Engineering preferred

Recommended College Coursework: Science, Engineering, Green Building

Experience Needed: Mid to High Level
1-3 years related experience with degree.
5-10 years related experience non-degreed

Growth Potential: As environmental standards get stricter we will see a greater need for those who aid in compliance

Employer Type: Private Firms, Government

Related Careers:

1. Energy Conservation Representative
2. Energy Efficiency Auditor

Civil Engineer

Description: Deals with the overall design, construction and maintenance of green buildings, and works with project managers on building projects within design specifications

Salary: \$73,000 - \$84,000

Min. Educational Req.: Bachelor's degree in Civil Engineering

Recommended College Coursework: Engineering, Land Use, Green Building

Certification: Professional Engineer (PE) or Engineer in Training (E.I.T.)

Desired Education: Master's Degree

Experience Needed: High Level
Most projects require experience of 2 - 5 years

Growth potential: EDD predicts 5,000 new civil engineering jobs by 2020

Employer Type: Private Firms, Government

Related Careers:

1. Energy Efficient Engineer
2. Construction

Refrigeration Engineer

Description: Design and install refrigeration units and maintain and repair controls

Salary: \$30 - \$50/hour

Min. Educational Req.: Bachelor's Degree in Engineering or equivalent Trade School/Apprenticeship

Recommended College Coursework: Mechanical Engineering, Refrigeration controls

Experience Needed: Mid to High Level

Growth Potential: EDD predicts 2,500 new HVAC and refrigeration mechanic and installer jobs by 2016

Employer Type: Private Firms, Power Plants/Facilities

Related Careers:

1. HVAC Engineer

HVAC Engineer

Description: The design and installation of all types of air conditioning, heating and ventilation systems, building automation systems and hot water heating for building heat

Salary: \$34 - \$50/hour

Min. Educational Req.: Trade School, Apprenticeship or Associate's Degree

Recommended College Coursework: Mechanical Engineering, HVAC controls

Experience Needed: High Level
Journey Level plus 5 years related experience.

Growth Potential: EDD predicts 2,500 new HVAC and refrigeration mechanic and installer jobs by 2016

Employer Type: Private Firms, Power Plants/Facilities

Related Careers:

1. Refrigeration Engineer
2. Energy Engineer
3. HVAC Service Technician

Green building project design & engineering

Electrical Engineer

Description: Electrical Engineer with a LEED-certified, sustainable, Green-building MEP and Architectural firm

Salary: \$71,000 - \$85,000/year

Min. Educational Req.: Bachelor's degree in Electrical Engineering

Recommended College Coursework: Electrical Engineering

Certification: Professional Engineer (P.E.)

Experience Needed: High level
4-7 years Electrical Engineering experience in an MEP or construction firm

Growth Potential: EDD predicts 1,100 new jobs for electrical engineers by 2016

Employer Type: Private Firms

Related Careers:
1. Civil Engineer

Indoor & Outdoor Landscape Architect

Description: Incorporate green building practices into the indoor and outdoor landscape

Salary: \$65,000 - \$83,000/year depending on experience

Min. Educational Req.: Bachelor's Degree in Landscape Architecture

Recommended College Coursework: Landscape Architecture, Urban planning, Green Building

Experience Needed: High Level
3-10 years of design and construction experience, depending on position sought

Desired Education: Master's Degree

Growth Potential: Large potential for growth as energy efficient landscaping practices evolve.

Employer Type: Private Firms

Related Careers:
1. Green/Retrofit Architects

Residential Green Building & Retrofit Architect

Description: Design residential buildings that meet LEED qualifications as well as develop retrofits for current structures

Salary: \$90,000 - \$107,000/year

Min. Educational Req.: Bachelor's Degree in Architecture

Recommended College Coursework: Architecture, Civil Engineering, Drafting, Retrofitting

Certification: LEED-accredited professional

Experience Needed: High Level

Growth Potential: EDD predicts architecture field will see 1,200 new jobs by 2016

Employer Type: Private Firms

Related Careers:
1. Civil Engineer

Industrial Green Systems & Retrofit Designer

Description: Design energy efficient and retrofit structures on industrial buildings

Salary: \$90,000 - \$107,000/year

Min. Educational Req.: Bachelor's Degree in Architecture

Recommended College Coursework: Architecture, Industrial Building

Certification: LEED-Certified Builder

Experience Needed: High Level
5-8 years experience

Growth Potential: EDD predicts architecture field will see 1,200 new jobs by 2016

Employer Type: Private Firms

Related Careers:
1. Structural Engineer

Commercial Green Building & Retrofit Architect

Description: Participate in all phases of design for commercial and educational buildings

Salary: \$90,000 - \$107,000/year

Min. Educational Req.: Bachelor's Degree in Architecture

Recommended College Coursework: Architecture, Drafting, Energy Efficiency

Certification: LEED-Certified Builder

Experience Needed: High Level
Minimum 5 years experience

Growth Potential: EDD predicts architecture field will see 1,200 new jobs by 2016

Employer Type: Private Firms

Related Careers:
1. Civil Engineer

Senior HVAC Engineer

Description: Coordinate HVAC equipment, ductwork and piping layouts with architectural/structural designs to prevent conflict during construction, and work on Title 24 compliance

Salary: \$75,000 - \$120,000/year

Min. Educational Req.: Bachelor of Science in Mechanical Engineering

Recommended College Coursework: Mechanical Engineering, HVAC, Building Design

Certification: Professional Engineer (P.E.)

Experience Needed: High Level
10 years working with a consulting engineering firm as an HVAC engineer, or with a design-build mechanical contractor

Growth Potential: EDD predicts 2,500 new HVAC and refrigeration mechanic and installer jobs by 2016

Employer Type: Private Firms

Related Careers:
1. Environmental Construction Engineer

Green building project design & engineering

Environmental Construction Engineer

Description: Project manager for an environmental construction or landfill project

Salary: \$100,000 - \$150,000

Min. Educational Req.: Bachelor's Degree in Civil Engineering

Recommended College Coursework: Environmental Construction, Civil Engineering

Certification Requirements: Licensed Civil Engineer

Experience Needed: High Level
12 plus years experience in civil engineering with at least 5 years experience in a management role

Growth Potential: EDD predicts 10,300 new construction manager positions by 2016

Employer Type: Private Firms, Government

Related Careers:

1. Civil Engineer
2. Construction Foreman

Energy Engineer

Description: Perform site-specific engineering analysis and evaluation of energy efficiency and solar projects involving residential, commercial and industrial end-use customers by utilizing building simulation software

Salary: \$75,000 - \$80,000/year

Min. Educational Req.: Bachelor's Degree in engineering discipline

Recommended College Coursework: Engineering, Physics

Certification Requirements: Professional Engineer, Engineer-In-Training, and/or Certified Energy Manager (CEM) desired.

Experience Needed: High Level
3-10 years related experience or training or equivalent combination of education and experience or 2-5 years of experience within the green building, energy efficiency, building science or related field

Desired Education: Master's degree a plus

Growth Potential: The direct linkage between solar programs and energy efficiency will create demand

Employer Type: Private Firms

Related Careers:

1. Civil Engineer

Structural Design Engineer

Description: Analyze and design structural elements and systems for steel, concrete, timber and masonry buildings in accordance with building code and design standards and prepare construction documents and specifications for structural systems

Salary: \$75,000 - \$88,000/year

Min. Educational Req.: Master's Degree in Structural Engineering

Recommended College Coursework: Structural and Seismic Engineering

Certification: Professional Engineer (P.E.)

Experience Needed: High Level
3-6 years experience and competence in structural analysis programs

Growth Potential: EDD projects over 5,000 civil engineering jobs by 2016

Employer Type: Private Firms, Government

Related Careers:

1. Civil Engineer

Green building project installation & operations

Home Improvement Retrofit Trainee

Description: Install energy efficient products for in-home retrofits, run safety tests on gas appliances and identify home energy reduction measures including doors, glass, weather-stripping, etc.

Salary: \$15 - \$17/hr

Min. Educational Req.: High School Student

Experience Needed: Entry Level
Experience in door, window, sheetrock repair and replacement helpful

Growth Potential: As standards for buildings become stricter this occupation will grow exponentially

Employer Type: Private Firms

Related Careers:

1. HVAC Maintenance Trainee
2. Environmental Compliance Specialist

Residential Air Sealing Technician

Description: Develop and implement effective air sealing techniques and applications while receiving on the job training working and explaining for customers about the applications and benefits of air sealing

Salary: To be determined

Min. Educational Req.: HS Diploma/GED

Experience Needed: Entry Level
Residential construction or work on an insulation crew is a plus

Desired Education: Trade School or Apprenticeship

Growth Potential: Huge growth likely, and a great way to get into energy efficient building

Employer Type: Private Firms

Related Careers:

1. HVAC Trainee

Insulation Installer

Description: Responsible for pasting, wiring, taping or spraying insulation onto a variety of structures and surfaces to exclude or retain heat

Salary: \$10 - \$12/hour

Min. Educational Req.: HS Diploma/GED

Experience Needed: Entry Level
1-3 month related experience

Growth Potential: Huge potential as energy efficient technology advances

Employer Type: Private Firms

Related Careers:

1. Carpenter

Green building project installation & operations

HVAC Maintenance/Repair Trainee

Description: Install and maintain heating, ventilation, and air conditioning equipment, tests and repair environmental systems and repair or replace sealants, parts, and components.

Salary: \$15 - \$20/hour

Min. Educational Req.: HS Diploma/GED

Experience Needed: Entry level

Growth Potential: EDD predicts 2,500 new HVAC and refrigeration mechanic and installer jobs by 2016

Employer Type: Private Firms, Power Plants/Facilities

Related Careers:

1. HVAC Technician
2. HVAC Engineer

Machinist

Description: Make precision metal or plastic parts, operate computer numerically controlled machine tools, and set up and operate all of the basic machine tools and many specialized variations

Salary: \$12 - \$21/hour

Min. Educational Req.: Apprenticeship or Trade School

Recommended College Coursework: Metalworking, Drafting, Math and Computer courses

Experience Needed: Mid-Level
Journey level status

Growth Potential: EDD predicts 3,500 new machinist jobs by 2016

Employer Type: Power Plants/Facilities

Related Careers:

1. Welder
2. Sheet Metal Worker

Water Purification Systems Service Technician

Description: Installs and services water purification systems at customer sites, including but not limited to reverse osmosis and deionization applications

Salary: \$20 - \$23/hour

Min. Educational Req.: HS Diploma/GED

Recommended College Coursework: Chemistry, Hydrology

Experience Needed: Entry-level
2 years water industry experience; reverse osmosis, ion exchange and related equipment highly desirable (College, Military, Technical/vocational School)

Desired Education: Associate's degree in Electrical, Industrial/Mechanical Engineering or Water Treatment disciplines

Growth Potential: Growing as the need for water purification increases

Employer Type: Private Firms, Government, Power Plants/Facilities

Related Careers:

1. Hydrogeologist

Welder

Description: Operate manual, semiautomatic, and automatic arc and gas equipment, and fabricate and repair machine parts, motors, trailers and manufacturing equipment

Salary: \$12 - \$20/hour

Min. Educational Req.: Apprenticeship or Trade School

Recommended College Coursework: Welding, Machine Shop, Math, Drafting, Physics, Chemistry, and Engineering

Certification: Various certifications dealing with different materials and uses

Experience Needed: Entry to Mid-Level

Growth Potential: EDD predicts 4,200 new welding jobs by 2016

Employer Type: Private Firms, Power Plants/Facilities

Related Careers:

1. Machinist
2. Sheet Metal Worker

Building Maintenance Engineer

Description: Effectively and efficiently operate and maintain all HVAC and MEP equipment, serve as a systems operator and perform and supervise maintenance work

Salary: \$30 - \$40/hour

Min. Educational Req.: HS Diploma/GED, Trade School or Apprenticeship

Recommended College Coursework: HVAC Maintenance, Energy Auditing

Experience Needed: Entry to Mid-Level
2-3 years experience in commercial HVAC and in operating large tonnage chill plant

Growth Potential: As more HVAC and building maintenance equipment "goes green," potential for growth increases

Employer Type: Private Firms, Power Plants/Facilities

Related Careers:

1. HVAC Engineer

Carpenter

Description: Work in almost every type of construction, with jobs including reading plans, identifying and locating materials, measuring and marking, assembly and installation, and operating hand tools and power equipment.

Salary: \$17 - \$21/hour

Min. Educational Req.: Apprenticeship or Trade School

Recommended College Coursework: Math, Drafting, and Shop courses

Experience Needed: Entry to Mid-Level
Journey Level status

Growth Potential: EDD predicts carpenters will see an influx of 25,700 new jobs by 2016

Employer Type: Private Firms

Related Careers:

1. Roofers

Green building project installation & operations

Electrical System Installer

Description: Plan, lay out, install, repair, and maintain electrical equipment that provides light, heat, communications and power, and install electrical wires, cables and conduit systems

Salary: \$21 - \$27/hour

Min. Educational Req.: Apprenticeship or Trade Schools

Recommended College Coursework: Electric Installation courses

Experience Needed: Mid-Level
Journey Level status

Growth Potential: Will grow as more buildings become energy efficient

Employer Type: Private Firms, Government, Power Plants/Facilities

Related Careers:

1. Lighting Engineer

HVAC Service Technician

Description: Maintenance and repair of all types of air conditioning, heating and ventilation systems

Salary: \$24 - \$29/hour

Min. Educational Req.: Trade School, Apprenticeship, or Associate's Degree

Recommended College Coursework: HVAC controls

Certification: EPA HVAC certification
Commercial HVAC if necessary

Experience Needed: Mid-Level
2-4 years related technical experience

Growth Potential: This is one of the fastest growing sectors in the energy efficiency industry. EDD predicts 2,500 new HVAC and refrigeration mechanic and installer jobs by 2016

Employer Type: Private Firms, Power Plants/Facilities

Related Careers:

1. HVAC Engineer

Field Technician

Description: Primary duties include installation, maintenance and repair of facilities, but can also include field installations, commissioning of advanced energy management and control systems, controls programming and controls sales

Salary: \$22 - \$40/hour and higher depending on experience level

Min. Educational Req.: Trade School or Apprenticeship

Experience Needed: Entry to Mid-Level
Master or Journey level. Should have HVAC, electrical and or automation and controls installation and service experience. 1-3 years of related experience and/or training; or equivalent combination of education and experience

Growth Potential: As the efficiency sector grows so will this position

Employer Type: Private Firms, Government, Power Plants/Facilities

Related Careers:

1. Solar PV Installer
2. Energy Engineer

Roofing & Skylight Installer

Description: Install skylights and other energy efficient roof ventilation systems

Salary: \$20 - \$37/hour

Min. Educational Req.: Apprenticeship or Trade School

Recommended College Coursework: Carpentry, Roofing, Energy Efficiency

Experience Needed: High Level
5-7 years related roofing and framing experience

Growth Potential: EDD predicts 4,000 new roofing jobs by 2016

Employer Type: Private Firms, Power Plants/Facilities

Related Careers:

1. Carpenters

Green Plumber & Pipefitter

Description: Installation of sinks, tubs, and other fixtures and their connection to water and sewage systems, and maintenance of existing plumbing systems

Salary: \$28 - \$37/hour

Min. Educational Req.: Apprenticeship or Trade School

Recommended College Coursework: Plumbing, Pipefitting, Energy Efficiency

Experience Needed: Mid-Level
Journey Level status

Growth Potential: EDD predicts 6,900 new plumber and pipefitters jobs by 2016

Employer Type: Private Firms, Government

Related Careers:

1. Water Purification

Weatherization Operations Manager

Description: Manage day-to-day weatherization activities to ensure that production goals are met, and supervise the activities of Installers, Assessors and Weatherization office staff

Salary: \$71,500 - \$102,500/year

Min. Educational Req.: None Specified

Experience: High Level
2 yrs experience in construction supervision and/or management. Technical and functional skills in building trades

Growth Potential: Will grow in number with trend of weatherizations

Employer Type: Private Firms

Related Careers:

1. Construction Foreman

Energy efficiency services

Residential Energy Field Auditor

Description: Conducts home energy audits in residential homes that consist of visually checking HVAC equipment, lighting, ducts, windows and weather-stripping, and identifies areas of improvement and makes recommendations to homeowner

Salary: \$12 - \$14 / hr

Min. Educational Req.: Associate's Degree in Building Materials, Environmental Science, Environmental Studies, Energy Management

Recommended College Coursework: Environmental Studies, Energy Management, Auditing

Certification: HERS Certification

Desired Education: Bachelor's Degree preferred

Experience Needed: Entry to Mid-Level

Growth Potential: Very large potential for growth due to increased construction of energy efficient housing

Employer Type: Private Firms, Public Utilities

Related Careers:

1. Auditing Services Sales Consultant
2. Energy efficiency consultant

Auditing Services Sales Consultant

Description: Establish sales plans, prepare proposals and close client deals

Salary: \$45,000 - \$85,000/year – range due to commission

Min. Educational Req.: Bachelor's Degree

Recommended College Coursework: Marketing, Sales, Sciences

Experience Needed: Mid-Level

2-5 years experience in commercial and/or in-home sales

Growth Potential: Grows with, and helps propel, the green building industry

Employer Type: Private Firms

Related Careers:

1. Energy Conservation Representative

Commercial Energy Field Auditor

Description: Conducts energy audits in commercial businesses that consist of visually checking HVAC equipment, lighting, ducts, windows and weather-stripping to capture data for future use and identify areas of improvement and make recommendations to business

Salary: \$12 - \$14 / hr

Min. Educational Req.: Associate's Degree in Building Materials, Environmental Science, Environmental Studies, Energy Management

Recommended College Coursework: Energy Management, Building Materials

Certification: HERS Cert.

Desired Education: Bachelor's Degree preferred

Experience Needed: Entry to Mid-Level

Growth Potential: Very large potential for growth due to increased construction of energy efficient buildings

Employer Type: Private Firms, Public Utilities

Related Careers:

1. HVAC Technician
2. Energy efficiency consultant

Renewable Energy Consultant

Description: Assesses industry trends and related implications, monitors product developments and preferences, explores competitive landscapes and examines emerging technologies

Salary: Hourly rate is commensurate with experience level

Min. Educational Req.: Advanced Degree

Recommended College Coursework: Specialize in Renewable Energy, with focus on any or all technologies

Experience Needed: High Level

Growth Potential: High Demand and will grow

Employer Type: Private Firms, Government, Education

Related Careers:

1. Environmental Scientist

Industrial Energy Field Auditor

Description: Conducts energy audits of industrial areas that consist of visually checking HVAC equipment, ducts, windows and weather-stripping to capture data for future use

Salary: \$12 - \$14 / hr

Min. Educational Req.: Bachelor's Degree in Building Materials, Environmental Science, Environmental Studies, Energy Management

Recommended College Coursework: Environmental Studies, Industrial Operations

Experience Needed: Mid-Level

2 – 3 years in related field of auditing and/or energy efficiency sector

Growth Potential: Very large potential for growth due to increased construction of energy efficient housing

Employer Type: Private Firms

Related Careers:

1. Energy Engineer

Automotive operations, vehicle production, manufacturing & modification

Automotive Plant Assembly

Description: Installs various filters to diesel powered vehicles

Salary: Varies with experience

Min. Educational Req.: HS Diploma/GED

Recommended College Coursework: Diesel Retrofit, Engine Design

Experience Needed: Entry Level

Desired Education: Trade School or Apprenticeship

Growth Potential: EDD predicts 11,200 new automotive service technician and mechanic jobs by 2016

Employer Type: Private Firms

Related Careers:

1. Diesel Retrofit Manufacturer

Diesel Retrofit Installer

Description: Installs various filters on diesel-powered vehicles

Salary: Varies with experience

Min. Educational Req.: HS Diploma/GED

Recommended College Coursework: Diesel Retrofit, Engine Design

Experience Needed: Entry Level

Desired Education: Trade School or Apprenticeship

Growth Potential: EDD predicts 3,700 new jobs dealing with diesel engines by 2016

Employer Type: Private Firms

Related Careers:

1. Diesel Retrofit Manufacturer

Diesel Retrofit Manufacturer Plant Labor

Description: Manufacturers diesel particulate filters as well as other retrofitting technology

Salary: Commensurate with other manufacturing sector positions

Min. Educational Req.: Trade School or Apprenticeship

Recommended College Coursework: Diesel Engines, Air Quality, Auto Manufacturing

Experience Needed: Entry to Mid-Level

Growth Potential: EDD predicts 3,700 new jobs dealing with diesel engines by 2016

Employer Type: Private Firms

Related Careers:

1. Diesel Retrofit Installer

Electric Vehicle Electrician

Description: Support project planning and design implementation for electrical vehicle projects, and install dedicated circuits needed to support high current charging systems

Salary: \$22 - \$26/hour

Min. Educational Req.: HS Diploma/GED

Experience Needed: Mid to High Level
5-10 years experience including old and new aspects of electrical installations

Desired Education: Bachelor's of Science or C10

Growth Potential: The number of electric vehicle maintenance and development personnel will grow as electric vehicle technology adoption expands

Employer Type: Power Plants/Facilities

Related Careers:

1. Hybrid Powertrain Development Engineer

Hybrid Powertrain Development Engineer

Description: Develops powertrain designs including components and sub-systems, performs complex design analysis, creates specifications and conducts calibration for alternative fuel and hybrid powertrains

Salary: Comparable to other engineering classes, though variable with experience level

Min. Educational Req.: Bachelor's Degree in Electrical or Mechanical Engineering or related field

Recommended College Coursework: Must have knowledge of powertrain technology, vehicle engineering, development, certification, OEM calibration, alternative fuels calibration and hybrid powertrain development

Experience Needed: Entry to Mid-Level
Up to 5 years experience in auto engineering and powertrain controls

Growth Potential: Increase alongside the hybrid automotive sector

Employer Type: Power Plants/Facilities

Related Careers:

1. Automotive Power Electronics Engineer
2. Powertrain Control Systems & Software Engineer

Powertrain Control Systems & Software Engineer

Description: Design and release powertrain control systems software into embedded automotive powertrain controllers, including hydrogen internal combustion, hybrid electric and fuel cell applications

Salary: Comparable to other engineering classes, though variable with experience level

Min. Educational Req.: Bachelor's Degree in Electrical or Mechanical Engineering

Recommended College Coursework: Engineering, Computer Software, Automotive, Alternative Fuels

Experience Needed: Mid to High Level
2-5 years embedded control software development and assembly experience. Also automotive or hybrid experience

Growth Potential: Huge potential for growth as alternative fuel technology expands

Employer Type: Power Plants/Facilities

Related Careers:

1. Hybrid Powertrain Development Engineer
2. Automotive Power Electronics Engineer

Automotive operations, vehicle production, manufacturing & modification

Air Pollution Specialist

Description: Investigates local government and land use activities, develops protocols for estimating greenhouse gas emissions, develops community GHG inventories and evaluates GHG reduction benefits from green buildings.

Salary: \$64,000 - \$74,000/year

Min. Educational Req.: Bachelor's degree in Chemistry, Chemical Engineering, or a Physical Science

Recommended College Coursework: Climate Change, Emissions accounting methods, Green Building, Chemistry

Experience Needed: Mid to High Level

Growth potential: EDD predicts 2,600 new environmental specialists and scientists by 2016

Employer Type: Private Firms, Government

Related Careers:

1. Air Resources Engineer

Senior Automotive Power Electronics Engineer

Description: Responsible for development of controls for electric traction motors and power electronics for hybrid and electric vehicle applications

Salary: Comparable to other senior level engineering jobs

Min. Educational Req.: Bachelor's Degree in Engineering

Recommended College Coursework: Engineering, Alternative Fuels, Electronic controls

Experience Needed: High Level
10 years experience of both automotive engineering and motor/power electronics controls

Growth Potential: Increase in alternative will drive increased specialization and higher demand for these jobs

Employer Type: Plants/Facilities

Related Careers:

1. Diesel Retrofit Designer

Diesel Retrofit Designer

Description: Designs and develops diesel retrofitting technology to produce cleaner burning engines

Salary: Comparable to engineering jobs

Min. Educational Req.: Master's Degree in Engineering

Recommended College Coursework: Engine Design, Catalytic Converters, Diesel Retrofit

Experience Needed: High Level

Desired Education: PhD

Growth Potential: EDD predicts 3,700 new jobs dealing with diesel engines by 2016

Employer Type: Private Firms

Related Careers:

1. Automotive Power Electronics Engineer

Efficient mass transit vehicle operations

Bus System Operator

Description: Transport passengers around scheduled routes, usually within urban areas

Salary: \$11 - \$17/hour

Min. Educational Req.: None required

Certification: California Class B Driver's License

Experience Needed: Entry Level

Desired Education: HS Diploma/GED

Growth Potential: EDD predicts 8,300 new jobs for bus drivers and transit workers by 2016

Employer Type: Private Firms, Government

Related Careers:

1. Train Operator

Train System Operator

Description: Work as a train conductor or train system engineer

Salary: \$20 - \$24/hour

Min. Educational Req.: HS Diploma/GED

Experience Needed: Entry Level
While there is training provided for conducting and engineering positions all personnel start entry level as yard workers

Growth Potential: EDD predicts the rail transportation industry will see 1,200 new jobs by 2016

Employer Type: Private Firm, Government

Related Careers:

1. Shipyard Operator

Electric Shipyard Operator

Description: Manage operations on an electrified port

Salary: \$20 - \$24/hour

Min. Educational Req.: HS Diploma/GED

Recommended College Coursework:

Experience Needed: Entry Level

While there is training provided for operations and engineering positions, most personnel start entry level as yard workers

Growth Potential: Good potential for growth

Employer Type: Private Firms, Government

Related Careers:

1. Rail Systems Operator,
2. Crane Operator

Biofuel production facilities operations & management

Biofuel Plant Operations Engineer

Description: Collects and processes information on well-field and plant performance, diagnoses well problems and designs procedures to fix them

Salary: \$70,000 - \$80,000/year

Min. Educational Req.: Bachelor's degree or higher in Engineering

Recommended College Coursework: Resource/ Petroleum Engineering, Computer Programming,

Certification: Professional Engineer (P.E.)

Experience Needed: High Level
15 years experience in geothermal resource engineering as well as petroleum engineering

Growth Potential: EDD projects 3,000 new plant and system operators by 2016

Employer Type: Private Firms, Government, Power Plants/Facilities

Related Careers:

1. Mechanical Engineering
2. Power Generation Development

Alternative Fuels Policy Analysts & Business Sales

Description: Stay on top of alternative fuel legislation and the renewable energy credits market, coordinate with partners in sales and project implementation and help market alternative fuels to consumers

Salary: \$60,000/year

Min. Educational Req.: Bachelor's Degree

Recommended College Coursework: Marketing & Sales, Economics, Environmental Studies, Alternative Fuels

Experience Needed: Mid-Level
3-5 years experience in business-to-business sales

Growth Potential: Both analyst and sales jobs will increase as alternative fuel technologies expand

Employer Type: Private Firms, Plants/Facilities

Related Careers:

1. Solar Sales
2. Policy Analyst

Biodiesel/Biofuel Plant Field Technician

Description: Maintenance of plant including pump maintenance, safety inspections, record keeping and any other required repairs or maintenance, and performs basic titration, measurements using scales and liquid measuring devices and other lab tests

Salary: Expected to be similar to operations and maintenance personnel at other facilities

Min. Educational Req.: HS Diploma/GED with experience or if none, Trade School or 30 semester hours

Recommended College Coursework: Chemistry, Plant Operations, Metal Fabrication, Industrial Safety and Health

Certification: Welding Cert. desired

Experience Needed: Entry Level
Up to 2 years at production facility

Growth Potential: Will grow alongside biodiesel/biofuel production facilities. EDD projects 1,600 new industrial engineering technicians by 2016

Employer Type: Power Plants/Facilities

Related Careers:

1. Biofuel Technology & Product Development Manager

Civil Engineer

Agriculture/Irrigation/Water Supply

Description: Engineers commercial agricultural operations, and works with irrigation, water supply and other farm systems

Salary: \$80,000 - \$120,000/year

Min. Educational Req.: Bachelor's Degree in Agricultural or Civil Engineering.

Recommended College Coursework: Civil Engineering, Biofuels, Chemical Engineering, Agriculture

Desired Education: Graduate Degree preferred

Experience Needed: High Level
Minimum 5 years work experience in design, construction and operations of large agricultural systems

Growth Potential: EDD predicts 5,000 new jobs in civil engineering by 2016

Employer Type: Power Plants/Facilities

Related Careers:

1. Wastewater Engineer

Biodiesel/Biofuel Technology & Product Development Manager

Description: Define, plan and execute research programs that evaluate alternative feedstock and process technologies for biodiesel/biofuel and have near-term commercial potential

Salary: Varies highly based on experience

Min. Educational Req.: Bachelor's Degree in Chemistry, Engineering, or Biology

Recommended College Coursework: Chemistry, Alternative Fuels, Engineering, Fuel Production

Experience Needed: Mid-Level
2-5 years of development and commercialization experience

Growth Potential: Grows alongside the biodiesel/biofuel technology sector

Employer Type: Power Plants/Facilities

Related Careers:

1. Biodiesel/Biofuel Plant Operator

Transportation systems design

Program Manager Environmental Construction

Description: Planning, staffing, schedule, budget, quality control, safety and coordination of subcontractors and internal support staff for environmental construction projects, with the direction and supervision of more senior staff as required

Salary: \$72,000 - \$85,000/year

Min. Educational Req.: Bachelor's Degree in Engineering

Recommended College Coursework: Civil Engineering, Environmental Construction

Experience Needed: High Level
15 years related experience

Growth Potential: EDD predicts the construction management sector will grow by 10,300 jobs by 2016

Employer Type: Private Firms, Government

Related Careers:

1. Civil Engineer

Environmental Planner

Description: Assist in a wide range of projects including environmental impact reports, environmental impact statements, land use planning and environmental permit process

Salary: \$30 - \$37/hour

Min. Educational Req.: Bachelor's Degree in Environmental Studies or Environmental Science

Recommended College Coursework: Social Science, Urban and Rural Land Use, Socioeconomics, Environmental Studies

Desired Education: Master's Degree

Experience Needed: Mid to High Level
3-4 years experience in related science or planning field

Growth Potential: Great potential for growth

Employer Type: Private Firms, Government

Related Careers:

1. Urban Planner
2. Restoration Planner

Urban Planner

Description: Develops short and long term comprehensive plans and programs for development, growth, revitalization and utilization of land and physical facilities of cities, counties and metropolitan areas to maximize quality of life for the community and its residents

Salary: \$25 - \$35/hour

Min. Educational Req.: Bachelor's degree in Urban Planning, Civil Engineering or related field

Recommended College Coursework: Civil Engineering, Urban Planning, Land Use.

Experience Needed: Mid to High Level
Experience in planning and development

Growth potential: Huge potential for growth as we become more aware of our impact on the environment

Employer Type: Private Firms, Government

Related Careers:

1. Urban Renewal Manager
2. Civil Engineer

Civil Engineer

Description: Deals with the design, construction and maintenance of the physical and naturally built environment, including works such as bridges and roads

Salary: \$73,000 - \$84,000

Min. Educational Req.: Bachelor's degree in Civil Engineering

Recommended College Coursework: Engineering, Land Use, Green Building

Certification: Professional Engineer (PE) or Engineer in Training (E.I.T.)

Desired Education: Master's Degree

Experience Needed: High Level
Most projects expect 2 - 5 years of experience

Growth potential: EDD predicts 5,000 new jobs for civil engineers by 2016

Employer Type: Private Firms, Government

Related Careers:

1. Energy Efficient Engineer

Environmental Engineering Manager

Description: Develops and coordinates environmental control activities including air and water quality and land conservation policies, and evaluates hazards within the facility for environmental risks

Salary: \$62,400 - \$82,900

Min. Educational Req.: Bachelor's Degree in related field

Recommended College Coursework: Environmental Engineering

Experience Needed: Mid-Level
A combination of over 4 years of directly related training and/or experience is required

Growth Potential: EDD predicts environmental engineering field will grow by 1,200 jobs by 2016

Employer Type: Private Firms, Government, Power Plants/Facilities

Related Careers:

1. Environmental Engineer
2. Energy Engineer

Energy Infrastructure Engineer

Description: Specializes in Transit/Rail, Highways and Bridges, Mine, Airports, and Energy Infrastructure Engineering

Salary: \$77,000 - \$91,000/year

Min. Educational Req.: Bachelor's degree in Mechanical Engineering

Recommended College Coursework: Mechanical and Electrical Engineering, Infrastructure development

Certification: Certified Energy Manager (CEM), Professional Engineer License (PE)

Experience Needed: High Level
4-10 years of experience in energy management/engineering and a strong HVAC background.

Growth Potential: Huge potential for growth as our infrastructure becomes more efficiently engineered

Employer Type: Private Firms, Government

Related Careers:

1. Mechanical Engineer

Transportations systems design

Environmental Engineer

Description: Plans, designs, and oversees construction and maintenance of structures and facilities, such as roads, railroads, airports, bridges, harbors, channels, dams, irrigation projects, pipelines, power plants, water and sewage systems, and waste disposal units to solve environmental problems. Determines sources and methods of controlling pollutants in air, water, and soil

Salary: \$21- \$31/hour

Min. Educational Req.: Bachelor's Degree in Environmental Engineering

Recommended College Coursework: Science, Chemistry, Engineering

Certification: E.I.T. – Engineer In Training – passed the National Council of Examiners for Engineering and Surveying (NCEES) 8 hr Fundamentals of Engineering (FE) exam

Experience Needed: Mid to High Level

Growth Potential: EDD predicts 1,200 new environmental engineering jobs by 2016

Employer Type: Private Firms, Government, Power Plants/Facilities

Related Careers:

1. Environmental Scientist
2. Energy Engineer

Climate change adaptation & climate studies

Environmental Sampling Technician

Description: Receive, check, log, bottle and ship samples, and analyze the samples for trace level organic, inorganic, radiological contaminants and air emissions

Salary: \$16 - \$22/hour

Min. Educational Req.: HS Diploma/GED

Recommended College Coursework: Sciences, Environmental Studies

Certification Programs: OSHA 40 hr. HAZWOPER training is a plus but all OSHA compliance training is usually provided without charge

Experience Needed: Entry Level
Non-degreed must demonstrate basic lab operational proficiency

Desired Education: Bachelor's of Science degree preferred, Environmental Lab experience a plus

Growth Potential: Increased demand as research and environmental sampling needs expand

Employer Type: Private Firms, Government, Power Plants/Facilities

Related Careers:

1. Environmental Scientist

Environmental Scientist

Description: Conducts research to identify and abate/eliminate sources of pollutants that affect people, wildlife and their environments. Collects and synthesizes data derived from pollution emission measurements, atmospheric monitoring, meteorological and mineralogical information and soil or water samples. Analyzes data to assess pollution problems, establishes standards and develops pollution control programs

Salary: \$65,000 - \$85,000/year

Min. Educational Req.: Bachelor's degree in scientific or engineering disciplines.

Recommended College Coursework: Advanced study in Environmental Sciences

Experience Needed: High Level

Desired Education: Master's or PhD

Growth Potential: Extremely high growth sector

Employer Type: Private Firms, Government, Treatment Plants/Facilities

Related Careers:

1. Hydrogeologist

Climatologist

Description: Conducts climate change research and data analysis. Collects and synthesizes data derived from pollution emission measurements, atmospheric monitoring, meteorological and mineralogical information, and soil or water samples

Salary: \$65,000 - \$85,000/year

Min. Educational Req.: Bachelor's degree in scientific or engineering discipline

Recommended College Coursework: Advanced study in Environmental Sciences

Experience Needed: High Level

Desired Education: Master's or PhD

Growth Potential: EDD predicts 25% growth in atmospheric, earth, marine, and space science teachers by 2016

Employer Type: Private Firms, Government, Treatment Plants/Facilities

Related Careers:

1. Environmental Engineer

Environmental Engineer/Scientist Internship

Description: Support project managers and air quality staff in conducting projects, including emissions inventories and environmental assessments, for private and public clients

Salary: Nominal or School Credit

Min. Educational Req.: 1-2 years of college coursework Pursuing a Bachelors degree in Engineering (Environmental, Chemical, or Civil) or Sciences (Chemistry, Physics, or Biology)

Recommended College Coursework: Science, Chemistry, Environment Sciences, Engineering

Experience Needed: Internship
Experience generating Excel reports and graphs

Growth Potential: EDD predicts 1,200 new environmental engineering jobs by 2016

Employer Type: Private Firms, Power Plants/Facilities

Government conservation management

Biologist – Marine/Fisheries

Description: Plan and conduct evaluations of factors affecting California's fish populations and provide oversight of fisheries monitoring programs

Salary: \$25 - \$32/hour

Min. Educational Req.: Bachelor's degree in Biology or related field

Recommended College Coursework: Biology, Marine Biology

Experience Needed: Mid to High Level

Growth potential: Huge potential for growth

Employer Type: Private Firms

Related Careers:

1. Environmental Scientist

GIS Specialist

Description: Experienced Engineer with GIS training. Develop and use advanced Geographic Information Systems methodologies and customized software applications in the fields of floodplain analysis, storm water management, surface water quality and wetland migration banking and restoration

Salary: \$46,000 - \$57,000/year

Min. Educational Req.: Bachelor's Degree in Geography

Recommended College Coursework: GIS courses, Water/Wastewater Treatment

Experience Needed: High Level
5-7 years in related field

Growth Potential: EDD projects 500 new jobs in mapping and surveying by 2016

Employer Type: Private Firms, Government, Power Plant/Facilities

Related Careers

1. Environmental Engineer
2. Restoration Planner

Water Resource Engineer

Description: Preparation of environmental documentation for water resources, regulatory program compliance, data management and analysis and field work (e.g., compliance monitoring and site reviews)

Salary: \$65,000 - \$74,000/year

Min. Educational Req.: Bachelor's Degree in Environmental Science/Studies, Engineering, Chemistry, Hydrology, or related field

Recommended College Coursework: Hydrology, Stormwater, Wastewater, Environmental Studies/ Sciences

Experience Needed: High Level
Experience in water quality compliance, permitting, and associated technical document preparation

Growth Potential: Huge potential for growth as our water resources are examined

Employer Type: Private Firms, Government

Related Careers:

1. Policy Analyst & Advocate

Engineering Geologist

Description: Conduct geologic field investigations on a wide range of public and private projects involving seismic evaluations, landslides, and subsurface soil, rock and water conditions for dams, buildings, water and waste water treatment facilities, transportation projects and remedial actions

Salary: \$31 - \$37/hour

Min. Educational Req.: Bachelor's Degree in Engineering Geology

Recommended College Coursework: Soil, Soil Gas, Groundwater, Environmental Studies, Engineering, Waste Management

Certification: Engineering Geologist (EG) Cert., OSHA 40-hour HAZWOPER training desirable

Experience Needed: High Level
Minimum 5 years experience as an engineering geologist

Desired Education: Master's Degree in EG

Growth Potential: Huge potential for growth

Employer Type: Private Firms, Government

Related Careers:

1. Soil Conservationist

Environmental Research Manager

Description: Analyze data to interpret correlation between property development and physical or health hazards, and prepare reports for city, state and federal authorities for permits

Salary: \$40/hour

Min. Educational Req.: Master's Degree in Chemical Engineering or Chemistry, Environmental Science, Atmospheric Science

Recommended College Coursework: Chemical Engineering, Chemistry, Policy, Public Health

Experience Needed: High Level

Growth Potential: Great potential for growth as we analyze our impact on the environment

Employer Type: Private Firms, Government

Related Careers:

1. Environmental Scientist

Urban Planner

Description: Develops short and long term comprehensive plans and programs for development, growth, revitalization and utilization of land and physical facilities of cities, counties and metropolitan areas to maximize quality of life for the community and its residents

Salary: \$25 - \$35/hour

Min. Educational Req.: Bachelor's degree in Urban Planning, Civil Engineering or related field

Recommended College Coursework: Civil Engineering, Urban Planning, Land Use.

Experience Needed: Mid to High Level
Experience in planning and development

Growth potential: Huge potential for growth as we become more aware of our impact on the environment

Employer Type: Private Firms, Government

Related Careers:

1. Urban Renewal Manager
2. Civil Engineer

Government conservation management, pollution prevention & energy management

Urban Renewal Manager

Description: Recommends governmental measures affecting land use, public utilities, community facilities and housing and transportation to control and guide community development and urban renewal

Salary: \$73,200 - \$89,200/year

Min. Educational Req.: Master's degree in Urban Planning, Civil Engineering, Environmental Studies or related field

Recommended College Coursework: Civil Engineering, Urban Planning, Land Use

Experience Needed: High Level
Experience in Urban Planning

Growth potential: Huge potential for growth as we become more aware of our impact on the environment

Employer Type: Private Firms, Government

Related Careers:

1. Civil Engineer
2. Urban Planner

Air Quality Specialist & Enforcement Officer

Description: Provides expertise on subject matter to help identify and resolve air quality issues, and assesses pollution control technologies for achieving air emissions compliance

Salary: \$30 - \$37/hour

Min. Educational Req.: Bachelor's degree in Engineering, Science or related field

Recommended College Coursework: Engineering, Chemistry, Climate & Air, Pollution Control, State and Federal Air Quality Standards, Environmental Science

Experience Needed: Entry to Mid-Level
Minimum 1 to 2 years of experience in air quality/environmental issues

Certifications: Desired: CHMM, REA, AHERA, CPEA, REHS, HZWOPR

Growth potential: EDD predicts 2,600 new environmental scientists and specialists by 2016

Employer Type: Private Firms, Government, Power Plants/Facilities

Related Careers:

1. Renewable Energy Consultant
2. Environmental Scientist

Conservation of Resources Commissioner

Description: Directs conservation of natural resources within state and negotiates with interested parties to promote maximum utilization of resources consistent with public interest. Establishes standards for resource depletion, such as annual oil production quotas or limitations on extraction of iron ore deposits

Salary: \$82,900 - \$113,500/year

Min. Educational Req.: Advanced Degree

Recommended College Coursework: Public Policy, Environmental Studies, Natural Resources

Experience Needed: High Level

Growth potential: Low growth rate since this is a high level job

Employer Type: Government

Related Careers:

1. Policy Analyst

Air Emissions Permit Engineer

Description: Provides expertise on emissions permitting for greenhouse gases and pollution control equipment

Salary: \$30 - \$40/hour

Min. Educational Req.: Bachelor's degree in Engineering, Science or related field

Recommended College Coursework: Engineering, Chemistry, Climate & Air, Pollution Control, State and Federal Air Quality Standards, Environmental Science

Experience Needed: High Level
Minimum 4 years of progressively more responsible experience in air quality/environmental issues

Certifications: Desired: PE, RG, CHMM, REA, AHERA, CPEA, REHS, HZWOPR

Growth potential: As standards change there will be a greater demand for specialists will arise.

Employer Type: Private Firms, Government, Power Plants/Facilities

Related Careers:

1. Renewable Energy Consultant
2. Environmental Scientist

Chemist

Description: Performs various testing and analysis on chemical compounds, from air toxics to biofuels

Salary: \$65,000 - \$74,000/year

Min. Educational Req.: Bachelor's Degree in Chemistry

Recommended College Coursework: Chemistry, Organic Chemistry, Chemical Engineering

Experience Needed: High Level
2-5 years lab experience

Desired Education: Master's or PhD

Growth Potential: Huge potential for growth as technology advances

Employer Type: Private Firms, Governments, Power Plants/Facilities

Related Careers:

1. Biologist
2. Environmental Scientist

Power System Operator & Instructor

Description: Operates power distribution systems, and designs, reviews, evaluates and conducts NERC Continuous Education training to Power Systems Operations control room personnel

Salary: \$25 - \$30/hour

Min. Educational Req.: HS Diploma/GED

Certification: NERC Reliability Authority or System Operator Certification

Experience Needed: High Level
10 years of progressively responsible work experience with 5 years in control room operations and 3 years as a Senior Shift Power System Operator

Growth Potential: EDD predicts 3,000 new jobs in plant and system operations by 2016

Employer Type: Government, Power Plants/Facilities

Government programs management

Economist

Description: Conduct primary and secondary research to support the formulation of analytical solutions, the development of economic models and the interpretation of results in the areas of transportation, the environment, energy, economic development and finance.

Salary: \$74,000 - \$87,000/year

Min. Educational Req.: Bachelor's Degree in Economics

Recommended College Coursework: Economics, Environmental Studies, Energy Efficiency

Experience Needed: High Level
Experience in conceptualizing and developing economic or business models using analytical methods

Desired Education: Master's Degree

Growth Potential: Large potential for growth as competition for innovation in green industries increases

Employer Type: Private Firms

Related Careers:

1. Top Environmental Officer

Greenhouse Gas Emissions Permitting Consultant

Description: Conduct data gathering, data analysis, calculation, inventories and reduction planning, and be familiar with emerging regulations on greenhouse gas management

Salary: Commensurate with Experience

Min. Educational Req.: Bachelor's Degree in Engineering or Science

Recommended College Coursework: Environmental Studies, Policy, Engineering

Experience Needed: Mid to High Level
2-5 years experience in energy management and efficiency, air pollutant inventories and permitting, and/or greenhouse gas inventories and management

Desired Education: Master's Degree

Growth Potential: Huge potential for growth as we increase regulations of GHG emissions

Employer Type: Private Firms, Government

Related Careers:

1. Air Quality Control Engineer

Environmental consulting & research

Environmental Technician

Description: Develops methods and devices used in the prevention, control and correction of environmental hazards. Work is highly specialized (e.g., collect water samples from streams and lakes, raw, semi-processed or processed water, industrial waste water, or water from other sources to assess pollution problems)

Salary: \$40,000 - \$53,000/year

Min. Educational Req.: Associate's degree in an Engineering technology

Recommended College Coursework: Environmental science, Engineering, Mathematics or Chemistry

Experience: Mid-Level

Growth Potential: EDD predicts 1,000 new environmental technician jobs by 2016

Employer Type: Private Firms, Government, Power Plants/Facilities

Related Careers:

1. Environmental Scientist
2. Environmental Engineer

Air Pollution Specialist

Description: Investigates local government and land use activities, develops protocols for estimating greenhouse gas emissions, develops community GHG inventories and evaluates GHG reduction benefits from green buildings

Salary: \$64,000 - \$74,000/year

Min. Educational Req.: Bachelor's degree in Chemistry, Chemical Engineering, or a Physical Science.

Recommended College Coursework: Climate Change, Emissions Accounting, Green Building, Chemistry

Experience Needed: Mid to High Level

Growth potential: EDD predicts 2,600 new environmental scientist and specialist jobs by 2016

Employer Type: Private Firm, Government

Related Careers:

1. Air Resources Engineer

Air Quality Control Engineer

Description: Conduct air quality analyses and permitting efforts and implement environmental compliance management systems and processes

Salary: \$80,000 - \$120,000/year

Min. Educational Req.: Bachelor's degree in Chemical Engineering or a technical discipline

Recommended College Coursework: Chemistry, Chemical Engineering, Engineering, Air Quality/Pollution

Experience Needed: High Level
Minimum 5 years experience in air permitting plus knowledge of federal/state environmental programs

Growth Potential: Great potential for growth as air quality standards change

Employer Type: Private Firms, Government, Power Plants/Facilities

Related Careers:

1. Air Quality Specialist

Air Resource Engineer

Description: Develop control measures and other strategies to reduce emissions of greenhouse gases from stationary and mobile sources

Salary: \$72,000 - \$85,000/year

Min. Educational Req.: Bachelor's Degree in Engineering

Recommended College Coursework: Engineering, Climate Change, Air Quality, Emissions, Clean Air Technology

Experience Needed: Mid to High Level

Growth potential: Great potential for growth

Employer Type: Private Firms, Government

Related Careers:

1. Air Pollution Specialist

Environmental consulting & research

Greenhouse Gas Emissions Report Verifier

Description: Conduct data audits of reported greenhouse gas emissions inventories

Salary: \$50,000 and up

Min. Educational Req.: Bachelor's Degree in Engineering or Science

Recommended College Coursework: Environmental Studies, Policy, Engineering

Experience Needed: Mid to High Level
2-5 years experience in energy management and efficiency, air pollutant inventories and permitting and/or greenhouse gas inventories and management

Desired Education: Master's Degree

Growth Potential: Large potential for growth as GHG reporting and verification protocols are implemented

Employer Type: Private Firms, Government

Related Careers:

1. Air Quality Control Engineer

Senior Environmental Consultant

Description: Manage all compliance requirements during pre-construction, construction and commercial operation phases of project, including environmental and building requirements

Salary: \$78,000 - \$93,000/year

Min. Educational Req.: Bachelor's Degree in Environmental Science, Engineering, Chemistry, Biology or related field

Recommended College Coursework: Environmental Sciences, Natural Science, Engineering

Experience Needed: Mid to High Level
Minimum 3 years regulatory compliance experience at power plants, industrial or construction sites

Growth potential: As new building standards are developed, the need for this job will grow

Employer Type: Private Firms, Power Plants/Facilities

Related Careers:

1. Renewable Energy Consultant

Water Quality Consultant - Water/Wastewater Engineer

Description: Deal with issues surrounding water quality discharge permitting

Salary: \$72,000 - \$92,000/year

Min. Educational Req.: Bachelor of Science in related field

Recommended College Coursework: Hydrology, Wastewater, Engineering, Permitting, Land Use

Experience Needed: High Level
3-5 years experience with water quality issues.

Desired Education: Master's Degree, Professional Engineer (P.E.)

Growth potential: EDD predicts 2,600 new environmental scientist and specialist jobs by 2016

Employer Type: Private Firms, Government

Related Careers:

1. Wastewater Treatment

Waste Reduction Consultants/ Energy Efficiency Experts

Description: Environmental consultant to design, implement and monitor a variety of commercial and municipal programs that include energy efficiency, waste prevention, recycling, construction & demolition, household hazardous waste, illegal hauling and used oil programs

Salary: \$60,000 - \$80,000/year

Min. Educational Req.: Bachelor's Degree in Waste Management and/or Energy Efficiency

Recommended College Coursework: Waste Reduction, Environmental Studies, Recycling

Experience Needed: High Level
5-7 years in related experience

Desired Education: Master's Degree or PhD

Growth Potential: Will grow exponentially alongside waste reduction management

Employer Type: Private Firms

Related Careers:

1. Environmental Consultant

Water Resource Consultant

Description: Deals with broader issues of water management and discharge, including flooding, ecosystem needs, distributions and marketing

Salary: \$72,000 - \$92,000/year

Min. Educational Req.: Bachelor of Science in related field.

Recommended College Coursework: Environmental Science, Hydrology, Wastewater, Engineering, Permitting, Land Use

Experience Needed: High Level
3-5 years experience with water quality issues

Desired Education: Master's Degree,

Growth potential: EDD predicts 2,600 new environmental scientist and specialist jobs by 2016

Employer Type: Private Firms, Government

Related Careers:

1. Water Resource Engineer

Renewable Energy Consultant

Description: Assessing industry trends and related implications, monitoring product developments and preferences, exploring competitive landscapes and examining emerging technologies.

Salary: Consultant establishes hourly rate

Min. Educational Req.: Advanced Degree

Recommended College Coursework: Specialize in Renewable Energy, with focus on one or all technologies

Experience Needed: High Level

Growth Potential: High Demand and will grow

Employer Type: Private consulting, Government, Education

Related Careers:

1. Environmental Scientist
2. Environmental Educator

Municipal waste treatment & recycling operations

Recycling Collections Driver

Description: Drives around and picks up recycling from designated locations

Salary: \$9 - \$12/hour

Min. Educational Req.: None

Experience Needed: Entry Level
Must have a driver's license

Growth Potential: EDD predicts 1,000 new jobs in refuse collections will need to be filled by 2016

Employer Type: Private firms, Government

Related Careers:

1. Recycling Center Operator

Hazardous Waste Management Specialist

Description: Conducts studies on hazardous waste management projects and provides information on treatment and containment of hazardous waste. Provides technical assistance in event of hazardous chemical spill and identifies pollutant, determines hazardous impact and recommends corrective action

Salary: \$25 - \$35/hour

Min. Educational Req.: College Degree in Chemistry or other Science

Recommended College Coursework: Analytical Chemistry, Organic Chemistry, and Physical Chemistry

Experience Needed: Mid-Level
2 years in a comprehensive environmental, health and safety program

Growth Potential: The need for waste management will increase with production

Employer Type: Private Firms, Government, Plants/Facilities

Related Careers:

1. Hazardous Materials Removal Worker
2. Nuclear Waste Management Engineer

Recycling Center Operator

Description: Performs daily operations at a Recycling Center, including materials processing and customer service, and hand sorts and separates recyclable from non-recyclable materials according to established procedures

Salary: \$11 - \$18/hour

Min. Educational Req.: None

Experience Needed: Entry Level
1 year as general laborer

Growth Potential: EDD predicts 1,000 new jobs in refuse collections will need to be filled by 2016

Employer Type: Private Firms, Government

Related Careers:

1. Recycling Collections Driver

Solid Waste (Energy) Engineer / Manager

Description: Works on solid waste projects, including planning, operations and technology development

Salary: \$76,000 - \$84,000/year

Min. Educational Req.: Bachelor's degree in Engineering or Environmental Studies

Recommended College Coursework: Engineering, Green building, Cogeneration, Auditing, Water efficiency

Certification: E.I.T. – Engineer in Training

Experience Needed: Mid to High Level
2-5 years experience in performing engineering and economic analyses for energy efficiency or solid waste management projects and/or programs

Growth Potential: Need will increase as efficiency in this sector increases

Employer Type: Private Firms, Power Plants/Facilities

Related Careers:

1. Wastewater Engineer

Hazardous Materials Removal Worker

Description: Identifies, removes, transports and disposes of various hazardous materials, including asbestos, lead and radioactive and nuclear materials

Salary: \$20 - \$25/hour

Min. Educational Req.: HS Diploma/GED

Certification Requirements: 1 – 3 months of training and licensure is required for each material to be handled

Experience Needed: Entry Level - Need Certification

Growth Potential: The need for waste management will increase with production

Employer Type: Private Firms, Government, Power Plants/Facilities

Related Careers:

1. Hazardous Waste Management Specialist
2. Nuclear Waste Management Engineer

Nuclear Waste Management Engineer

Description: Designs, implements, and tests systems and procedures to reduce volume and dispose of hazardous waste materials and contaminated objects. Oversees construction, testing and implementation of waste disposal systems and resolves operational problems

Salary: \$89,000 – \$106,000/year

Min. Educational Req.: Bachelor's degree in Nuclear Engineering or a related field

Recommended College Coursework: Engineering, Waste Management

Experience: High Level

Growth Potential: Good potential for growth as possible alternative energy industries are explored

Employer Type: Government, Power Plants/Facilities

Related Careers:

1. Hazardous Materials Removal Worker

Wastewater treatment & management

Operations Maintenance Worker for Water Services

Description: Responsible for repairing water mains, services, general maintenance and other duties

Salary: \$17 - \$22/hour

Min. Educational Req.: HS Diploma/GED

Certification Requirements: Grade II Distribution certification desired or must have or obtain Grade II Distribution cert. within 10 months

Experience Needed: Entry Level

Growth Potential: Advancement available within water/waste water treatment facility

Employer Type: Government, Power Plants/Facilities

Related Careers:

1. Wastewater Engineer

Wastewater Plant Civil Engineer

Description: Project manager for wastewater design and implementation, responsible for all facets of hydraulic modeling and pipeline design

Salary: \$74,000 - \$82,000/year

Min. Educational Req.: Bachelor's Degree in Civil Engineering

Recommended College Coursework: Civil Engineering, Mechanical Engineering, Wastewater management

Certification: Professional Engineer (P.E.)

Experience Needed: High Level
10 years experience in Civil Design

Growth Potential: EDD predicts wastewater treatment will see 1,800 new workers by 2016

Employer Type: Private Firms, Power Plants/Facilities

Related Careers:

1. Civil Engineer
2. Wastewater Plant Operator

Associate Engineer – Wastewater Treatment

Description: Evaluate and provide recommendations on renewable energy projects and assist with the development of a comprehensive energy management strategy

Salary: \$70,000 - \$84,000/one year contract

Min. Educational Req.: Bachelor's degree in Mechanical or Electrical Engineering OR equivalent combination of training and experience

Recommended College Coursework: Mechanical or Electrical Engineering, Renewable energies

Experience Needed: Mid-Level
2 years of comprehensive experience with renewable energy projects and energy procurement principles

Growth Potential: EDD predicts wastewater treatment will see 1,800 new workers by 2016

Employer Type: Power Plants/Facilities

Related Careers:

1. Energy Engineer
2. Electrical Engineer

Wastewater Engineer in Industrial Facilities

Description: Administer the stormwater/wastewater program for major industrial facilities. Manage the implementation of the Spill Prevention Control and Countermeasure Plan (SPCC) and the Stormwater Pollution Prevention Plan (SWPPP), and complete the Air Emissions Report and lead the new Greenhouse Gas Program

Salary: \$75,000 - \$100,000/year

Min. Educational Req.: Bachelor's Degree in Chemical, Petroleum, Mechanical or Environmental Engineering

Recommended College Coursework: Chemistry, Mechanical Engineering, Water/Waste Water treatment

Experience Needed: High Level
Minimum 5 years related experience

Growth Potential: EDD predicts wastewater treatment will see 1,800 new workers by 2016

Employer Type: Plants/Facilities

Related Careers:

1. Environmental Engineer
2. Waste water treatment operator

Non-profit sector

Conservation Policy Analyst & Advocate

Description: Plan and manage Conservation Programs, including program development, project implementation, budget management, fundraising and community relations, and provide high-level oversight for restoration programs

Salary: Varies with experience, \$30,000 and up

Min. Educational Req.: Bachelor's Degree in environmental studies or science, environmental policy, conservation biology or another field related to natural resources conservation

Recommended College Coursework: Environmental studies, Ecology, Natural Resources, Conservation

Experience Needed: Mid to High Level
3 years experience in wildlife conservation policy and advocacy

Growth Potential: EDD predicts 2,600 new environmental scientist and specialist jobs by 2016. Non-profit sector growth will occur as green economy matures

Other Employer Type: Private Firms

Related Careers:

1. Conservation Scientist
2. Government Analyst

Climate Change Policy Specialists & Advocate

Description: Develop and advance a policy strategy to promote the creation of a long-term price signal for the reduction of global emissions of greenhouse gases, including financial incentives to prevent deforestation and restore valuable forest habitats

Salary: Varies with experience, \$30,000 and up

Min. Educational Req.: Master's Degree in international relations, public policy, forestry, energy resource management, or related field

Recommended College Coursework: Forestry, Public Policy, Resource Management, Air Quality

Experience Needed: High Level
6 years related experience

Growth Potential: EDD predicts 2,600 new environmental scientist and specialist jobs by 2016. Non-profit sector growth will occur as green economy matures

Employer Type: Private Firms

Related Careers:

1. Policy Analyst
2. Government Analyst

Water Resource Policy Specialists & Advocate

Description: Conduct hydrogeologic and hydrologic analysis for environmental and water resources projects, including computer simulations of water resources, evaluations of how to best plan for the future availability of water resources, surface and subsurface water quality modeling, development of input values that go into water supply and water quality models, developing environmental management and decision support systems and technical report writing

Salary: Varies with experience, \$30,000 and up

Min. Educational Req.: Master's Degree in Environmental Studies, Science or Environmental Engineering

Recommended College Coursework: Environmental Studies, hydrology, Engineering

Experience Needed: High Level

Growth Potential: EDD predicts 2,600 new environmental scientist and specialist jobs by 2016. Non-profit sector growth will occur as green economy matures

Employer Type: Private Firms

Related Careers:

1. Hydrogeologist
2. Government Scientist

Green Jobs – A pathway out of poverty

“We must connect the people who need work the most with the work that most needs to be done.”

—Van Jones, Co-Founder of the Ella Baker Center for Human Rights, Founder of Green For All

As investment in the green economy has exploded in recent years, observers have noted that millions of good-paying jobs are being created across the nation in new and existing industries.⁸ With poverty, unemployment, and pollution worsening, especially in communities of color, green job opportunities that offer social and environmental solutions couldn't come at a better time. However, unless programs and policies are developed specifically to ensure that low-income people with barriers to employment are provided access to such jobs, then the growing green economy could simply replicate the social divisions of previous economic booms.

WHAT IS A GREEN-COLLAR JOB? HOW CAN THEY BENEFIT LOW-INCOME JOB SEEKERS?

According to Dr. Raquel Pinderhughes of San Francisco State University, low-income job seekers can benefit from “green-collar jobs,” which she defines as “blue collar jobs in green businesses — that is, manual labor jobs in businesses whose products and services directly improve environmental quality.”⁹ Because such jobs have low barriers to entry, they are well-suited for youth and young adults who have limited education or skills, who have been out of the labor market for awhile, or who were formerly incarcerated. Moreover, they are high quality jobs in sectors poised for dramatic growth — career-track jobs that can support families and help re-build the middle class. These features make green-collar jobs ideal for low-income men and women seeking work that pays a living wage with benefits and opportunities for advancement.

In a recent study of Bay Area green businesses, Pinderhughes identified 22 sectors that provide green-collar work, ranging from bicycle repair and public transit to renewable energy generation and energy efficiency retrofits to green landscaping and sustainable agriculture. Among the businesses she interviewed, most owners and managers said they were enthusiastic about providing low-income residents with training and green collar jobs in their firms. However, employers insisted that such candidates must be “job ready.”¹⁰

Characteristics employers are looking for in job applicants with low experience or education to show they are job ready:

- ✓ a sense of responsibility
- ✓ a strong work ethic
- ✓ basic presentation, listening, communication, and literacy skills
- ✓ consistent punctuality
- ✓ a positive attitude
- ✓ ability to work independently and as part of a team

⁸ The American Solar Energy Society estimates that in 2006 alone, renewable energy and energy efficiency were responsible for \$970 billion in industry revenues and the creation of 8.5 million jobs. Source: Roger Bezdek, *Renewable Energy and Energy Efficiency: Drivers for the 21st Century* (American Solar Energy Society, 2007).

⁹ Dr. Raquel Pinderhughes, *Green Collar Jobs: An Analysis of the Capacity of Green Businesses to Provide High Quality Jobs for Men and Women with Barriers to Employment, Executive Summary* (San Francisco State University, 2007), p. 2.

¹⁰ *Ibid*, p. 4.

Cutting edge green job training and education programs

Providing low-income people with access to green collar jobs requires strong partnerships between green employers, educational institutions and job training programs that prepare those with barriers to employment to enter the labor market. Labor unions can also play a critical role in designing curriculum and connecting qualified green jobs program graduates with opportunities in union apprenticeships and eventually union-track careers. Labor union apprenticeship programs are discussed later in the Guidebook.

In addition to vocational skills training, training programs for those with barriers to employment should offer full “wrap-around” services, including case management, soft skills and job readiness training, literacy and basic skills training. The best programs may provide stipends or other support to participants during training and will connect program participants to union apprenticeship programs or good-paying employers. Some programs will also combine on-the-job training with environmental education so that green-collar workers understand the importance of their work in supporting environmental sustainability.

The following are excellent examples of green-collar jobs training and education programs that are providing “pathways out of poverty” for California residents:

Program name, location and Internet contact information	Description of the program offering
<p>Green Ambassadors Los Angeles, CA with connections to Southern California Website: www.greenambassadors.org</p>	<p>An environmental education program that enables youth to bring change to their communities and the world. Programs include: Green Youth Coalition which links all groups in Southern California; After School/In-School community based service-learning in-action program; National Youth Summits; Green Solution Tours which bring students across the country together to talk about green issues; and Green Adventures, a global student exchange.</p>
<p>LA Infrastructure and Sustainability Jobs Collaborative Los Angeles, CA Website: http://www.lattc.edu/dept/lattc/REDI/Utility.html</p>	<p>A partnership between public, private and community partners to implement a seamless education, training and workforce infrastructure that connects low-income, disadvantaged populations to livable wage jobs with career paths within the energy-utility industry. Key partners include LA Trade Tech, the Regional Economic Development Institute, LA Dept. of Water and Power, Southern California Gas Company, LA Unified School District and IBEW Locals 11 and 18.</p>
<p>Ma'at Youth Academy Richmond, CA Website: www.maatya.org</p>	<p>A free training and education academy for youth volunteers to prepare them for participating in city planning and community outreach activities. Program participants work with local planning and environmental agencies to develop recommendations on how to improve the environmental impact of cities and buildings on the environment.</p>

Cutting edge green job training and education programs continued

Program name, location and Internet contact information	Description of the program offering
<p>Oakland Green Jobs Corps Oakland, CA Cypress-Mandela Training Center: www.cypressmandela.org Laney College: www.laney.peralta.edu</p>	<p>The Oakland Green Jobs Corps provides “green pathways out of poverty” for young adults in Oakland facing barriers to employment. The program — a partnership between Cypress Mandela Training Center, Laney College and Growth Sector — offers job-readiness training, ongoing support services and on-the-job training, enabling trainees to pursue careers in green industries.</p>
<p>Regional Technical Training Center (RTTC) Oakland, CA Website: www.rttc.us</p>	<p>Offers multiple hands-on free training programs including hazardous waste management and environmental engineering. Requires supplemental coursework for the engineering program, though job placement assistance is offered upon program completion</p>
<p>Rising Sun Energy Center and Community Youth Energy Services (CYES) Multiple Locations, San Francisco Bay Area Website: www.risingsunenergy.org/cyes.htm</p>	<p>Offers free training to volunteers ages 15 to 22 and sends them to residential homes and public shelters during the summer to perform energy audits and installation services. Students are trained in energy conservation and solar energy generation.</p>
<p>SCOPE and the Los Angeles Apollo Alliance Los Angeles, CA Website: www.scopela.org</p>	<p>Currently working to develop a Green Career Ladder Training Program to train 50 inner-city residents and place graduates in union apprenticeship programs and green jobs. Check in regularly at their website for updates.</p>
<p>Solar Richmond Richmond and Oakland, CA Website: www.solarrichmond.org Solar Living Institute: www.solarliving.org GRID Alternatives: www.gridalternatives.org RichmondBUILD: www.ci.richmond.ca.us/index.asp?NID=1243</p>	<p>A partnership with Solar Living Institute, GRID Alternatives and the city’s of Richmond’s BUILD program. Offers free job training, paid internships and job placement assistance to low-income area residents in solar installation and energy efficiency auditing.</p>
<p>YouthBuild USA Multiple Locations throughout the state Website: www.youthbuild.org</p>	<p>Offers free job training within a construction pre-apprenticeship and general education program. Participants must be 16 to 24 years old and working toward a GED or high school diploma. Participants spend 6 to 24 months in the program, dividing their time between a YouthBuild construction site and an alternative school.</p>

Green job apprenticeship programs offered by unions and utilities

WHAT IS AN APPRENTICESHIP PROGRAM?

An apprenticeship is an entry-level job that pays the employee while they learn a skilled craft or trade. Most of the job training occurs during the working hours, though classroom training may also be required. The apprentice typically works alongside a highly experienced teacher to perform jobs and installations. The duration of the apprenticeship is typically between three and five years based on the skills and trade being learned. At the start of the apprenticeship, the worker may earn between \$9 and \$14 per hour. Once completed, the apprentice-turned-craftsman can earn more than \$30 an hour.

Most apprenticeship programs are either run through a labor union, large company like an electric utility (for the purposes of placing the worker in that company), or a local college. Typically, applicants to apprenticeship programs must be 18 years of age, in good physical health, possess a high school diploma or a GED, and able to read, write, and speak English.

Formal apprenticeship programs offered by labor unions in California specialize in:

- Air conditioning & refrigeration
- Automotive
- Boiler making
- Carpentry
- Cement-masonry
- Electrician
- Heat & frost insulation
- Ironworking
- Machinists & mechanics
- Millwrights
- Operations engineering
- Plumbing
- Power Lineman
- Roofing
- Sheet metal working
- Solar turbines
- Stationary engineering
- Steam fitting

RESOURCES TO FIND APPRENTICESHIPS

Paid apprenticeship programs can be offered through local unions or directly from employers like large public utilities. Coursework required by apprenticeship programs can be taken in approved academic institutions throughout the state. The State of California Division of Apprenticeship Standards (DAS) oversees apprenticeship standards for wages, hours, working conditions and the specific skills required for state certification. More information on state-approved apprenticeship education programs can be found at: <http://www.dir.ca.gov/apprenticeship.html>.

California green job apprenticeship programs

Excellent resources to learn more about apprenticeships through local unions, trade organizations and individual companies can be found on the Internet.

APPRENTICESHIP PROGRAMS (Labor Organization and Industry Managed)	WEBSITE CONTACT INFORMATION
Building Trades	www.scbtc.org
California Apprenticeship Coordinators Association	www.calapprenticeship.org/Programs.htm
California State Apprenticeship Search Database of available apprenticeship programs by county and occupation group	www.dir.ca.gov/databases/das/aigstart.asp
Carpenters Training Academy	www.ctcnc.org
IBEW Local 11 International Brotherhood of Electrical Workers	www.ibew11.org
Fresno Electrical Apprenticeship	www.fresnojatc.org
Local 250 Air Conditioning and Refrigeration Training Center	www.HVACr-training.com
Los Angeles Electrical Training Institute	www.laett.com/apprentice.html
Millwright Apprenticeship	www.unionmillwright.com
Northern California Cement Masons Joint Apprenticeship & Training Committee	www.norcalcementmasonsapprenticeship.org
Pacific Gas and Electric Power Pathways	www.pge.com/about/careers/powerpathway
Roofers 95	www.roofer95.com
Sacramento Municipal Utility District	smud.org/careers/college.html
Sacramento Valley Sheet Metal Worker	www.sheetmetaltraining.com
San Francisco Electrical Training	www.sfelectricaltraining.org
San Francisco Sprinkler Fitters Local 483	www.sprinklerfitters483.org/apprenticeship.asp
San Diego Electrical Training Trust	www.sdett.org
Southern California Carpenters JATC	www.californiacarpenters.org
Stationary Engineer Apprenticeship	www.local39training.org
Ventura County Electrical Joint Apprenticeship Training Committee	www.ibew952.org
Western Apprenticeship Coordinators Association	www.waca-apprenticeships.org

Government sponsored green jobs placement assistance

In addition to activities by unions and non-profit organizations, green job training and placement services sponsored by federal and state government agencies offer important opportunities to connect California workers with high quality jobs. As the green economy continues to grow and more workers are needed, similar programs may emerge at the city or county level.

TRAINING & PLACEMENT SERVICES	OFFERING OF THE SERVICE
<p>California Employment Development Department Youth Employment Opportunity Program (YEOP) Multiple Locations throughout the state Website: www.edd.ca.gov/Jobs_and_Training/Services_for_Youth.htm</p>	<p>Offers special services to youth, ages 15 to 21, including peer advising, referrals to supportive services, workshops, job referrals and placement assistance and referrals to training and community outreach efforts. Programs are reached through one-stop career centers and workforce career offices located throughout the state.</p>
<p>California Employment Development Department - Training Institution Provider Listing Location: Web based tool Website: etpl.edd.ca.gov/wiaetplocc.asp</p>	<p>Offers a searchable database of over 10,000 approved training programs throughout California. Individuals can search by cost of program, whether it accepts financial aid, program location, occupation type and additional services offered.</p>
<p>California Employment Development Department Location: Offices throughout the state Workforce Services offices: www.edd.ca.gov/Jobs_and_Training/Workforce_Services_Offices One-stop career centers: www.edd.ca.gov/Jobs_and_Training/pubs/osfile.pdf</p>	<p>Workforce Services Offices and One-stop Career Centers offer in-person assistance to job seekers throughout California. Individuals can speak with EDD representatives about job placement assistance, training opportunities and education</p>
<p>East LA Skills Center Los Angeles, CA Website: elasc.adultinstruction.org</p>	<p>The Center is a full-employment preparation and training center operated by the LA Unified School District. The center serves a diverse community that includes at-risk youth and offers training courses in solar photovoltaic systems installation. Students can earn the North American Board of Certified Energy Practitioner (NABCEP) entry-level certificate — the industry standard. In addition to providing short-term vocational training, the center offers classes for a High School Diploma, and GED prep in English and Spanish.</p>
<p>Los Angeles Conservation Corps Los Angeles, CA Website: www.lacorps.org/conservation.html</p>	<p>Employs young people to provide conservation services for government agencies and private contract sponsors throughout the greater Los Angeles area.</p>
<p>United States Dept. of Labor - Job Corps Multiple locations throughout the state Website: www.jobcorps.dol.gov/centers/CA.htm</p>	<p>Offers free education, job-training and paid apprenticeship programs for multiple career types - including jobs in the energy, construction, automotive and transportation sectors - to people ages 16 to 24. Programs are reached through Job Corps offices located throughout the state. Also offers career pathways assessments for education program planning.</p>

California green job programs at academic institutions

California boasts world-class educational institutions where students can learn valuable skills that prepare them to enter the workforce. Community colleges, trade schools, 4-year universities and graduate schools all offer excellent programs to individuals looking to learn about and advance in the green economy.

A sound education that gives an individual a specialized skill set can make it easier to be hired and promoted at the company of one's choosing. Surveys have shown that employers of the new green workforce are going to be looking for educational preparation in math, science and technology, in addition to good problem solving skills and hands-on training. In addition, just as in any other field, there will always be a need for individuals with advanced training, especially at the Master's level and higher.

4-YEAR COLLEGES, UNIVERSITIES AND GRADUATE SCHOOLS

Most, if not all, four-year colleges and universities offer a wide range of basic and advanced courses within bachelor's level and higher degree programs to prepare students for the green workforce. Environmental studies and science programs have been training workers in environmental resource management fields (including energy, waste and water) for decades, and coursework in chemistry, biology, engineering, math, geology and environmental science has continued to be a main emphasis of the required curriculum. For more information on these schools and the programs they offer, a large number of resources are available on the Internet, through career services offices at high schools and colleges, or by contacting the schools directly. Due to the breadth of such coursework offerings and the limited nature of this guidebook, academic programs at 4-year institutions are not included in the Guidebook.

TRADE SCHOOLS AND PROGRAMS

California is home to many specialty schools and institutions that offer coursework tailored to meet the requirements of a specific job class or field. These programs allow students the flexibility to complete a certificate or degree program in the field of their choosing. However, students may first want to identify the type of green job they desire and specifically tailor their concentration to meet the demands of that job.

2-YEAR COMMUNITY COLLEGES

The network of over 100 California community colleges offers a diverse array of low cost two-year degree and certificate programs to prepare students for green jobs. In addition to the traditional sciences, many two-year schools offer specialty degree programs and apprenticeship programs designed to fill specific green job niches. A list of all the California community colleges with identified specialty programs beyond the traditional sciences of chemistry, biology, math, physics, geography and geology is included on the following pages.

Green job educational programs at California community colleges

COMMUNITY COLLEGE	GREEN JOB PROGRAM CONCENTRATIONS - Apprenticeship program offerings in bold
Alameda	Automotive Technology, Diesel and Truck Mechanics, Green Job Apprenticeship Programs
Allan Hancock	Civil Engineering, Natural Science
American River	Ecology, Natural Resources, Green Diesel Technology, Geographic Information Systems, Green Job Apprenticeship Programs
Antelope Valley	HVAC (Heating, Ventilation and Air Conditioning), Geographic Information Systems
Bakersfield	Environmental Engineering, Environmental Science
Barstow	Natural Resources, Green Job Apprenticeship Programs
Berkeley City College	Biotech Program focus in Physical Sciences
Butte	Civil Engineering, Ecology, Environmental Science, Hydrological Sciences, Natural Resources
College of Canyons	Natural Resources
Cerritos	Natural Resources, Green Job Apprenticeship Programs
Cerro Coso	Natural Resources
Chabot	HVAC, Green Job Apprenticeship Programs
Chaffey	Earth Sciences, Green Job Apprenticeship Programs
Citrus	HVAC, Wastewater Engineering and Operations
Columbia	Environmental Science, Watershed Restoration, Geographic Information Systems
Contra Costa	Earth Sciences
Copper Mountain	Environmental Science
Cosumnes River	Civil Engineering, Environmental Engineering, Geographic Information Systems
Crafton Hills	Environmental Science
Cuesta	Environmental Science, Natural Resources, Green Job Apprenticeship Programs
Cuyamaca	Civil Engineering, Environmental Engineering, Environmental Science, Wastewater
Cypress	HVAC, Geographic Information Systems
De Anza	Ecology, Pollution Prevention
College of Desert	Ecology, HVAC, Environmental Science
Diablo Valley	Geographic Information Systems, Alternate Energy Technology program, Green Job Apprenticeship Programs
El Camino	Horticulture, HVAC, Environmental Science
Evergreen Valley	Civil Engineering
Feather River	Environmental Science, Natural Resources
Foothill	Horticulture, Environmental Science, Geographic Information Systems, Green Job Apprenticeship Programs
Fresno City	HVAC and Industrial Electronics, Green Job Apprenticeship Programs

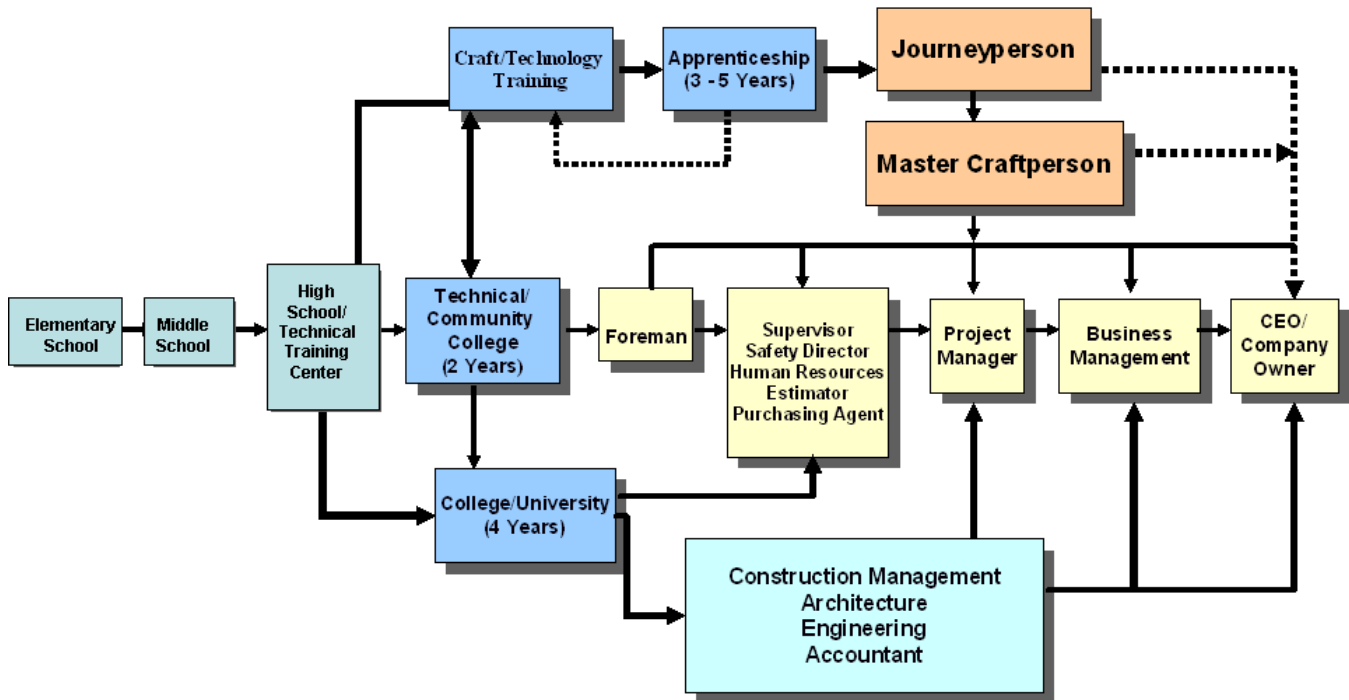
COMMUNITY COLLEGE	GREEN JOB PROGRAM CONCENTRATIONS - Apprenticeship program offerings in bold
Fullerton	Environmental Technology, Environmental Science
Golden West	Environmental Technology
Grossmont	Hydrology
Imperial Valley	Industrial Electronics, Wastewater Engineering and Operations, Green Job Apprenticeship Programs
Laney	Architectural & Engineering Technology, HVAC and Refrigeration (Environmental Control Technician), Construction Management, Carpentry, Welding, Machine Technology, Physical Sciences, Electricity & Electronics, Green Job Apprenticeship Programs
Las Positas	Occupational Health And Safety
Long Beach City	Alternative Fuels, HVAC, Green Job Apprenticeship Programs
Los Angeles Pierce	Nursery Technician, Horticulture, Natural Resources, Green Job Apprenticeship Programs
Los Angeles Trade-Tech	Diesel Technology, Solid Waste Operations, HVAC, Wastewater Engineering and Operations, Geographic Information Systems, Green Job Apprenticeship Programs
Los Angeles Valley	Industrial Operations and Manufacturing, Earth Sciences
Los Angeles Medanos	Appliance Repair, Environmental Science, Green Job Apprenticeship Programs
Los Medanos College	Electrical and Electronic Technology, Environmental Science, Welding Technology, Physical Sciences
College of Marin	Civil Engineering, Environmental Landscaping, Natural Resources
Medocino	Horticulture, Earth Sciences, Natural Resources
Merced	Agricultural Science, Horticulture, HVAC, Natural Resources
Merritt	Green Building, Urban Farming Ecology, Horticulture, Environmental Restoration
Mira Costa	Radiation
Mission	Environmental Engineering
Modesto Junior	Horticulture, Environmental Engineer, Natural Resources, Industrial Systems Technician, Green Job Apprenticeship Programs
Moorpark	Civil Engineering, Environmental Engineer, Environmental Science
Mt. San Antonio	Industrial Electronics, HVAC, Water Distribution, Agricultural Power Equipment, Green Job Apprenticeship Programs
Mt. San Jacinto	Environmental Sciences, Wastewater Engineering and Operations, Geographic Information Systems
Napa Valley	Natural Resources
Ohlone	Natural Resources, Environmental Studies, Solar Photovoltaic Design and Installation (Future plans to add wind, biomass and nanotechnology design and installation)
Orange Coast	Civil Engineering, HVAC, Natural Resources, Machinist, Green Job Apprenticeship Programs
Oxnard	HVAC, Environmental Science
Palo Verde	Welding, Environmental Engineer, Automotive Technician
Palomar	Building, Welding, Carpentry, Wastewater Engineering and Operations, Automotive Technician, Sheet Metal, Green Job Apprenticeship Programs
Pasadena City	Building, Welding, Carpentry, Automotive Technician
Porterville	Agricultural Production
College of Redwoods	Metal Working

COMMUNITY COLLEGE	GREEN JOB PROGRAM CONCENTRATIONS - Apprenticeship program offerings in bold
Reedley	Metal Working, Horticulture, Mechanized Agriculture, Agricultural Technician, Automotive Technician
Rio Hondo	Building, Welding, Carpentry, Heavy Equipment, Environmental Technology, Automotive Technician, Green Job Apprenticeship Programs
Riverside City	Building, Welding, HVAC, Automated Systems Engineering
Sacramento City	Civil Engineering, Ecology, HVAC, Wastewater Engineering and Operations, Electric Vehicles Operation, Railroad Operations
Saddleback	Horticulture, Ecology, Automotive Technician, Construction Inspection, Geographic Information Systems
San Bernadino	Metal Working and Welding, HVAC, Wastewater Engineering and Operations, Automotive Technician, Green Job Apprenticeship Programs
San Diego City	Building, Welding, Carpentry, Plumbing, HVAC, Pipefitting Solar Turbines, Green Job Apprenticeship Programs
San Diego Mesa	Construction, Geographic Information Systems
San Diego Miramar	Heavy Equipment Operations
San Francisco City	Construction Management, Mechanical Engineering, Electrical Engineering
San Joaquin Delta	Building, Welding, Carpentry, Horticulture, HVAC, Wastewater Engineering and Operations, Natural Resources, Automotive Technician, Green Job Apprenticeship Programs
San Jose City	Building, Welding, Carpentry, HVAC, Machinist, Green Job Apprenticeship Programs
San Mateo	Building, Welding, Carpentry, Plumbing, HVAC, Construction, Metalworking, Green Job Apprenticeship Programs
Santa Ana	Welding, Automotive Technician
Santa Barbara City	Ecosystem Restoration, Horticulture, Green Job Apprenticeship Programs
Santa Rosa Junior	Sustainable Agriculture, Welding Diesel Technology, Geographic Information Systems, Green Job Apprenticeship Programs
Santiago Canyon	Public Works, Carpentry, Wastewater Engineering and Operations, Green Job Apprenticeship Programs
College of Sequoias	Construction, Welding, Carpentry, HVAC, Agricultural Power Equipment, Welding Industrial Maintenance, Green Job Apprenticeship Programs
Shasta	Civil Engineering, Horticulture, Forestry, Automotive Technician, Wastewater Engineering and Operations, Natural Resources, Agricultural Power Equipment, Welding, Industrial Operations
Sierra	Horticulture, Watershed Ecology, Construction, Metalworking, Geographic Information Systems
College of the Siskiyous	Welding
Solano CC	Horticulture, Hazardous Waste , Wastewater Engineering and Operations, Industrial Systems, Welding and Metalworking, Automotive Specialist
Southwestern	Building and Construction Trades, Environmental Management
Taft	Automotive Specialist
Ventura	Building and Construction Trades, Horticulture, Wastewater Engineering And Operations, Natural Resources, Green Job Apprenticeship Programs
Victor Valley	Building and Construction Trades, Horticulture, Green Job Apprenticeship Programs
W. Hills-Coalinga	Precision Agriculture
West Los Angeles	Power Plant Management and Operations
W. Valley	Geographic Information Systems
Yuba	Welding, Horticulture, Agriculture, Industrial Electricity, Hazardous Materials Management

California green jobs career pathway

WHAT IS A CAREER PATHWAY MAP?

Finding a first job, moving into a new career field, or working up to become a high level manager or craftsman can be a very difficult process without the right tools and perspective of how to get from A to Z. Creating and using a career pathway map helps the process look more manageable and can answer many of the questions about where to start and what resources are available to help. A simplified career pathway map –such as the one below that diagrams the green jobs marketplace- lays out the steps involved with progressing through a career, from education and formal job training to skills enhancement and promotion.



Source: *Orientation to Apprenticeship*, Workforce Investment Board of Marin County and the Dominican University of California Institute for Leadership Studies, (2008).

CASE STUDY: DETAILED CAREER PATHWAY MAP FOR THE EAST SAN FRANCISCO BAY AREA

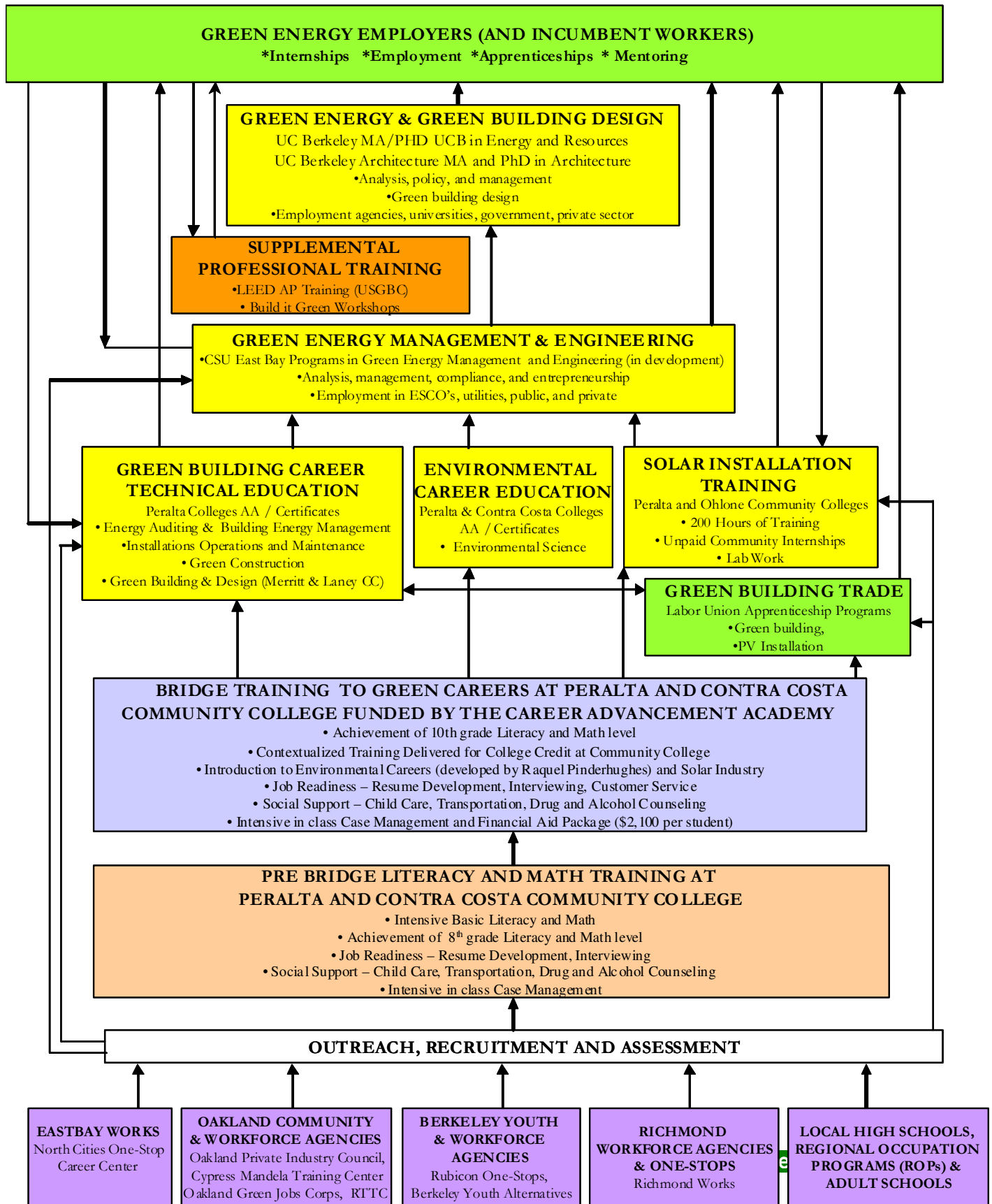
To help job seekers of all levels of education and skills in Contra Costa and Alameda Counties, two organizations (the Easy Bay Green Corridor Partnership and the Oakland Partnership) joined together in 2007 to form the Green Academy. The Green Academy developed a detailed career pathway map and identified the education institutions, training opportunities and workforce placement services available to the Eastern San Francisco Bay area. While developing such career pathway maps is time and resource intensive for an organization to complete, these pathway maps identify the critical resources available to job seekers and can be developed for any geographic area. The Green Academy Vision career pathway map is on the next page or can be found with extended descriptions on the Internet at www.oaklandpartnership.com/GreenAcademy.

GREEN ACADEMY VISION

GREEN ENERGY EDUCATION PATHWAYS

In the East Bay Green Corridor

Education for Environmental Sustainability, Social Justice, and Community Development



Green jobs guidebook references

PARTNER ORGANIZATIONS

Environmental Defense Fund, www.edf.org
Ella Baker Center for Human Rights, www.ellabakercenter.org

ORGANIZATIONS ENDORSING THE GUIDEBOOK

Apollo Alliance, www.apolloalliance.org
Oakland Partnership, www.oaklandpartnership.com

INDIVIDUALS CONTACTED DURING RESEARCH OR REFERENCED WITHIN THE GUIDEBOOK

- Anthony Andreoni, Jerry Hart and Reza Mahdavi (California Air Resources Board)
- Narinder Bansal (Ohlone Community College District);
- Zoey Burrows (Solar Richmond)
- John Carrese (San Francisco Bay Region Center of Excellence)
- Patti Castro (Alameda County Workforce Investment Board)
- Susanna Cooper (Senator Darrell Steinberg)
- Brad Edgar (Cleaire)
- Karen Engel (Oakland Metropolitan Chamber of Commerce)
- Grant Ferrier (Environmental Business International, Inc.)
- Elena Foshay and Mac Lynch (Apollo Alliance)
- Karina Garbesi, PhD (California State University East Bay)
- Bonnie Graybill (California Employment Development Department)
- Van Jones (Green For All)
- Ian Kim and Aaron Lehmer (Ella Baker Center for Human Rights)
- Richard Lew (Bay Area Air Quality Management District)
- Fred Lucero and Sal Vaca (Richmond BUILD)
- Carol McClelland, PhD (Green Career Central)
- Raquel Pinderhughes, Ph.D. (San Francisco State University)
- Elizabeth Redman (Competitiveness Group, Inc.)
- Michele Rodriguez (Workforce Investment Board of Marin)
- Erika Shumate (MMA Renewable Ventures, LLC.)

ORGANIZATIONS CONTACTED OR REFERENCED DURING RESEARCH FOR THE GUIDEBOOK

Blue Green Alliance, www.bluegreenalliance.org
California Climate Action Network (California CAN!), www.ca.ilg.org/climatechange
California Community Colleges, https://misweb.cccco.edu/webproginv/prod/collegelist_n.cfm
Cleaire, www.cleaire.com
Green Academy, www.oaklandpartnership.com/GreenAcademy
Green For All, www.greenforall.org
Laney College in partnership with the Green Academy
Merritt College, Environmental Management and Technology's Program, www.ecomerritt.org
North American Board of Certified Energy Practitioners (NABCEP) www.nabcep.org
Pacific Gas & Electric, www.pge.com
Rising Sun Energy Center (RSEC) California Youth Energy Services (CYES), www.risingsunenergy.org
Tesla Automobiles, www.teslamotors.com

WEB-BASED EMPLOYMENT DATA SOURCES USED DURING RESEARCH FOR THE GUIDEBOOK

www.aesp.org	www.greenjobs.com	www.simplyhired.com
www.cacareerzone.com	green-jobs.monstertrak.com	www.spb.ca.gov
www.cbsalary.com	www.microturbine.com/company/careers	www.stopdodo.com
www.ecoemploy.com	www.mygreenscene.com	www.thingamajob.com
www.edd.ca.gov	www.renewableenergyworld.com	

The Green Jobs Guidebook is also available on the Internet at:

www.edf.org/cagreenjobs