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**Industry Scan Report  
Los Angeles County**

**Green Building  
Occupational Profiles**



**Center of Excellence**

**Los Angeles Community College District**

**November 2007**



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# **Green Building and Construction Occupational Profiles**

**November 2007**

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OUR MISSION IS TO STRENGTHEN CALIFORNIA'S WORKFORCE AND ADVANCE ECONOMIC GROWTH THROUGH EDUCATION, TRAINING AND JOB DEVELOPMENT.

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## Traditional Construction Occupations Impacted by Green Building

For this study, green building occupations fall into two groups; those traditional construction occupations that will require new training or education because of the transition to green building; and occupations that are emerging as the building industry develops more green and sustainable building practices.

**Table 1 - Traditional Construction Occupations in Green Building - Demand**

SOC Code	Occupational Title	Estimated Employment - Los Angeles (2007)	Annual Openings Due to Growth & Separations
11.9021	Construction Managers	7,485	197
13.1051	Cost Estimators	4,572	162
47.1011	First-Line Supervisors of Construction Trades	13,816	341
47.2111	Electricians	13,885	364
47.4011	Construction and Building Inspectors	2,769	103
41.3099	Sales Representatives, Services, All Other	23,708	721
47.2051	Cement Masons and Concrete Finishers	4,020	128
47.2181	Roofers	4,110	142

Please note that the following occupation section focuses on demand indicators for each occupation which includes employment expectations and wages. Skills, training and education requirements, and a more qualitative discussion of the occupations will follow.

**Demand for Construction Managers** is strong and is growing at the national and state average in traditional construction, but considerably faster for green construction. The median wage<sup>1</sup> for Construction Managers in Los Angeles is approximately \$91,540 annually or \$44.01 an hour.

**Demand for Cost Estimators** is reasonably strong but can be found in industries beyond building and construction. Growth in the occupation is expected to be consistent with overall occupational growth trends at both the national and state level. The median wage for Cost Estimators in Los Angeles is approximately \$56,120 annually or \$27.98 an hour.

<sup>1</sup> Median wages were taken from the Employment Development Department's median wage by SOC occupation for Los Angeles County.

**Demand for First-Line Supervisors of Construction** is over 10,000 in Los Angeles County and growing nationally and within the state at about the average occupational growth rate (i.e., between 10 percent and 15 percent) over the next 10 years. The median wage for First-line Supervisors of Construction in Los Angeles is approximately \$60,902 annually or \$29.28 an hour.

**Demand for Electricians** is also over 13,000 in Los Angeles and is increasing faster than average within California, at about 20% over the next 10 years. A large portion of that increase is tied to the need for electricians that can install solar panels. The median wage for Electricians in Los Angeles is approximately \$60,902 annually or \$29.28 an hour, but is often higher, by \$5 to \$10 dollars an hour for those electricians that are installing or working on solar panels.

**Demand for Construction and Building Inspectors** is currently below 3,000 in Los Angeles County, but national, state and regional data indicates strong growth for this occupation through 2014. California expects to increase overall employment in this occupation by over 25 percent by 2014. A large portion of the growth in this position is tied to the increase regulations and complexity associated with green buildings. The median wage for Construction and Building Inspectors in Los Angeles is approximately \$65,560 annually or \$31.52 an hour.

**Demand for Sales Representatives** is over 20,000 in Los Angeles County, but like Cost Estimators is often found in industries outside of construction. Within the building industry in Los Angeles, Sales Representative account for approximately 10% of total occupational employment or 2,300 positions. But demand for the occupation is growing by over 20 percent in the next 10 years within California. The median wage for Sales Representatives in Los Angeles is approximately \$60,902 annually or \$29.28 an hour.

**Demand for Cement Masons and Concrete Finishers** is currently just above 4,000 positions in Los Angeles County and is expected to increase faster than average within California. The median wage for Cement Masons and Concrete Finishers in Los Angeles is approximately \$40,540 annually or \$19.49 an hour.

**Demand for Roofers** is also currently just above 4,000 positions in Los Angeles County and is expected to increase faster than average within the State. The median wage for Roofers in Los Angeles is approximately \$41,600 annually or \$20.00 an hour.

## Occupational Skills and Training Requirements for Green Construction

Below is a brief assessment of the educational requirements and skills that were identified for each of the eight traditional construction occupations and the impact of green building on their training and education needs. The final column indicates whether the occupation could be highly impacted by the increase in green building or if the impact is expected to be less substantial. Each occupation is also evaluated to consider skills and training and education needed as it relates to green construction.

**Table 2 - Traditional Construction Occupations in Green Building – Training & Education**

SOC Code	Occupational Title	Education & Training	Impact of Green Building
11.9021	Construction Managers	Associates or Bachelors, 2 to 3 years work experience	High
13.1051	Cost Estimators	Associates or Bachelors, 2 to 4 years work experience	High
47.1011	First-Line Supervisors of Construction	Vocational School or an Associates Degree, OJT for 1 to 2 years	High
47.2111	Electricians (Solar Panel Installers)	Several Years as an Apprentice or Schooling and Pass Exam	High
47.4011	Construction and Building Inspectors	Associates or Bachelors Degree & OJT for 2 to 3 years	High
41.3099	Sales Representatives, Services, All Other	Associates or Bachelors, 2 to 3 years work experience	Lower
47.2051	Cement Masons and Concrete Finishers	Vocational School or Several Years OJT	Lower
47.2181	Roofers	Vocational School or Several Years OJT	Lower

**Construction Managers:** This is an entry to mid-level position that typically requires a bachelor's degree for commercial and industrial builders and often an associates degree or higher for residential builders. The work is focused on planning and coordinating the building of a home or facility. Green buildings require more planning and integration of different systems, subcontractors and building materials. Leaders in green construction, like Turner Construction and Swinerton, have developed their own internal training program so construction managers are taught the nuances of planning and implementing the design of a

green home or facility. These internal training programs are typically intensive 4 to 8 week programs that not only teach the many different aspects of green construction management but also provide a better understanding of the LEED and/or other certifications.

**Cost Estimators:** This is an entry-level to mid-level position that typically requires at least an associate's degree and sometimes a bachelor's degree. In the construction industry, cost estimators must have a comprehensive understanding of how the design process is implemented and which building materials will work for a given design and how they should be priced. Because green construction requires different designs and uses different building materials, cost estimators are significantly impacted by green construction. A common perception is that green construction facilities are generally estimated to cost more than traditional construction facilities, because cost estimators are not as familiar with green construction processes and materials, and if people are not familiar with costs they tend to over-estimate rather than under-estimate.

**First-line Supervisors of Construction:** This is an entry-level position that has very different training and education requirements depending on the employer. Some require a bachelor's degree while others will only require OJT (on-the-job training). The work is somewhat similar to construction managers but instead of managing the entire building process, it typically is focused on managing a group of employees or sub-contractors to complete a component of the construction project. Like construction managers, supervisors need to have a general understanding of how to implement a green construction design and be familiar with more sustainable building materials. As projects become greener, there will be a greater need to coordinate among a larger group of sub-contractors. The supervisor position often provides an opportunity to move up to construction manager.

**Electricians (Solar Panel Installers & Technicians):** This is an entry to mid-level position that typically requires five years as an apprentice (Local 11 IBEW – Solar Panel Installers Program) or several years of vocational training and passing a licensing exam. Electricians are a critical occupation in green construction because solar installers and many solar technicians must be trained as electricians. Experienced and properly trained solar installers are an important component in maximizing the energy generated by solar panels, both in the placement of the panel as well as ensuring that they are installed in such a way to minimize future maintenance problems. Non-solar panel electricians can also be impacted by green buildings as they will need to work with energy systems that are more complex than traditional systems, such as energy management systems that are integrated with HVAC (Heating, Ventilation, Air Conditioning and Cooling), lighting and refrigeration.

**Construction and Building Inspectors:** This is an entry to mid-level position that like many construction occupations can be trained through extensive on the job training, or through a college degree, such as a bachelor's. Given the

importance of certifications as well as the need to measure performance of a facility in terms of energy efficiency and/or energy generation in green construction, inspectors play an important role in the development of green buildings. Their fundamental role of focusing on safety and liability is changing to become much more concerned with performance. The training and education for inspectors will need to become more rigorous as more certifications are implemented for residential buildings and legislative requirements are put into place for commercial and industrial facilities.

**Sales Representatives:** This is an entry to mid-level position which can be trained through extensive on-the-job training or with less training and a college degree (associate's or bachelor's). Sales Representatives working for green builders need to be conversant with LEED, CHPS and other relevant certifications; green building materials; and the impact of ever-changing legislative requirements and incentives, which are occurring at both the state and local level. The training and education requirements for Sales Representatives will be impacted by the transition to greener, more sustainable buildings, but not as significantly as for occupations like Construction Managers or Building Inspectors.

**Cement Masons and Concrete Finishers:** This is an entry-level position that typically requires moderate on the job training or some vocational schooling. Cement Masons and Concrete Finishers working on green building projects will need to understand the complexities of using different types of paving especially pervious or porous cement. The training and education requirements for Cement Masons will be impacted by the transition to greener, more sustainable buildings, but not as significantly as for occupations like Construction Managers or Building Inspectors.

**Roofers:** This is an entry-level position that also typically requires moderate on the job training or some vocational schooling. Roofers working on green building projects face more complexities than traditional roofers as roofs are often very different for green projects and also typically include solar panels. Green roofers need to be familiar with a broader spectrum of roofing materials and will often need to coordinate with solar panel installers. The training and education requirements for Roofers will be impacted by the transition to greener, more sustainable buildings, but not as significantly as for occupations like Construction Managers or Building Inspectors.

## **Occupational Profiles - KSAs**

Please note the following occupational profiles are not specific to the green construction industry. For information on the differences in green construction occupational needs and requirements (i.e., knowledge, skills and abilities) please see the occupational outlook in the body of the report.

## Construction Manager

### Knowledge

**Building and Construction** - Knowledge of materials, methods, and the tools involved in the construction or repair of houses, buildings, or other structures such as highways and roads.

**Design** - Knowledge of design techniques, tools, and principles involved in production of precision technical plans, blueprints, drawings, and models.

**Mathematics** - Knowledge of arithmetic, algebra, geometry, calculus, statistics, and their applications.

**English Language** - Knowledge of the structure and content of the English language including the meaning and spelling of words, rules of composition, and grammar.

**Public Safety and Security** - Knowledge of relevant equipment, policies, procedures, and strategies to promote effective local, state, or national security operations for the protection of people, data, property, and institutions.

### Skills

**Reading Comprehension** - Understanding written sentences and paragraphs in work related documents.

**Critical Thinking** - Using logic and reasoning to identify the strengths and weaknesses of alternative solutions, conclusions or approaches to problems.

**Coordination** - Adjusting actions in relation to others' actions.

**Instructing** - Teaching others how to do something.

**Mathematics** - Using mathematics to solve problems.

### Abilities

**Oral Expression** - The ability to communicate information and ideas in speaking so others will understand.

**Oral Comprehension** - The ability to listen to and understand information and ideas presented through spoken words and sentences.

**Problem Sensitivity** - The ability to tell when something is wrong or is likely to go wrong. It does not involve solving the problem, only recognizing there is a problem.

**Inductive Reasoning** - The ability to combine pieces of information to form general rules or conclusions (includes finding a relationship among seemingly unrelated events).

**Deductive Reasoning** - The ability to apply general rules to specific problems to produce answers that make sense.

**Information Ordering** - The ability to arrange things or actions in a certain order or pattern according to a specific rule or set of rules (e.g., patterns of numbers, letters, words, pictures, mathematical operations).

**Speech Clarity** - The ability to speak clearly so others can understand you.

**Speech Recognition** - The ability to identify and understand the speech of another person.

**Written Comprehension** - The ability to read and understand information and ideas presented in writing.

## **Cost Estimator**

### **Knowledge**

**Mathematics** - Knowledge of arithmetic, algebra, geometry, calculus, statistics, and their applications.

**Administration and Management** - Knowledge of business and management principles involved in strategic planning, resource allocation, human resources modeling, leadership technique, production methods, and coordination of people and resources.

**English Language** - Knowledge of the structure and content of the English language including the meaning and spelling of words, rules of composition, and grammar.

**Customer and Personal Service** - Knowledge of principles and processes for providing customer and personal services. This includes customer needs assessment, meeting quality standards for services, and evaluation of customer satisfaction.

**Production and Processing** - Knowledge of raw materials, production processes, quality control, costs, and other techniques for maximizing the effective manufacture and distribution of goods.

## Skills

**Active Listening** - Giving full attention to what other people are saying, taking time to understand the points being made, asking questions as appropriate, and not interrupting at inappropriate times.

**Reading Comprehension** - Understanding written sentences and paragraphs in work related documents.

**Mathematics** - Using mathematics to solve problems.

**Time Management** - Managing one's own time and the time of others.

**Writing** - Communicating effectively in writing as appropriate for the needs of the audience.

## Abilities

**Oral Comprehension** - The ability to listen to and understand information and ideas presented through spoken words and sentences.

**Oral Expression** - The ability to communicate information and ideas in speaking so others will understand.

**Information Ordering** - The ability to arrange things or actions in a certain order or pattern according to a specific rule or set of rules (e.g., patterns of numbers, letters, words, pictures, mathematical operations).

**Deductive Reasoning** - The ability to apply general rules to specific problems to produce answers that make sense.

**Inductive Reasoning** - The ability to combine pieces of information to form general rules or conclusions (includes finding a relationship among seemingly unrelated events).

**Mathematical Reasoning** - The ability to choose the right mathematical methods or formulas to solve a problem.

**Near Vision** - The ability to see details at close range (within a few feet of the observer).

**Speech Clarity** - The ability to speak clearly so others can understand you.

**Speech Recognition** - The ability to identify and understand the speech of another person.

**Written Comprehension** - The ability to read and understand information and ideas presented in writing.

## Supervisor of Construction Trades

### Knowledge

**Building and Construction** - Knowledge of materials, methods, and the tools involved in the construction or repair of houses, buildings, or other structures such as highways and roads.

**Administration and Management** - Knowledge of business and management principles involved in strategic planning, resource allocation, human resources modeling, leadership technique, production methods, and coordination of people and resources.

**Mathematics** - Knowledge of arithmetic, algebra, geometry, calculus, statistics, and their applications.

**Customer and Personal Service** - Knowledge of principles and processes for providing customer and personal services. This includes customer needs assessment, meeting quality standards for services, and evaluation of customer satisfaction.

**Mechanical** - Knowledge of machines and tools, including their designs, uses, repair, and maintenance.

### Skills

**Time Management** - Managing one's own time and the time of others.

**Coordination** - Adjusting actions in relation to others' actions.

**Instructing** - Teaching others how to do something.

**Judgment and Decision Making** - Considering the relative costs and benefits of potential actions to choose the most appropriate one.

**Speaking** - Talking to others to convey information effectively.

### Abilities

**Oral Comprehension** - The ability to listen to and understand information and ideas presented through spoken words and sentences.

**Oral Expression** - The ability to communicate information and ideas in speaking so others will understand.

**Problem Sensitivity** - The ability to tell when something is wrong or is likely to go wrong. It does not involve solving the problem, only recognizing there is a problem.

**Deductive Reasoning** - The ability to apply general rules to specific problems to produce answers that make sense.

**Inductive Reasoning** - The ability to combine pieces of information to form general rules or conclusions (includes finding a relationship among seemingly unrelated events).

**Near Vision** - The ability to see details at close range (within a few feet of the observer).

## Electricians

### Knowledge

**Building and Construction** - Knowledge of materials, methods, and the tools involved in the construction or repair of houses, buildings, or other structures such as highways and roads.

**Mechanical** - Knowledge of machines and tools, including their designs, uses, repair, and maintenance.

**Mathematics** - Knowledge of arithmetic, algebra, geometry, calculus, statistics, and their applications.

**English Language** - Knowledge of the structure and content of the English language including the meaning and spelling of words, rules of composition, and grammar.

**Public Safety and Security** - Knowledge of relevant equipment, policies, procedures, and strategies to promote effective local, state, or national security operations for the protection of people, data, property, and institutions.

### Skills

**Installation** - Installing equipment, machines, wiring, or programs to meet specifications.

**Active Listening** - Giving full attention to what other people are saying, taking time to understand the points being made, asking questions as appropriate, and not interrupting at inappropriate times.

**Reading Comprehension** - Understanding written sentences and paragraphs in work related documents.

**Troubleshooting** - Determining causes of operating errors and deciding what to do about it.

**Equipment Selection** - Determining the kind of tools and equipment needed to do a job.

## **Abilities**

**Arm-Hand Steadiness** - The ability to keep your hand and arm steady while moving your arm or while holding your arm and hand in one position.

**Problem Sensitivity** - The ability to tell when something is wrong or is likely to go wrong. It does not involve solving the problem, only recognizing there is a problem.

**Finger Dexterity** - The ability to make precisely coordinated movements of the fingers of one or both hands to grasp, manipulate, or assemble very small objects.

**Near Vision** - The ability to see details at close range (within a few feet of the observer).

**Deductive Reasoning** - The ability to apply general rules to specific problems to produce answers that make sense.

**Extent Flexibility** - The ability to bend, stretch, twist, or reach with your body, arms, and/or legs.

**Manual Dexterity** - The ability to quickly move your hand, your hand together with your arm, or your two hands to grasp, manipulate, or assemble objects.

**Trunk Strength** - The ability to use your abdominal and lower back muscles to support part of the body repeatedly or continuously over time without 'giving out' or fatiguing.

## **Construction & Building Inspectors**

### **Knowledge**

**Building and Construction** - Knowledge of materials, methods, and the tools involved in the construction or repair of houses, buildings, or other structures such as highways and roads.

**Engineering and Technology** - Knowledge of the practical application of engineering science and technology. This includes applying principles, techniques, procedures, and equipment to the design and production of various goods and services.

**Customer and Personal Service** - Knowledge of principles and processes for providing customer and personal services. This includes customer needs assessment, meeting quality standards for services, and evaluation of customer satisfaction.

**Public Safety and Security** - Knowledge of relevant equipment, policies, procedures, and strategies to promote effective local, state, or national security operations for the protection of people, data, property, and institutions.

**Design** - Knowledge of design techniques, tools, and principles involved in production of precision technical plans, blueprints, drawings, and models.

## **Skills**

**Reading Comprehension** - Understanding written sentences and paragraphs in work related documents.

**Active Listening** - Giving full attention to what other people are saying, taking time to understand the points being made, asking questions as appropriate, and not interrupting at inappropriate times.

**Mathematics** - Using mathematics to solve problems.

**Critical Thinking** - Using logic and reasoning to identify the strengths and weaknesses of alternative solutions, conclusions or approaches to problems.

**Active Learning** - Understanding the implications of new information for both current and future problem-solving and decision-making.

## **Abilities**

**Problem Sensitivity** - The ability to tell when something is wrong or is likely to go wrong. It does not involve solving the problem, only recognizing there is a problem.

**Oral Expression** - The ability to communicate information and ideas in speaking so others will understand.

**Inductive Reasoning** - The ability to combine pieces of information to form general rules or conclusions (includes finding a relationship among seemingly unrelated events).

**Near Vision** - The ability to see details at close range (within a few feet of the observer).

**Oral Comprehension** - The ability to listen to and understand information and ideas presented through spoken words and sentences.

## Sales Representatives

### Knowledge

**Sales and Marketing** — Knowledge of principles and methods for showing, promoting, and selling products or services. This includes marketing strategy and tactics, product demonstration, sales techniques, and sales control systems.

**Customer and Personal Service** — Knowledge of principles and processes for providing customer and personal services. This includes customer needs assessment, meeting quality standards for services, and evaluation of customer satisfaction.

**Mathematics** — Knowledge of arithmetic, algebra, geometry, calculus, statistics, and their applications.

**Administration and Management** — Knowledge of business and management principles involved in strategic planning, resource allocation, human resources modeling, leadership technique, production methods, and coordination of people and resources.

**English Language** — Knowledge of the structure and content of the English language including the meaning and spelling of words, rules of composition, and grammar.

**Economics and Accounting** — Knowledge of economic and accounting principles and practices, the financial markets, banking and the analysis and reporting of financial data.

**Production and Processing** — Knowledge of raw materials, production processes, quality control, costs, and other techniques for maximizing the effective manufacture and distribution of goods.

### Skills

**Active Listening** — Giving full attention to what other people are saying, taking time to understand the points being made, asking questions as appropriate, and not interrupting at inappropriate times.

**Speaking** — Talking to others to convey information effectively.

**Time Management** — Managing one's own time and the time of others.

**Reading Comprehension** — Understanding written sentences and paragraphs in work related documents.

**Persuasion** — Persuading others to change their minds or behavior.

**Service Orientation** — Actively looking for ways to help people.

**Negotiation** — Bringing others together and trying to reconcile differences.

**Social Perceptiveness** — Being aware of others' reactions and understanding why they react as they do.

**Active Learning** — Understanding the implications of new information for both current and future problem-solving and decision-making.

**Coordination** — Adjusting actions in relation to others' actions.

## **Abilities**

**Oral Expression** — The ability to communicate information and ideas in speaking so others will understand.

**Oral Comprehension** — The ability to listen to and understand information and ideas presented through spoken words and sentences.

**Speech Clarity** — The ability to speak clearly so others can understand you.

**Speech Recognition** — The ability to identify and understand the speech of another person.

**Written Comprehension** — The ability to read and understand information and ideas presented in writing.

**Near Vision** — The ability to see details at close range (within a few feet of the observer).

**Written Expression** — The ability to communicate information and ideas in writing so others will understand.

**Inductive Reasoning** — The ability to combine pieces of information to form general rules or conclusions (includes finding a relationship among seemingly unrelated events).

**Problem Sensitivity** — The ability to tell when something is wrong or is likely to go wrong. It does not involve solving the problem, only recognizing there is a problem.

**Category Flexibility** — The ability to generate or use different sets of rules for combining or grouping things in different ways.

## **Cement Masons & Concrete Finishers**

### **Knowledge**

**Building and Construction** - Knowledge of materials, methods, and the tools involved in the construction or repair of houses, buildings, or other structures such as highways and roads.

**Administration and Management** - Knowledge of business and management principles involved in strategic planning, resource allocation, human resources modeling, leadership technique, production methods, and coordination of people and resources.

**English Language** - Knowledge of the structure and content of the English language including the meaning and spelling of words, rules of composition, and grammar.

**Public Safety and Security** - Knowledge of relevant equipment, policies, procedures, and strategies to promote effective local, state, or national security operations for the protection of people, data, property, and institutions.

**Mechanical** - Knowledge of machines and tools, including their designs, uses, repair, and maintenance.

### **Skills**

**Coordination** - Adjusting actions in relation to others' actions.

**Mathematics** - Using mathematics to solve problems.

**Active Listening** - Giving full attention to what other people are saying, taking time to understand the points being made, asking questions as appropriate, and not interrupting at inappropriate times.

**Critical Thinking** - Using logic and reasoning to identify the strengths and weaknesses of alternative solutions, conclusions or approaches to problems.

**Active Learning** - Understanding the implications of new information for both current and future problem-solving and decision-making.

## **Abilities**

**Control Precision** - The ability to quickly and repeatedly adjust the controls of a machine or a vehicle to exact positions.

**Problem Sensitivity** - The ability to tell when something is wrong or is likely to go wrong. It does not involve solving the problem, only recognizing there is a problem.

**Arm-Hand Steadiness** - The ability to keep your hand and arm steady while moving your arm or while holding your arm and hand in one position.

**Extent Flexibility** - The ability to bend, stretch, twist, or reach with your body, arms, and/or legs.

**Manual Dexterity** - The ability to quickly move your hand, your hand together with your arm, or your two hands to grasp, manipulate, or assemble objects.

## **Roofers**

### **Knowledge**

**Building and Construction** - Knowledge of materials, methods, and the tools involved in the construction or repair of houses, buildings, or other structures such as highways and roads.

**Mechanical** - Knowledge of machines and tools, including their designs, uses, repair, and maintenance.

**Engineering and Technology** - Knowledge of the practical application of engineering science and technology. This includes applying principles, techniques, procedures, and equipment to the design and production of various goods and services.

**Design** - Knowledge of design techniques, tools, and principles involved in production of precision technical plans, blueprints, drawings, and models.

**Physics** - Knowledge and prediction of physical principles, laws, their interrelationships, and applications to understanding fluid, material, and atmospheric dynamics, and mechanical, electrical, atomic and sub-atomic structures and processes.

## Skills

**Equipment Selection** - Determining the kind of tools and equipment needed to do a job.

**Operation and Control** - Controlling operations of equipment or systems.

**Coordination** - Adjusting actions in relation to others' actions.

**Installation** - Installing equipment, machines, wiring, or programs to meet specifications.

**Repairing** - Repairing machines or systems using the needed tools.

## Abilities

**Gross Body Equilibrium** - The ability to keep or regain your body balance or stay upright when in an unstable position.

**Static Strength** - The ability to exert maximum muscle force to lift, push, pull, or carry objects.

**Extent Flexibility** - The ability to bend, stretch, twist, or reach with your body, arms, and/or legs.

**Stamina** - The ability to exert yourself physically over long periods of time without getting winded or out of breath.

**Explosive Strength** - The ability to use short bursts of muscle force to propel oneself (as in jumping or sprinting), or to throw an object.

**Manual Dexterity** - The ability to quickly move your hand, your hand together with your arm, or your two hands to grasp, manipulate, or assemble objects.

## **Emerging Occupations in Green Construction**

Many of the emerging occupations that have been identified as central in the development of green buildings have existed as niche occupations for many years. However, with the expected increases in employment within green construction these niche occupations will become more prevalent in the construction industry. Labor market information on these occupations is either non-existent or quite incomplete, so most of the information for these occupations was gathered through executive interviews and some secondary data sources.

**Table 3 - Emerging Green Building Occupations**

Occupational Title	Entry-Level Training & Education	Overall Employment Potential
Solar Installer & Technician (Electrician)	Up to 5 Years as an Apprentice or Vocational Schooling and Pass Licensing Exam	High
Deconstruction Worker	2 Week Intensive Training & OJT	High
Energy & Indoor Air Quality Auditor	Bachelors Degree, 2 to 4 years work experience	Medium
Energy Modeler	Bachelors Degree, 2 to 4 years work experience	Medium
Operations & Maintenance for HVAC and PV (HVAC Technicians & Electricians)	Vocational School, Associates Degree or Certificate & OJT for 2 to 3 years	Medium
Commisioning Agent or Certification Consultant	Bachelors or Graduate Degree, 2 to 4 years work experience & OJT	Low

**Solar Installer & Technician** is typically an electrician who has also been trained to place and install PV (photo-voltaic) panels. The training emphasizes maximizing the performance of the solar panel in terms of optimizing energy generation and minimizing maintenance problems associated with PV systems. The training also focuses on safety and minimizing the risks associated with live electrical systems. Wages for Solar Panel installers are approximately \$25 to \$40 an hour.

**Deconstruction Worker** is an entry-level opportunity to move into the green construction industry with only a 2 week intensive training course. The position is focused on reducing all waste associated with rebuilding or retrofitting a house or facility and reusing as many materials as possible. Deconstruction workers typically earn \$10 to \$15 an hour and can relatively quickly move up to a Deconstruction crew chief earning \$12 to \$18 an hour.

**Energy & Indoor Air Quality Auditor** has the potential to grow significantly as legislation (AB 1103, Saldana) in Sacramento is being considered that would require new buildings to assess their production of greenhouse gas emissions or their carbon footprint. Even without new legislation, these positions will increase due to the increased demand for greater energy efficiency from new buildings and the increased focus on measuring and maintaining healthy indoor air quality. Healthy Buildings International is a leader in evaluating indoor air quality and

their air quality specialists require 1 to 5 years of industrial/environmental work experience. Starting salaries vary depending on the employer but \$40,000 to \$65,000 is the typical range for most employers depending on responsibilities and work experience.

**Energy Modeler** Like an energy auditor, an energy modeler is becoming increasingly important as green builders become more focused on quantifying the performance parameters of a given facility particularly as it relates to energy efficiency and generation. This occupation can also play a valuable role in meeting certification requirements for LEED, CHPS or other relevant standards. These occupations are typically found in larger commercial and industrial construction firms; however, they may become more widespread as more firms move into green construction. These positions typically require at least a bachelor's degree due to the intense mathematical requirements and sophisticated software usage. Starting salaries vary depending on the employer but \$50,000 to \$70,000 is the typical range for most employers depending on responsibilities and work experience.

**Operations and Maintenance for HVAC and PV (Electricians & HVAC Technicians)** This is not technically a new position, but the changing training and education requirements for electricians and HVAC technicians that operate and maintain green facilities is synonymous with re-categorizing a position. These occupations will require a new understanding of energy systems management as green facilities integrate PV systems with HVAC and lighting systems. In general these individuals will need to have a much stronger understanding of the entire system as green buildings are much more integrated from the bottom up.

**Commissioning Agent or Certification Consultant** are personnel that assist construction firms, school districts and local governments build green facilities that meet LEED, CHPS and other appropriate certifications. These occupations typically require at least a Bachelor's Degree in urban planning or environmental studies and often require other certifications such as a LEED AP (Accredited Professional). These positions should technically disappear as construction managers and supervisors have a comprehensive understanding of green buildings and the related certifications, but currently demand for these positions is strong and growing.