



# Survey of Inclusion Workforce Landscape

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## Executive Summary

The ICF International Team was contracted to prepare a survey of the inclusion workforce landscape related to energy efficiency, divided into two separate scopes of work, Workscope A and Workscope D. Workscope A addressed the question, “What are the requirements for Energy Savings Assistance (ESA) Program field workers?” Workscope D was divided into three objectives. Objective D-1 addressed the question, “What are the existing career pathways within Energy Efficiency which provide promising opportunities for disadvantaged workers – entry-level and ongoing opportunities for advancement?” Objective D-2 addressed the questions, “What is the Definition for ‘Relevant’ Inclusion-Related Work in California? What is the Definition of ‘Working Relationship’ with the IOUs? What Qualifies as Inclusion-Related Working Partners for the IOUs?” Objective D-3 addressed the question, “What is an effective inclusion infrastructure for California and what is the IOUs’ role in this vision and infrastructure?”

In Survey of Inclusion Landscape Workscope A, the ICF International Team—comprised of ICF International, Workforce Incubator, and Craft Consulting Group—was tasked by the California’s Investor-Owned utilities (IOUs)—Pacific Gas and Electric (PG&E) Company, Southern California Edison (SCE), Southern California Gas (SoCalGas) and San Diego Gas and Electric (SDG&E)—to identify work requirements and gather job descriptions for four ESA Program field worker jobs: Energy Specialist/Program Representative/Residential Outreach Specialist, Installation Technician/Specialist, Natural Gas Appliance Test (NGAT) Technician, and Inspector. The study consisted of three major objectives:

1. Gather job descriptions for ESA field workers.
2. Determine whether the ESA job descriptions could be mapped into existing Federal or State job classifications.
3. Assess gaps in alignment with existing job classifications.

For Objective A-1, the ICF Team used information provided by the IOUs including brief ESA job descriptions, the ESA installation standards manual, and job task analysis findings from PG&E’s subject matter experts to gather detailed job descriptions. If there was not enough information provided on a particular job, as was the case for Inspector, the ICF Team located additional information from United States Department of Energy (DOE) job task analyses and used this information as the basis for the ESA Inspector job. The team synthesized the information from these sources and conducted a coding exercise to classify the knowledge, skills, abilities, and other characteristics (KSAOs) to gather job descriptions. The detailed job descriptions that represent ICF’s response to Objective A-1 are presented in section 1.2 of this report.

For Objectives A-2 and A-3, the ICF Team identified existing Federal or State job classifications potentially relevant to the four ESA jobs. After the search for relevant job classifications was complete, ICF conducted a systematic evaluation to determine whether the ESA program field worker jobs could be appropriately mapped to any of the identified job classifications, in which a rater panel assessed the level of similarity between the ESA jobs and the identified classifications. For two jobs, Energy Specialist/Program Representative/Residential Outreach Specialist and Inspector, no existing classifications were determined to be appropriately aligned.

Based on the evaluation results, it was determined that two of the jobs—Installation Technician/Specialist and NGAT Technician<sup>1</sup>—mapped to the classification of the Online Information Network or O\*NET<sup>2</sup> Weatherization Installers and Technicians. While the current research supports the use of this classification based on the information that was available about these two ESA jobs, these results should be validated with subject matter experts on the

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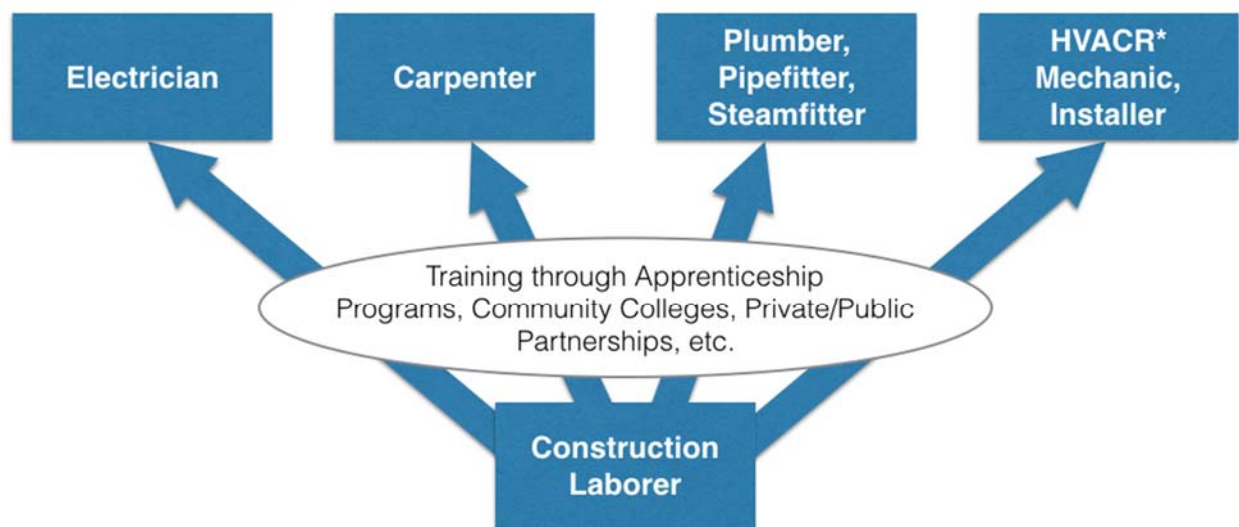
<sup>1</sup> Note: under this category, across the IOUs, installation has many performance components of which a limited comparison was performed.

<sup>2</sup> O\*NET sponsored by the U.S. Department of Labor, Employment and Training Administration, is the primary national source of occupational information, and provides information on a wide range of jobs performed in the United States; [www.onetonline.org](http://www.onetonline.org)

jobs (e.g., incumbents or supervisors of these positions) to confirm they represent how the jobs are actually performed. The other two ESA jobs—Energy Specialist/Program Representative/Residential Outreach Specialist and Inspector—did not map to any existing classifications.

In Workscope D, the ICF Team was asked how the IOUs, through their Workforce, Education, and Training (WE&T) efforts, can support disadvantaged workers in obtaining opportunities in energy efficiency (EE) careers. For Objective D-1, the ICF Team used a four-stage approach to identify four priority energy efficiency career paths: (1) Define promising energy efficiency career opportunities; (2) Evaluate Labor Market Information (LMI) forecasts; (3) Analyze real-time job posting data; and (4) Map career paths. The four career pathways that emerged are represented graphically in Exhibit 1:

**Exhibit 1: Career Pathways**



\* Heating, Ventilation, Air Conditioning & Refrigeration

All occupations in the selected pathways were drawn from the Lawrence Berkeley National Laboratory’s Energy Efficiency Taxonomy, which is comprised of 78 occupations. The four career pathways all begin with Construction Laborer as the entry-level occupation. Construction Laborer is an occupation with broad exposure to other skilled trades, and with low barriers to entry for disadvantaged workers entering the workforce or transitioning to the energy efficiency field. All five occupations were shown to have regional and statewide demand through LMI forecasts validated by further research into the past 6 years of job posting trends. Ample training resources are available for each of the skilled trades, though varying by region, through the California Community Colleges, as well as through apprenticeship programs and other training providers. Wages for these occupations are shown to compare favorably in many cases with median wages for all occupations – only Construction Laborer earns less than the comparable median wage for All Occupations<sup>3</sup> statewide, and that occupation earns from 79% to 115% of the comparable wage for All Occupations by region.

<sup>3</sup> “All Occupations” is a Standard Occupational Classification developed by the United States Bureau of Labor Statistics to capture wage and employment data for all workers. All supporting wage and employment data are provided as appendices.

The ICF Team addressed Objective D-2 through a combination of secondary research and follow-up phone conversations with service providers who perform inclusion-related work (“inclusion implementers”). Inclusion-related work is defined, for purposes of this study, as “programs targeted at workers from disadvantaged communities that guide them towards rewarding careers in energy efficiency jobs and occupations”. The ICF Team was asked what would qualify as an inclusion partner, and proposed that qualified inclusion partners for the IOUs’ consideration would meet seven criteria identified by the United States Department of Health and Human Services Self-Sufficiency Research Clearinghouse as promising practices:

- Training by itself doesn’t guarantee success<sup>4</sup>. Providing disadvantaged individuals with occupational training by itself does not guarantee successful job placement and retention. Wraparound services that teach soft skills, address individual barriers to employment, help an individual prepare for and seek employment, and post-placement follow-up are required in a more holistic approach.
- Simply offering generic post-employment job coaching, guidance, advice, and training referrals are unlikely to make a difference<sup>5</sup>. Instead of trying to be all things to all people, post-employment job coaching, guidance, advice, and training referrals should be specific to the target sector, industry, or occupation.
- Subsidized employment alone hasn’t proven successful<sup>6</sup>. At a minimum, disadvantaged individuals should receive soft and hard skills training, help with job search and placement, and case management throughout and after their training.
- Work-focused strategies with support services may be more promising than using either work-focused strategies or support services alone<sup>7</sup>.
- Provide a mix of job search activities and short-term education/training, and include a strong focus on quick employment<sup>8</sup>.
- Financial work incentives combined with job coaching and guidance after being placed in a job may strengthen employment retention<sup>9</sup>.
- Hard-to-serve need, unpaid work experience, job placement, and education services to recipients with health conditions had longer-term gains<sup>10</sup>.

Based on these criteria, the ICF Team developed two methodologies for the IOUs to determine if a training program is aligned with the IOUs inclusion goals. The first methodology is a quadrant matrix approach which categorizes implementers into one of four quadrants, based on the inclusion implementers’ focus on disadvantaged workers and the alignment of the programs to the targeted career pathways outlined in this report. Providers falling in Quadrant 1 have the greatest alignment with goals of bringing energy efficiency training to disadvantaged populations.

The second methodology is a “yardstick” evaluation where inclusion implementers’<sup>11</sup> programs are scored on a number of supporting “dimensions” in both the “qualified inclusion partner” and “training alignment.” For each criterion, an implementer may score 1 (yes), 0 (no), or “na” (not applicable). The result is that the IOUs can then create a scatterplot of programs on a continuum as well as quickly compare one program to another on established criteria. Providers plotted higher on the X (Inclusion) and Y (Quality Program) axes of the scatterplot have the greatest alignment with goals of bringing energy efficiency training to disadvantaged populations.

<sup>4</sup> MDRC, *Promoting Employment Stability and Advancement Among Low-Income Adults*, March, 2013.

<sup>5</sup> MDRC, *Meeting the Needs of Workers and Employers: Implementation of a Sector-Focused Career Advancement Model for Low-Skilled Adults*, October, 2014.

<sup>6</sup> IBID

<sup>7</sup> MDRC, *What Strategies Work for the Hard-to-Employ? Final Results of the Hard-to-Employ Demonstration and Evaluation Project and Selected Sites from the Employment Retention and Advancement Project*, March, 2012.

<sup>8</sup> MDRC, *Providing Earnings Supplements to Encourage and Sustain Employment*, May, 2011.

<sup>9</sup> National Fund for Workforce Solutions, *Characteristics of a High Performing Industry Partnership*, May, 2014.

<sup>10</sup> Mathematica Policy Research, *The Implementation of the Welfare-to-Work Grants Program*, August, 2002.

<sup>11</sup> Inclusion Implementer is an organization the focuses on training individuals from disadvantaged populations.

Appendix 12 highlights the 76 organizations researched for this effort and their rankings among these two criteria. For either of these criteria, the IOUs may want to refine the criteria based on additional priorities.

For Objective D-3, the ICF Team conducted secondary research regarding national best practices for providing energy efficiency-related training and support to disadvantaged workers. Best practices are commonly defined as “techniques or methodologies that, through experience and research, have been proven to reliably lead to a desired result.”<sup>12</sup> The overall objective of the research is to (1) provide an overview of California’s current energy efficiency workforce training system focused on disadvantaged workers; (2) identify inclusionary program best practices; and (3) determine an effective inclusion infrastructure for California and what role the IOUs might play in this infrastructure.

The ICF Team presents a framework of best practices for inclusionary training programs with examples drawn from research. This framework includes recruitment into training programs, incorporating workforce skills standards into training programs, and providing “wrap-around” services for disadvantaged workers. Specifically, five best practices were identified:

- Workforce Sector Strategies: Coalitions of industry, education, and other workforce stakeholders to plan and implement training programs targeted at specific industry needs;
- Pre-Apprenticeship Training: To attract, introduce, prepare, and train new entrants for careers in aligned trades;
- Skills Standards and Credentials: While there is broad acceptance that skill standards are needed and that industry recognition of credentials is beneficial, there is less evidence of industry coordination around standards and credentials;
- Career Readiness and Supportive Services: Disadvantaged workers face barriers other than hard skills training; comprehensive case management provides the supportive services framework necessary to help disadvantaged workers find and prepare for the workforce; and,
- Job Placement and Follow-up Support Services: Once trained, disadvantaged workers need assistance in finding and retaining employment.

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<sup>12</sup> Bitpipe Definition.



# 1. Scope A: What are the requirements for ESA Program Field Workers?

## 1.1 Project Background, Purpose, and Methodologies

The IOUs tasked the ICF team with providing guidance regarding job classifications for ESA program field workers with the following job titles:

- Energy Specialist/Program Representative/Residential Outreach Specialist.
- Installation Technician/Specialist.
- Natural Gas Appliance Test (NGAT) Technician.
- Inspector.

To determine whether ESA workers could be placed within appropriate classifications, the ICF team undertook a job classification and mapping review of ESA program field positions to ascertain the level of alignment, using available state and federal job classifications as the starting place. This effort entailed three primary tasks to address three major research questions, as specified in the subsequent sections.

- What are the current ESA program contractors' field worker job classifications and their descriptions?
- Can these existing job descriptions be mapped into existing federal, state or other generally accepted standard job classifications?
- Are there any existing ESA field worker job classifications that can't be properly mapped?

This technical report provides the methodology and findings addressing each of these research questions.

## 1.2 What are the current ESA program contractors' field worker job classifications and their descriptions?

### METHODOLOGY

To address the first research question, the ICF Team gathered and evaluated the following data from the IOUs:

- Four brief ESA Job Descriptions that outline typical responsibilities.
- The California Installation Standards for Use in the Energy Savings Assistance Program manual that included detailed documentation of all ESA installation standards.
- Previous *Job Task Analysis (JTA) Findings* that were completed for Energy Specialist/Program Representative/Residential Outreach Specialist, Installation Technician/ Specialist, and Natural Gas Appliance Test (NGAT) Technician for the purpose of comparing the required tasks and knowledge, skills, abilities, and other characteristics (KSAOs) required in the positions to current training content.
- The task and KSAO lists included in these JTAs were based upon JTAs completed by the United States Department of Energy's National Renewable Energy Laboratory (NREL). For the fourth job (Inspector), although a JTA had not been completed by the IOUs, applicable JTA information on this job was available from NREL.
- Gathered detailed job descriptions. Based upon the background information reviewed, the ICF Team gathered job descriptions for each of the four positions. Each job description includes:

- Job Title.
- Description.
- Job Tasks.
- A list of broad job domains and more specific tasks under each domain, based upon the JTA information.
- Knowledge, Skills, Abilities, and Other Characteristics (KSAOs).

The JTA data reviewed included several hundred KSAOs for each of the four jobs. ICF conducted a coding exercise to classify each of the KSAOs into broader categories and refine the KSAO lists into a succinct set that addressed the comprehensive KSAO needs for each job. This coding exercise involved sorting the KSAOs into categories (e.g., communication), and then analyzing the KSAOs within each category to develop final set of KSAOs and definitions. While some KSAOs are listed for multiple positions, the KSAO descriptions for each job are specific to the needs for that individual position.

Table 1 provides an overview of the four ESA jobs, including the brief description of each and documentation of the NREL JTA that was used to compile the task and KSAO lists.

Table 1: ESA Job Descriptions		
Position (position name varies by utility)	Description	Applicable NREL JTA for Task & KSAO Lists
Energy Specialist/ Program Representative/ Residential Outreach Specialist	<p>Typical responsibilities are to promote and enroll customers in the ESA Program, which may include:</p> <ul style="list-style-type: none"> <li>• Recruiting and informing customers (owners and renters) for participation in ESA Program.</li> <li>• Screening customers for ESA Program eligibility by verifying and/or collecting customer documents.</li> <li>• Evaluating customers' homes for eligibility and assessing feasibility of ESA Program measures.</li> <li>• Providing Energy Education materials and educate the customer on ways to conserve energy and provide information on other available utility, state and federal programs.</li> <li>• Installing easy to install measures (if applicable), such as CFLs, Torchiere Lamps, or Advanced Power Strips.</li> </ul>	<p>Energy Auditor  <a href="http://energy.gov/sites/pr/files/2014/01/f7/51672.pdf">http://energy.gov/sites/pr/files/2014/01/f7/51672.pdf</a></p>

Table 1: ESA Job Descriptions		
Position (position name varies by utility)	Description	Applicable NREL JTA for Task & KSAO Lists
Installation Technician/Specialist	<p>Employees in this position are responsible for:</p> <ul style="list-style-type: none"> <li>• Replacing (i.e., installing) and/or repairing measures offered through the ESA Program.</li> <li>• Educating customers on the proper use and maintenance of the installed measure(s).</li> <li>• Explaining warranty of installed measure(s) to customers</li> </ul> <p>This is a partial list of available measures:</p> <ul style="list-style-type: none"> <li>• Refrigerators</li> <li>• Microwaves</li> <li>• Washers</li> <li>• Central Air Conditioner (A/C) and Heat Pump (H/P)*</li> <li>• Furnace repair/replacement*</li> <li>• Room A/Cs*</li> <li>• Evaporative Coolers*</li> <li>• Pool Pumps*</li> <li>• Water Heaters*</li> <li>• Weatherization*</li> </ul> <p>*These measures may require a license and/or specialized skills by the Installation Technician/Specialist that may limit their installation to specialists.</p>	<p>Retrofit Installer Technician</p> <p><a href="http://energy.gov/sites/prod/files/2014/01/f7/51671.pdf">http://energy.gov/sites/prod/files/2014/01/f7/51671.pdf</a></p>
Natural Gas Appliance Test (NGAT) Technician	<p>Employees in this position perform natural gas appliance testing in accordance with the ESA Program policies. This process may be performed by third-party with specialized skill, training, and/or license.</p>	<p>Retrofit Installer Technician</p> <p><a href="http://energy.gov/sites/prod/files/2014/01/f7/51671.pdf">http://energy.gov/sites/prod/files/2014/01/f7/51671.pdf</a></p>
Inspector	<p>Employees in this position ensure safety and quality control of the installation of ESA Program measures. This process may be performed by third-party with specialized skills, training, and/or license.</p>	<p>Quality Control Inspector</p> <p><a href="http://energy.gov/sites/prod/files/2014/01/f7/51670.pdf">http://energy.gov/sites/prod/files/2014/01/f7/51670.pdf</a></p>

## FINDINGS

Based on the background information that was gathered and reviewed, the ICF Team gathered a detailed list of tasks performed and KSAOs required in the ESA field worker positions for each of the four jobs. The job descriptions are presented on the following pages.

## Energy Specialist/Program Representative/ Residential Outreach Specialist<sup>13</sup>

### Description:

Typical responsibilities are to promote and enroll customers in the ESA Program, which may include:

- Recruiting and informing customers (owners and renters) for participation in ESA Program.
- Screening customers for ESA Program eligibility by verifying and/or collecting customer documents.
- Assessing/Evaluating customers home for eligibility and feasibility of ESA Program measures.
- Providing Energy Education materials and educate the customer on ways to conserve energy and provide information on other available utility, state and federal programs.
- Installing easy to install measures (if applicable), such as CFLs, Torchiere Lamps, or Advanced Power Strips.

### Job Tasks:

- **Domain I: Program Promotion.**
  - Task 1: Establish client relations for an energy audit.
  - Task 2: Represent the program/agency/organization.
  - Task 3: Maintain professionalism.
- **Domain II: Collect information about the building for an energy audit.**
  - Task 1: Capture energy consumption.
  - Task 2: Document the building history.
  - Task 3: Conduct a physical/visual inspection.
  - Task 4: Collect appliance information.
  - Task 5: Compile building measurements.
  - Task 6: Assemble health and safety data.
  - Task 7: Collect mechanical ventilation data.
  - Task 8: Identify building insulation (attic, walls, and foundations).
  - Task 9: Gather attic data.
  - Task 10: Document window data.
  - Task 11: Record door data.
  - Task 12: Compile foundation data.
  - Task 13: Collect roof data.

<sup>13</sup> Position name and description varies by utility.

- **Domain III: Evaluate the collected energy audit data.**
  - Task 1: Assess the health and safety of the building.
  - Task 2: Calculate the durability/structural integrity of the building.
  - Task 3: Review the HVAC system.
  - Task 4: Appraise the mechanical system.
  - Task 5: Determine the foundation.
  - Task 6: Review the walls.
  - Task 7: Study the attic.
  - Task 8: Examine the doors.
  - Task 9: Assess the windows.

### Knowledge, Skills, Abilities, and Other Characteristics:

- **Analysis & Logical Reasoning** – Skill in reviewing collected data to identify issues, comparing data against standards, interpreting output from software, and using reasoning skills to make decisions (e.g., determinations to repair versus replace).
- **Verbal/Written Communication & Interpersonal Skills** – Skill in presenting information, asking questions, creating reports, documenting findings, listening, professionally interacting with clients, and serving as a liaison between clients and contractors.
- **Computer Usage** – Skill in using computers to enter data, use energy modeling software, and navigate online mapping tools.
- **Data Collection & Measurement** – Skill in making observations, collecting and documenting data regarding appliances, electrical systems, and client energy usage, operating tools such as a compass or watt hour meter, taking measurements (e.g. attics, doors, foundations, radiators, roofs, walls, windows), and performing calculations (e.g., area, volume, ventilation, load, building tightness limits).
- **Physical Ability** – Ability to detect unusual odors, use ladders, perform visual inspections, walk around the interior/exterior of a building, work in confined spaces, and do work at varying heights.
- **Professionalism & Self-Management** – Ability to follow professional codes of conduct, manage time, work independently, acquire and maintain professional certifications, achieve education requirements, and provide attention to detail.
- **Safety** – Knowledge of requirements and procedures regarding electrical hazards, hazardous materials, CO exposure, and Occupational Safety and Health Administration (OSHA) standards.
- **Technical Knowledge** – Knowledge of ESA program requirements, energy consumption, buildings and their components (e.g., walls, doors, windows, roofs, foundations), appliances, HVAC systems, ventilation, and relevant technical standards.

## Installation Technician/Specialist

### Description:

Employees in this position are responsible for:

- Replacing (i.e., installing) and/or repairing measures offered through the ESA Program.
- Educating customers on the proper use and maintenance of the installed measure(s).
- Explaining warranty of installed measure(s) to customers
- This is a partial list of available measures:
  - Refrigerators
  - Microwaves
  - Washers
  - Central Air Conditioner (A/C) and Heat Pump (H/P)\*
  - Furnace repair/replacement\*
  - Room A/Cs\*
  - Evaporative Coolers\*
  - Pool Pumps\*
  - Water Heaters\*
  - Weatherization\*

\* These measures may require a license and/or specialized skills by the Installation Technician/Specialist that may limit their installation to specialists.

### Job Tasks:

- **Domain I: Maintain safety.**
  - Task 1: Follow work rules of Jurisdiction that has authority.
  - Task 2: Handle materials/equipment according to manufacturer specifications.
  - Task 3: Manipulate tools according to manufacturer specifications.
- **Domain II: Prepare for the job (before arriving at job site).**
  - Task 1: Attend appropriate training.
  - Task 2: Gather materials and supplies.
  - Task 3: Collect tools.
- **Domain III: Prepare and maintain tools and materials on-site.**
  - Task 1: Assemble tools.
  - Task 2: Set up materials.
- **Domain IV: Prepare and maintain job site.**
  - Task 1: Attend job site safety meeting.
  - Task 2: Implement safety protocol (rigging, ventilation, blocking).
  - Task 3: Use protective barriers (drop cloths).
  - Task 4: Report preexisting conditions (that are not in scope).
  - Task 5: Protect exterior environment.
- **Domain V: Implement work scope**
  - Task 1: Locate specific work areas.
  - Task 2: Verify access to work areas.
  - Task 3a: Install air sealing measures.

- Task 3b: Install loose fill insulation.
- Task 3c: Install or patch moisture barriers.
- Task 3d: Rough in mechanical ventilation systems.
- Task 3e: Identify mechanical systems.
- Task 3f: Identify combustion appliance safety hazards.
- Task 3g: Install dense pack insulation.
- Task 3h: Install windows and doors.
- Task 3i: Identify electrical installation needs (rough-in, fans).
- Task 3j: Identify plumbing installation needs.
- Task 3k: Assess roofing and flashing installation needs.
- Task 4: Clean and organize throughout the process.
- Task 5: Address deviations from work scope.
- **Domain VI: Wrap up.**
  - Task 1: Pick up tools and materials.
  - Task 2: Clean up and close out.
  - Task 3: Participate in crew debriefing (after action review and construction job review).

## Knowledge, Skills, Abilities, and Other Characteristics:

- **Communication** – Skill in verbal communication (e.g., discussing with homeowners), written communication (e.g., creating reports, documenting findings), and listening technique (e.g., comprehending safety guidelines and manufacturers specifications).
- **Materials Management** – Ability to confirm needed materials to match work specifications, properly dispose of materials and waste that may contain hazardous materials, organize/store tools and materials, and keep an inventory of tools and materials used during process.
- **Physical Ability** – Ability to perform physical aspects of the job, such as setting up drop cloths and protective coverings, removing and moving equipment, blocking large openings, cleaning the work area, walking around the home interior/exterior, and working in confined spaces.
- **Professionalism & Self-Management** – Ability to identify strengths and weaknesses of oneself, request and attend safety meetings and trainings, and review, modify, and implement the work scope as needed.
- **Safety** – Knowledge of safety requirements and procedures (e.g., fire code, lift safety procedure, self-care, tool safety) and ability to inspect the work area for hazards (e.g., asbestos, combustion, lead).
- **Technical Knowledge** – Knowledge of details about equipment installation requirements and operation, floor plans, local building codes, material specifics (e.g., characteristics, durability, strength, handling), ventilation systems, moisture symptoms, electrical safety, insulation standards and requirements, and general carpentry, construction, and landscape.

## Natural Gas Appliance Test (NGAT) Technician

### Description:

Employees in this position perform natural gas appliance testing in accordance with the ESA Program policies. This process may be performed by third-party with specialized skill, training, and/or license.

### Job Tasks:

- **Domain I: Maintain safety.**
  - Task 1: Follow work rules of Jurisdiction that has authority.
  - Task 2: Handle materials/equipment according to manufacturer specifications.
  - Task 3: Manipulate tools according to manufacturer specifications.
- **Domain II: Prepare for the job (before arriving at job site).**
  - Task 1: Attend appropriate training.
  - Task 2: Gather materials and supplies.
  - Task 3: Collect tools.
- **Domain III: Prepare and maintain tools and materials on-site.**
  - Task 1: Assemble tools.
  - Task 2: Set up materials.
- **Domain IV: Prepare and maintain job site.**
  - Task 1: Attend job site safety meeting.
  - Task 2: Implement safety protocol (rigging, ventilation, blocking).
  - Task 3: Use protective barriers (drop cloths).
  - Task 4: Report preexisting conditions (that are not in scope).
  - Task 5: Protect exterior environment.
- **Domain V: Implement work scope**
  - Task 1: Locate specific work areas.
  - Task 2: Verify access to work areas.
  - Task 3a: Rough in mechanical ventilation systems.
  - Task 3b: Identify mechanical systems.
  - Task 3c: Identify combustion appliance safety hazards.
  - Task 3d: Identify plumbing installation needs.
  - Task 4: Clean and organize throughout the process.
  - Task 5: Address deviations from work scope.



- **Domain VI: Wrap up.**
  - Task 1: Pick up tools and materials.
  - Task 2: Clean up and close out.
  - Task 3: Participate in crew debriefing (after action review and construction job review).

### **Knowledge, Skills, Abilities, and Other Characteristics:**

- **Communication** – Skill in verbal communication (e.g., discussing with homeowners), written communication (e.g., creating reports, documenting findings), and listening technique (e.g., comprehending safety guidelines and manufacturers specifications).
- **Materials Management** – Ability to confirm needed materials to match work specifications, properly dispose of materials and waste that may contain hazardous materials, organize/store tools and materials, and keep an inventory of tools and materials used during process.
- **Physical Ability** – Ability to perform physical aspects of the job, such as setting up drop cloths and protective coverings, removing and moving equipment, blocking large openings, cleaning the work area, walking around the home interior/exterior, and working in confined spaces.
- **Professionalism & Self-Management** – Ability to identify strengths and weaknesses of oneself, request and attend safety meetings and trainings, and review, modify, and implement the work scope as needed.
- **Safety** – Knowledge of safety requirements and procedures (e.g., fire code, lift safety procedure, self-care, tool safety) and ability to inspect the work area for hazards (e.g., asbestos, combustion, lead).
- **Technical Knowledge** – Knowledge of details about equipment installation requirements and operation, floor plans, local building codes, material specifics (e.g., characteristics, durability, strength, handling), ventilation systems, moisture symptoms, electrical safety, insulation standards and requirements, and general carpentry, construction, and landscape.

## Inspector

### Description:

Employees in this position ensure safety and quality control in the installation of ESA Program measures. This process may be performed by third-party with specialized skills, training, and/or license.

### Job Tasks:

- **Domain I: Conduct in-process visual/sensory inspections.**
  - Task 1: Verify worker compliance with safety rules.
  - Task 2: Assure worker professionalism.
  - Task 3: Address work problems.
  - Task 4: Evaluate client satisfaction regarding the in-process work.
- **Domain II: Conduct post-work visual/sensory inspection.**
  - Task 1: Review client file and the work scope.
  - Task 2: Perform an exterior and interior visual/sensory inspection.
  - Task 3: Evaluate client satisfaction.
  - Task 4: Determine pass/fail of the work.
- **Domain III: Conduct post-work diagnostic inspections.**
  - Task 1: Administer health and safety tests.
  - Task 2: Conduct diagnostic tests.
  - Task 3: Identify any work problems.
- **Domain IV: Ensure worker professionalism.**
  - Task 1: Perform spot checks.
  - Task 2: Provide feedback regarding professionalism.
- **Domain V: Ensure program and/or project compliance.**
  - Task 1: Maintain professional credentials.
  - Task 2: Confirm the allocation of public/private funds.
  - Task 3: Evaluate installed measures against the field guide, SWS and state/local codes.
  - Task 4: Close out the project.
  - Task 5: Maintain files and records.

### Knowledge, Skills, Abilities, and Other Characteristics:

- **Analytical Thinking & Decision Making** – Skill in making comparisons (e.g., comparing work completed against accepted practices, comparing results), determining deficiencies, evaluating job sites, identifying problems, interpreting data, reviewing inspection results, and determining pass/fail decisions.
- **Communication & Interpersonal Skills** – Skill in verbal communication (e.g., interviewing, assisting in training workers, educating clients, communicating findings and issues), written communication (e.g., writing reports, documenting findings), and listening technique.
- **Data Collection & Testing** – Skill in observing site conditions and worker/client behavior, and performing diagnostic procedures (e.g., appliance tests, domestic water heater temperature tests, electrical safety tests,

moisture evaluations, combustion tests, duct leakage tests, electric circuit tests, fan flow tests, infrared scans, pressure pan tests, refrigerant tests, ventilation system tests, zone tests)

- **Organization & Record Keeping** – Skill in documenting findings, collecting required documentation and signatures, reviewing audits and work orders, and maintaining files with job logs, photos, and notes.
- **Physical Ability** – Ability to perform physical aspects of the job, such walking around the site interior/exterior, and working in confined spaces.
- **Professionalism & Self-Management** – Ability to follow codes of conduct, maintain certifications/licenses, and provide attention to detail.
- **Safety** – Knowledge of safety requirements and procedures (e.g., safety combustion protocols, first aid, safety issues)
- **Technical Knowledge** – Knowledge of audit processes, basic building science and building materials, construction practices, installation methods, ESA program requirements; and relevant standards, specifications, and regulations.

### 1.3 Can these existing job descriptions be mapped into existing Federal, State or other generally accepted standard job classifications?

#### METHODOLOGY

To map existing job descriptions to federal, state or other generally accepted job classifications, the ICF Team identified existing classifications that were potentially relevant to the ESA program field worker jobs. To ensure any classification that could potentially be a fit was included, the ICF Team conducted a thorough search of existing classification standards (listed below) using broad criteria to determine relevance. We focused the search on jobs within the energy sector and flagged classifications that appeared potentially relevant for each job (e.g., jobs focused on installation, inspection, or customer service programs, depending on the job of interest). The following sources of job classifications were reviewed:

- Federal:** The Office of Personnel Management's *Handbook of Occupational Groups and Families* provides information on all job classifications within the federal government. The ICF Team analyzed wage grade jobs (i.e., trade, craft, or labor jobs), as they were the most applicable to the four ESA jobs. However, given that none of the jobs were in energy or related fields, it was determined that no existing federal job classifications were similar enough to the four ESA jobs to warrant inclusion in the more detailed evaluation.
- The Occupational Information Network (O\*NET) is the primary national source of occupational information, and provides information on a wide range of jobs performed in the United States (in contrast to the OPM handbook, which provides information on jobs within the federal government only). Several O\*NET job descriptions were identified for further analysis in this effort.
- State:** The ICF Team reviewed state job classifications from California and a selection of additional states, including targeted searches in other States with more budgetary resources (e.g., New York, Texas) and broader internet searches to identify any state classifications that may be relevant. While a selection of State job classifications were identified for further evaluation, overall, there were very few relevant classifications and most states did not have any applicable classifications to include. Similar to the findings from the search of Federal government classifications (i.e., OPM Handbook), this is likely because this type of energy field work is not generally performed at the state level.
- Other:** The ICF Team also reviewed information from industry groups and public and private sector organizations. Because little relevant information was uncovered through well-established job classification sources, the ICF Team included job descriptions that could be investigated further if deemed highly relevant during the evaluation.

After the search for relevant job classifications was complete, the ICF Team conducted a systematic evaluation to determine whether the ESA program field worker jobs could be appropriately mapped to any of the identified job classifications. To conduct this evaluation, the ICF Team hosted a panel of four industrial/organizational psychologists (two PhD-level and two Masters-level) who were experienced with job task analysis and job classification and familiar with the jobs of interest. These job classification experts completed a series of evaluation ratings to assess the suitability of the existing identified classifications. For each of the four ESA jobs, raters reviewed the job description that was gathered to answer Research question one (i.e., what are the current ESA program contractors' field worker job classifications and their descriptions?), and completed ratings on the level of similarity between the ESA job and each of the identified job classifications. The job classification experts also provided an overall rating of how well each job classification mapped to the job, and also provided a qualitative rationale for their ratings as desired. Ratings from this panel were then analyzed by the ICF Team. The rating scales used for this task are provided in Table 2.

Table 2: Rating Scales for Mapping Job Descriptions to Job Classifications	
<p>Please rate the level of similarity between the job classification and the job of [title] on each of the following dimensions,* using the following rating scale:</p> <ul style="list-style-type: none"> <li>1=Completely different</li> <li>2=Mostly different</li> <li>3=Slightly similar</li> <li>4=Very similar</li> <li>5=About the same</li> <li>N/A=Not applicable</li> </ul> <p>*Dimensions rated include General Responsibilities, Tasks, KSAOs, and Level of Responsibility.</p>	<p>Overall, how well does this job classification map to this job? Use the following rating scale:</p> <ul style="list-style-type: none"> <li>1=Not at all</li> <li>2=Somewhat</li> <li>3=Moderate</li> <li>4=Well</li> <li>5=Very well</li> </ul>

The job classifications included in this evaluation are provided in Appendix 1 – ESA Comparison Job Classifications.

### FINDINGS

Job classifications were deemed applicable to the ESA job if they were rated a mean of 4.0 or higher across all factors in terms of their level of similarity, and if the mean overall extent of alignment was 4.0 or higher (i.e., the job classification was considered to map to the ESA job at least 'well').

**Table 3: Industrial/Organizational Psychologists Panel Results**

Job Title	Findings
Energy Specialist/ Program Representative/ Residential Outreach Specialist	All job classifications had mean ratings below 4.0, so none of the existing classifications rated by the panel were deemed to be applicable to the job.
Installation Technician/Specialist	One classification (Weatherization Installers and Technicians from O*NET <a href="http://www.onetonline.org/link/summary/47-4099.03">[http://www.onetonline.org/link/summary/47-4099.03]</a> ) was deemed "highly relevant" to the job (Level of similarity: mean = 4.19; overall extent of alignment: mean = 4.50). Note: under this category, across the IOUs, installation has many performance components of which a limited comparison was performed.
Natural Gas Appliance Test (NGAT) Technician	One classification (Weatherization Installers and Technicians from O*NET <a href="http://www.onetonline.org/link/summary/47-4099.03">[http://www.onetonline.org/link/summary/47-4099.03]</a> ) was deemed "highly relevant" to the job (Level of similarity: mean = 4.00; overall extent of alignment: mean = 4.00). The tasks and KSAOs for NGAT technician and Installation Technician/Specialist were nearly the same. However, mean ratings met—but did not exceed—the cutoff criterion in this case, as the O*NET classification did not specifically address NGAT. Note: under this category, across the IOUs, installation has many performance components of which a limited comparison was performed.
Inspector	All job classifications had mean ratings below 4.0, so none of the existing classifications rated by the panel were deemed to be applicable to the job.

Specific results of the evaluation for each of the four ESA jobs are presented on the following pages.

The mean (average) score across all raters and the standard deviation of the ratings are presented in each table. The same set of four raters rated all of the job classifications. The level of similarity was rated for each of the key components contained in the ESA job descriptions, including the general responsibilities, tasks, and KSAOs. Level of responsibility was also added, as this is an important characteristic of the job that can generally be inferred from the tasks described (for example, jobs may involve similar tasks, but the level of responsibility may differ depending on whether someone assist others versus performs the task independently versus oversees others in performing the task). The ratings for all of these factors were then averaged to obtain the overall level of similarity. Finally, raters were asked to make a rating of the overall extent of alignment between the ESA job and each job classification.

**Table 4: Energy Specialist/Program Representative/Residential Outreach Specialist**

#	Type	Title	Level of similarity (1=Completely different to 5=About the same)										Overall Extent of Alignment (1=Not at all to 5=Very Well)	
			General Responsibilities		Tasks		KSAOs		Level of Responsibility		All Factors			
			Mean	SD	Mean	SD	Mean	SD	Mean	SD	Mean	SD	Mean	SD
1	Federal	O*NET Energy Auditor	3.25	1.09	3.25	1.09	3.75	0.43	3.50	1.12	<b>3.44</b>	0.93	<b>3.50</b>	1.12
2	State	California Energy Analyst	2.50	0.87	2.50	0.50	2.00	0.82	2.50	0.50	<b>2.38</b>	0.67	<b>2.25</b>	0.43
3	State	California Energy Commission Specialist/Supervisor (Technology Evaluation & Development)	2.75	0.83	2.75	0.83	2.50	0.50	2.25	0.83	<b>2.56</b>	0.75	<b>2.50</b>	0.50
4	State	California Energy Commission Specialist/Supervisor (Forecasting)	1.33	0.47	1.33	0.47	1.33	0.47	1.67	0.94	<b>1.42</b>	0.59	<b>1.33</b>	0.47
5	State	California Energy Commission Specialist/Supervisor (Efficiency)	2.25	0.83	2.25	1.30	2.00	1.00	2.25	0.83	<b>2.19</b>	0.99	<b>2.00</b>	1.00
6	State	Oregon Weatherization Program Coordinator	2.50	0.87	2.25	0.43	2.00	0.00	2.00	0.71	<b>2.19</b>	0.50	<b>2.25</b>	0.43
7	Other	Direct Installation Technician	3.25	0.83	3.25	0.83	2.75	0.83	3.00	1.00	<b>3.06</b>	0.87	<b>3.00</b>	1.00
8	Other	Energy Advisor I	3.75	1.09	3.75	1.09	3.25	0.83	3.00	1.41	<b>3.44</b>	1.11	<b>3.50</b>	1.12
9	Other	Energy Efficiency Program Administrator	2.75	0.43	2.75	0.43	2.50	1.12	2.25	0.83	<b>2.56</b>	0.70	<b>2.75</b>	0.43
10	Other	Home Energy Technician	3.75	0.83	3.75	0.83	3.50	0.50	3.25	0.83	<b>3.56</b>	0.75	<b>3.75</b>	0.83
11	Other	Energy Coordinator	3.00	0.71	2.75	0.43	2.25	0.43	2.25	0.83	<b>2.56</b>	0.60	<b>2.50</b>	0.50
12	Other	Program Coordinator	2.25	0.83	2.25	0.83	2.25	1.09	2.50	1.12	<b>2.31</b>	0.97	<b>2.25</b>	0.83
13	Other	Energy Assistance Clerk	3.25	0.83	2.25	0.83	2.75	0.83	2.25	0.83	<b>2.63</b>	0.83	<b>3.00</b>	1.00
14	Other	LIHEAP Intake Specialist	4.00	0.71	3.00	0.71	3.00	0.71	3.50	0.87	<b>3.38</b>	0.75	<b>3.50</b>	1.12
15	Other	LIHEAP Intake Worker	3.00	0.71	3.00	0.71	3.00	0.71	3.25	0.43	<b>3.06</b>	0.64	<b>3.00</b>	0.71
16	Other	LIHEAP Worker (Temporary)	2.75	0.83	2.00	0.71	2.50	0.87	2.25	0.43	<b>2.38</b>	0.71	<b>2.25</b>	0.83

As shown in Table 4, there were no classifications that had mean ratings of 4.0 or higher in terms of their level of similarity or overall extent of alignment with the Energy Specialist/Program Representative/Residential Outreach Specialist job.

**Table 5: Installation Technician/Specialist**

#	Type	Title	Level of similarity (1=Completely different to 5=About the same)										Overall Extent of Alignment (1=Not at all to 5=Very Well)	
			General Responsibilities		Tasks		KSAOs		Level of Responsibility		All Factors			
			Mean	SD	Mean	SD	Mean	SD	Mean	SD	Mean	SD	Mean	SD
1	Federal	O*NET Weatherization Installers and Technicians	4.50	0.87	3.75	1.09	4.00	0.00	4.50	0.87	<b>4.19</b>	0.71	<b>4.50</b>	0.87
2	Federal	O*NET Heating and Air Conditioning Mechanics and Installers	3.75	0.83	3.50	0.87	3.50	0.50	4.00	0.71	<b>3.69</b>	0.73	<b>3.75</b>	0.83
3	Federal	O*NET Helpers--Installation, Maintenance, and Repair Workers	3.75	0.83	3.75	0.83	3.25	0.83	3.25	1.09	<b>3.50</b>	0.89	<b>3.50</b>	1.12
4	Federal	O*NET Solar Thermal Installers and Technicians	3.00	1.22	3.50	1.12	3.00	0.71	3.50	0.87	<b>3.25</b>	0.98	<b>3.25</b>	1.09
5	Other	Energy Efficiency Installation Technician	3.50	1.12	3.25	0.43	2.75	0.43	4.00	0.71	<b>3.38</b>	0.67	<b>3.50</b>	0.50
6	Other	Energy Efficiency Technician	4.00	1.22	4.00	1.22	3.75	0.83	4.00	1.00	<b>3.94</b>	1.07	<b>3.75</b>	1.30
7	Other	Home Energy Technician	2.75	0.43	2.75	0.43	2.75	0.43	3.00	0.71	<b>2.81</b>	0.50	<b>2.75</b>	0.43
8	Other	Energy Efficiency & Insulation Installer	3.50	1.12	3.50	0.50	3.00	0.71	3.75	0.83	<b>3.44</b>	0.79	<b>3.25</b>	1.09
9	Other	Heating, Ventilation, Air Conditioning, and Refrigeration Technician	3.75	1.30	3.75	1.30	3.50	0.87	4.00	1.00	<b>3.75</b>	1.12	<b>3.75</b>	1.30
10	Other	Energy Conservation Technician II	4.25	0.43	4.00	0.71	3.75	0.83	3.75	0.83	<b>3.94</b>	0.70	<b>4.00</b>	0.71
11	Other	Energy Utilities Technician	3.75	0.83	4.00	0.71	3.75	0.83	3.75	0.83	<b>3.81</b>	0.80	<b>3.75</b>	0.83

As shown in Table 5, O\*NET Weatherization Installers and Technicians is the only classification that had mean ratings of 4.0 or higher in terms of their level of similarity and overall extent of alignment with the Installation Technician/Specialist job.



**Table 6: Natural Gas Appliance Test (NGAT) Technician**

#	Type	Title	Level of similarity (1=Completely different to 5=About the same)										Overall Extent of Alignment (1=Not at all to 5=Very Well)	
			General Responsibilities		Tasks		KSAOs		Level of Responsibility		All Factors			
			Mean	SD	Mean	SD	Mean	SD	Mean	SD	Mean	SD	Mean	SD
1	Federal	O*NET Weatherization Installers and Technicians	4.00	1.00	3.50	0.87	4.00	0.00	4.50	0.87	4.00	0.68	4.00	0.71
2	Federal	O*NET Heating and Air Conditioning Mechanics and Installers	3.25	0.43	3.25	0.43	3.50	0.50	4.00	0.71	3.50	0.52	3.50	0.50
3	Federal	O*NET Helpers--Installation, Maintenance, and Repair Workers	3.50	0.87	3.50	0.87	3.25	0.83	3.25	1.09	3.38	0.91	3.25	1.09
4	Federal	O*NET Solar Thermal Installers and Technicians	3.00	1.22	3.25	0.83	3.00	0.71	3.50	0.87	3.19	0.91	3.25	1.09
5	Other	Energy Efficiency Installation Technician	3.00	0.71	3.00	0.00	2.75	0.43	4.00	0.71	3.19	0.46	3.25	0.43
6	Other	Energy Efficiency Technician	4.00	1.22	4.00	1.22	3.75	0.83	4.00	1.00	3.94	1.07	3.75	1.30
7	Other	Home Energy Technician	2.75	0.43	2.75	0.43	2.75	0.43	3.00	0.71	2.81	0.50	2.75	0.43
8	Other	Energy Efficiency & Insulation Installer	3.50	1.12	3.50	0.50	3.00	0.71	3.75	0.83	3.44	0.79	3.25	1.09
9	Other	Heating, Ventilation, Air Conditioning, and Refrigeration Technician	3.75	1.30	3.75	1.30	3.50	0.87	4.00	1.00	3.75	1.12	3.75	1.30
10	Other	Energy Conservation Technician II	4.00	0.00	3.75	0.43	3.75	0.83	3.75	0.83	3.81	0.52	3.75	0.43
11	Other	Energy Utilities Technician	3.75	0.83	3.75	0.43	3.75	0.83	3.75	0.83	3.75	0.73	3.75	0.83

As shown in Table 6, O\*NET Weatherization Installers and Technicians is the only classification that had mean ratings of 4.0 or higher in terms of their level of similarity and overall extent of alignment with the NGAT Technician job.

**Table 7: Inspector**

#	Type	Title	Level of similarity (1=Completely different to 5=About the same)										Overall Extent of Alignment (1=Not at all to 5=Very Well)	
			General Responsibilities		Tasks		KSAOs		Level of Responsibility		All Factors		Mean	SD
			Mean	SD	Mean	SD	Mean	SD	Mean	SD	Mean	SD		
1	Federal	Construction and Building Inspectors	2.75	0.43	3.00	0.71	3.00	0.71	3.25	0.43	<b>3.00</b>	0.57	<b>3.00</b>	0.71
2	Federal	Energy Auditor	2.50	1.12	3.00	0.71	3.50	0.50	3.75	0.43	<b>3.19</b>	0.69	<b>3.00</b>	0.71
3	State	California Construction Inspector I	3.75	0.43	3.75	0.43	3.25	0.43	3.75	0.43	<b>3.63</b>	0.43	<b>3.75</b>	0.43
4	State	Texas Inspector I	3.50	0.50	3.25	0.43	3.25	0.43	3.50	0.50	<b>3.38</b>	0.47	<b>3.50</b>	0.50
5	Other	Weatherization Auditor	4.00	0.82	3.67	0.47	3.33	0.47	3.33	1.25	<b>3.58</b>	0.75	<b>3.67</b>	0.94
6	Other	Energy Conservation Diagnostic Auditor	3.00	0.71	3.50	0.50	4.00	0.71	3.50	1.12	<b>3.50</b>	0.76	<b>3.75</b>	0.43
7	Other	Weatherization Auditor	3.50	0.50	3.75	0.43	3.50	0.50	4.50	0.50	<b>3.81</b>	0.48	<b>3.75</b>	0.43

As shown in Table 7, there were no classifications that had mean ratings of 4.0 or higher in terms of their level of similarity or overall extent of alignment with the Inspector job.

In summary, two of the ESA jobs—Installation Technician/Specialist and NGAT Technician<sup>14</sup>—mapped to an existing classification because they had mean ratings of 4.0 or higher in terms of their level of similarity and overall extent of alignment between the ESA job description and the classification of O\*NET Weatherization Installers and Technicians. For the other two ESA jobs—Energy Specialist/Program Representative/Residential Outreach Specialist and Inspector—there were no

<sup>14</sup> Note: under this category, across the IOUs, installation has many performance components of which a limited comparison was performed.

classifications that had mean ratings of 4.0 or higher in terms of their level of similarity or overall extent of alignment; thus, it was determined that these two ESA jobs did not map to any existing classifications.

## 1.4 Are there any existing ESA field worker job classifications that can't be properly mapped?

As stated in Tables 4-7, two of the ESA field jobs did not map to generally available classifications. In the research questions below the ICF Team discusses the level of the matched and unmatched job classifications.

### 1.4.1 For matched job classifications: How well do ESA jobs align to existing classifications? In what ways are they and are they not aligned? Is any additional information needed?

As outlined in 1.3, ICF conducted a systematic evaluation and determined that the Installation Technician/Specialist and NGAT Technician<sup>15</sup> mapped to O\*NET's Weatherization Installer and Technician job classification. Both of these jobs mapped to the same classification because these job descriptions were largely the same; however, it is important to note that NGAT specific information is lacking from the O\*NET classification. O\*NET, or the Occupational Information Network, is a database of occupational information sponsored by the Department of Labor, which provides information on over 900 occupations in the United States.

The overall responsibilities of the job, KSAOs, and level of responsibility required described in the O\*NET classification are highly aligned with the ESA job descriptions. The tasks described in the O\*NET classification are less detailed than the ESA tasks, however, the nature of the tasks is still very relevant.

The O\*NET job classification includes additional details not included in the ESA job description. For example, O\*NET provides details on information such as work context, education and job zone (i.e., required preparation), interests, work styles, work values, and wage and employment trends. Because this information was not available in the O\*NET job classifications for the ESA jobs, the extent of alignment with these additional details cannot be determined without conducting on-site observations and primary research interviews.

Overall, while the results of this research suggest the O\*NET Weatherization Installer and Technician job classification is applicable to both the Installation Technician/Specialist and NGAT Technician jobs, the information contained in this classification should be validated with subject matter experts in these positions prior to implementation.

### 1.4.2 For the unmapped job classifications: What is the nature of these tasks?

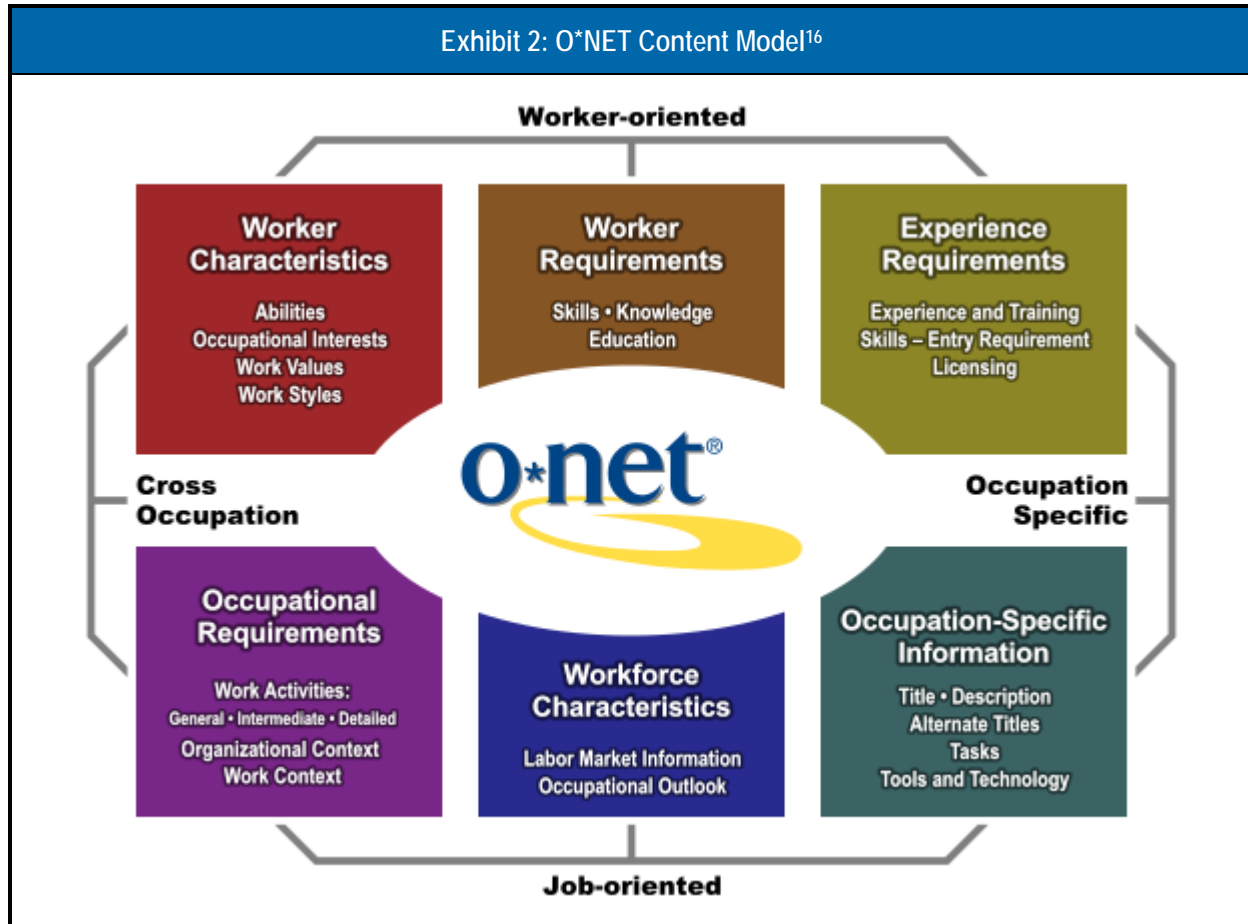
The Energy Specialist/Program Representative/Residential Outreach Specialist and Inspector jobs did not map to any existing classifications. The job descriptions for these two positions gathered for this effort provide a strong starting point for the development of new classifications, include an overview of the job, the required tasks, and KSAOs to successfully perform the job.

### IS IT IMPORTANT TO CREATE JOB CLASSIFICATIONS FOR THESE UNMAPPED TASKS? IS ANY ADDITIONAL INFORMATION NEEDED?

The importance of developing job classifications for these positions depends largely on their intended use and the level of detail desired from the IOUs. The IOUs would need to determine a classification framework to use in order to define the required detail that will need to be added. For example, the O\*NET Content Model contains the details illustrated in the content model in Exhibit 2. Based upon the information that was available on the jobs of interest, the current effort focused upon a subset of the job characteristics in the O\*NET Content Model, including title, description, tasks, knowledge, skills, and abilities. The IOUs may wish to document additional characteristics of

<sup>15</sup> Note: under this category, across the IOUs, installation has many performance components of which a limited comparison was performed.

the jobs, such as some of the additional variables included in the O\*NET Content Model (e.g., tools and technology, experience and training, work context).



**IS ANY ADDITIONAL INFORMATION NEEDED?**

Additional information is needed about precisely how the job classifications will be used in order to appropriately assess the importance of establishing accurate classifications as well as to document the policy and cost implications of implementation. Additionally, this research is based upon secondary information that was available about the ESA jobs and did not include on-site monitoring of work conducted. To ensure that this information accurately reflects the way the jobs are actually performed, all findings from this study should be validated with subject matter experts (e.g., through interviews with incumbents and supervisors of the jobs of interest and observations of the work being performed).

Based on what has been learned, could ICF identify program related impacts associated with aligning jobs to existing classifications?

The implementation of job classifications for these positions could have a number of benefits to the ESA program, including a more uniform approach across the IOUs and ESA contractors. Job classifications could also be

<sup>16</sup> United States Department of Labor, *The O\*NET Content Model*, 2016.

used as the basis for personnel actions, including recruitment and selection, performance reviews, and employee development.

Potential negative impacts depend on the nature of their intended use, as well as the level of variation across these jobs in terms of how they are performed in different organizations (e.g., whether the distribution of responsibilities and tasks by position is consistent across organizations). For example, if wide variation currently exists in the application of these jobs, implementation of the classifications could be initially disruptive if employers are expected to strictly adhere to the classifications.

Finally, as noted above, all classifications should be validated with subject matter experts in the positions (e.g., incumbent workers who hold these positions or supervisors of these positions) prior to implementation.

## 1.5 Conclusion

Overall, this research resulted in the gathering of detailed job descriptions for the four ESA field worker jobs, including Energy Specialist/Program Representative/Residential Outreach Specialist, Installation Technician/Specialist, NGAT Technician, and Inspector (refer to section 1.2 for the job descriptions that were gathered).

Following the gathering of these job descriptions, an evaluation was conducted to determine if the ESA jobs could map to existing job classifications. Based on the evaluation results, it was determined that two of the jobs—Installation Technician/Specialist and NGAT Technician—mapped to the classification of O\*NET Weatherization Installers and Technicians<sup>17</sup>. While the current research supports the use of this classification based on the information that was available about these two ESA jobs, these results should be validated with subject matter experts on the jobs (e.g., incumbents or supervisors of these positions) to confirm they represent how the jobs are actually performed. The other two ESA jobs—Energy Specialist/Program Representative/Residential Outreach Specialist and Inspector—did not map to any existing classifications.

Based upon the results of the classification evaluation, a new trade classification may or may not need to be developed for the Energy Specialist/Program Representative/Residential Outreach Specialist and Inspector ESA program field worker positions. If a match for these positions is desired, the next steps could include:

- A review of the feasibility of developing a new classification. As a first step in this review, the IOUs could clarify and document how the job classifications would be implemented and used by ESA contractors and other stakeholders.
- Identification of the stakeholders who need to be engaged in the process. Document the stakeholders that will need to provide input throughout the process, including subject matter experts on the jobs (e.g., incumbents and supervisors of the jobs of interest) and representatives from the IOUs that will provide review/approval.
- Anticipation of timing requirements throughout the development period. Based upon the objectives and stakeholders involved, determine an anticipated timeline.
- Assessment of the likelihood of obtaining necessary stakeholder support. Determine feasibility of needed stakeholder support, including support for conducting primary research.
- Interviews and observations to gather additional data on the jobs. Because the current research focused on secondary research about the jobs, additional primary research should be conducted to validate how they are actually performed. This could include interviews with incumbent workers and supervisors of these jobs and

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<sup>17</sup> Note: under this category, across the IOUs, installation has many performance components of which a limited comparison was performed.

systematic observations of the jobs being performed. The extent of research that will need to be conducted will depend upon how much variation there is in regard to how these jobs are performed across organizations.

## 2. Scope D: Career Pathway and Training Requirements for Disadvantaged Workers

### 2.1 What are the existing career pathways within Energy Efficiency which provide promising opportunities for disadvantaged workers – entry-level and ongoing opportunities for advancement?

#### 2.1.1 Project Background, Purpose, and Methodologies

The ICF Team was asked to outline existing and promising energy efficiency (EE) career pathways for disadvantaged workers outside of the ESA Program in Workslope A. The ICF Team was tasked with finding both entry level and ongoing opportunities for advancement. The ICF Team considered pathways for a minimum of three priority/in-demand occupations, and included a list of occupations and industries for jobs that currently exist and are expected to exist in the future.

The ICF Team developed and implemented a 4-stage approach to identify three priority/in-demand energy efficiency career pathways:

1. Define promising EE career opportunities.
2. Evaluate Labor Management Information (LMI) forecasts.
3. Analyze real-time job posting data.
4. Map career pathways.

Using secondary research, the ICF Team developed a taxonomy of occupations with impact on energy efficiency, and identified which occupations would be suitable for entry-level career paths for disadvantaged workers. The full taxonomy of energy efficiency industries and occupations may be found in Appendix 2 – Taxonomy. The ICF Team obtained occupation forecasts from Regional Economic Models, Inc.<sup>18</sup> (REMI) to assess the greatest hiring potential, and gathered real-time job posting data from Burning Glass Technologies<sup>19</sup> to validate the forecasts. Finally, the ICF Team mapped occupations having the largest labor market projections validated by real-time job postings into career pathways.

#### 2.1.2 Definitions of Promising Career Opportunities and Selection Criteria

##### DEFINING PROMISING ENERGY EFFICIENCY CAREER OPPORTUNITIES

The ICF Team started with occupations that had identified impact on residential, commercial, and industrial energy efficiency in *Lawrence Berkeley Labs Taxonomy of Energy Efficiency Jobs and Industries*<sup>20</sup> as this tool has previously been used by the IOUs in the creation of an Energy Efficiency Sector Strategy. Occupations are presented in Exhibit 3.

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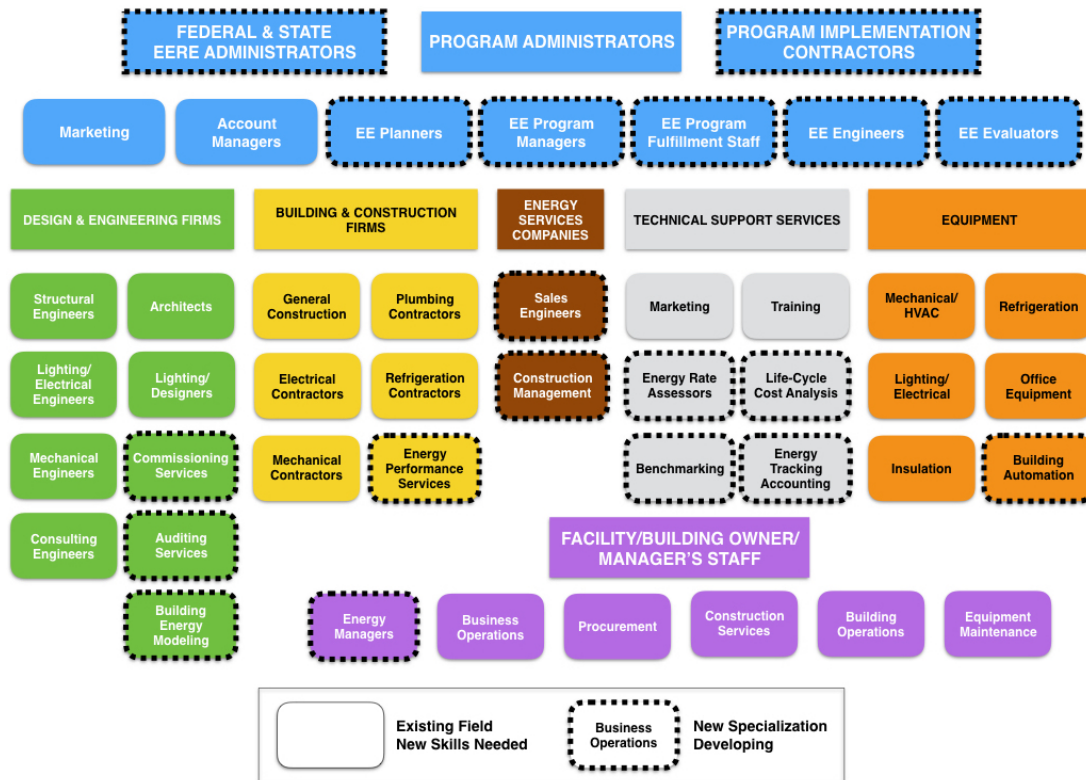
<sup>18</sup> <http://www.remi.com>

<sup>19</sup> <http://www.burning-glass.com>

<sup>20</sup> Lawrence Berkeley National Laboratories, *Energy Efficiency Services Sector: Workforce Education and Training Needs*, March 2010. All data, including taxonomy, appended to this memo as appendices.



### Exhibit 3: Lawrence Berkeley Labs Taxonomy of Energy Efficiency Jobs and Industries



The ICF Team updated this taxonomy to include recent job classification changes made since 2010 by the United States Department of Labor (DOL). The ICF Team also added several “helper” occupations that were related to occupations in the taxonomy (e.g., “Helper – Electrician” was not in the original taxonomy but is clearly related to Electrician, which was included in the taxonomy). These additional occupations offered numerous entry points for a new workforce entrant, by providing opportunities for disadvantaged workers with minimal preparation or prior experience.

Using this taxonomy, the ICF Team identified 78 occupation codes across 13 relevant industry codes that are related to energy efficiency careers<sup>21</sup> as outlined in the Donald Vial Center on Employment in the Green Economy (Don Vial Center) publication, *Workforce Issues and Energy Efficiency Programs* (Guidance Plan)<sup>22</sup>.

The Lawrence Berkeley Labs Taxonomy of EE Jobs and Industries does not include renewable energy occupations. While these are considered outside of traditional EE occupations, the ICF Team was interested in two career occupations common for entry level workers - Solar PV Installer and Solar Thermal Installer - and included these job classifications in the analysis. There are other occupations in this field, but they either require advanced degrees (e.g., Engineer) or are not technical occupations (e.g., Sales & Marketing). Furthermore, these more advanced/non-technical occupations were already considered in the LMI forecasts as part of the taxonomy of EE jobs.

21 It should be noted that not all occupations are technical in nature; Lawrence Berkeley Labs presented an holistic approach to energy efficiency that included the energy efficiency value chain from sales & marketing through design, installation, operation, maintenance, finance & accounting, and management. The ICF Team focused on those technical occupations that were aligned with the IOU Workforce Education & Training remits.

22 University of California, Berkeley, Donald Vial Center on Employment in the Green Economy, *Workforce Issues and Energy Efficiency Programs: A Plan for California Utilities*, May 2014.

## EVALUATING LMI FORECASTS

Using a dataset from Regional Economic Models, Inc. (REMI) the ICF Team obtained a 10-year forecast of each of the 78 occupation codes, both statewide and regionally.<sup>23</sup> The complete set of LMI forecasts may be found in Appendix 3 – LMI Forecasts. The ICF Team chose the REMI dataset because it incorporated aspects of four major modeling approaches: Input-Output, General Equilibrium, Econometric, and Economic Geography.<sup>24</sup> An additional advantage of this dataset is that it included both payroll and non-payroll jobs in its forecast, meaning it included non W-2 employees, who are instead in sole proprietorships or partnerships. This is not uncommon in the construction trades, so the REMI dataset captures employees who might otherwise not be reported in other forecasting models.

Further, the ICF Team modeled the metropolitan statistical areas (MSAs) separately from the non-metropolitan statistical areas. This provided the ICF Team with a dataset that encompassed not only the entire state of California and all of the IOU service territories, but also gave regional insight into forecast variations in high-density population areas where WE&T efforts could reach larger populations within smaller geographical areas. The MSAs chosen were Los Angeles, San Diego, and San Francisco; the non-metropolitan forecasts were grouped into “Rest of Northern California” and “Rest of Southern California.”

Once the dataset was gathered, the ICF Team used O\*NET Online to filter occupations for those that could be included in an entry- or mid-level career pathway.<sup>25</sup> The top 10 statewide and regional entry- or mid-level occupations projected openings (both new and replacement workers) are presented in Tables 8-13.

**Table 8: California Statewide LMI Forecast**

Standard Occupational Classification (SOC) Code	Occupation	Total Projected Job Openings 2013-2023
47-2111	Electricians	38,429
47-2061	Construction laborers	16,575
47-2031	Carpenters	11,208
47-2152	Plumbers, pipefitters, and steamfitters	9,301
47-1011	First-line supervisors/managers of construction trades and extraction workers	6,877
49-9021	Heating, air conditioning, and refrigeration mechanics and installers	5,076
51-2092	Team assemblers	4,308
43-4051	Customer service representatives	3,460
49-9071	Maintenance and repair workers, general	3,275
49-1011	First-line supervisors/managers of mechanics, installers, and repairers	1,637

<sup>23</sup> Regional Economic Models, Inc.

<sup>24</sup> For definitions of the modeling approach used by REMI, see Appendix 4 – The REMI Model

<sup>25</sup> O\*NET Job Zone Classifications 2 or 3:

2 – Some Preparation Needed (e.g., High School diploma)

3 – Medium Preparation Needed (e.g., some vocational training up to Associates Degree or equivalent)

*[Note: No jobs in the taxonomy were Job Zone 1 – Little or No Preparation Needed – including “Helper” occupations]*

**Table 9: Los Angeles MSA LMI Forecast<sup>26</sup>**

SOC Code	Occupation	Total Projected Job Openings 2013-2023
47-2111	Electricians	22,169
47-2061	Construction laborers	9,345
47-2031	Carpenters	6,026
47-2152	Plumbers, pipefitters, and steamfitters	4,934
47-1011	First-line supervisors/managers of construction trades and extraction workers	3,552
51-2092	Team assemblers	2,895
49-9021	Heating, air conditioning, and refrigeration mechanics and installers	2,575
43-4051	Customer service representatives	1,986
49-9071	Maintenance and repair workers, general	1,813
47-2211	Sheet metal workers	484

**Table 10: San Diego MSA LMI Forecast<sup>27</sup>**

SOC Code	Occupation	Total Projected Job Openings 2013-2023
47-2111	Electricians	2,318
47-2061	Construction laborers	1,115
47-2031	Carpenters	777
47-2152	Plumbers, pipefitters, and steamfitters	672
47-1011	First-line supervisors/managers of construction trades and extraction workers	520
49-9021	Heating, air conditioning, and refrigeration mechanics and installers	463
43-4151	Order clerks	363
49-9012	Control and valve installers and repairers, except mechanical door	337
43-4051	Customer service representatives	310
51-8021	Stationary engineers and boiler operators	304

<sup>26</sup> Consisting of Los Angeles, Orange, Ventura, Kern, San Bernardino, and Riverside Counties. For consistency, these regional definitions are applied for all data presented (e.g., Community Colleges).

<sup>27</sup> Consisting of the Counties of San Diego and Imperial.

**Table 11: San Francisco MSA LMI Forecast<sup>28</sup>**

SOC Code	Occupation	Total Projected Job Openings 2013-2023
47-2111	Electricians	6,601
47-2061	Construction laborers	2,855
47-2031	Carpenters	2,059
47-2152	Plumbers, pipefitters, and steamfitters	1,709
47-1011	First-line supervisors/managers of construction trades and extraction workers	1,288
49-9021	Heating, air conditioning, and refrigeration mechanics and installers	866
51-2092	Team assemblers	591
49-9071	Maintenance and repair workers, general	512
43-4051	Customer service representatives	494
43-4151	Order clerks	364

**Table 12: Rest of Northern California (Not Part of MSA) LMI Forecast<sup>29</sup>**

SOC Code	Occupation	Total Projected Job Openings 2013-2023
47-2111	Electricians	5,550
47-2061	Construction laborers	2,379
47-2031	Carpenters	1,738
47-2152	Plumbers, pipefitters, and steamfitters	1,461
47-1011	First-line supervisors/managers of construction trades and extraction workers	1,105
49-9021	Heating, air conditioning, and refrigeration mechanics and installers	764
49-9071	Maintenance and repair workers, general	384
43-4051	Customer service representatives	365
43-4151	Order clerks	364
51-2092	Team assemblers	360

<sup>28</sup> Consisting of the Counties of San Francisco, San Mateo, Santa Cruz, San Benito, Santa Clara, Alameda, Contra Costa, and Marin.

<sup>29</sup> Consisting of the Counties of Merced, Madera, Mariposa, Mono, Tuolumne, Stanislaus, San Joaquin, Calaveras, Alpine, El Dorado, Sacramento, Solano, Sonoma, Napa, Yolo, Sutter, Placer, Nevada, Sierra, Yuba, Colusa, Lake, Mendocino, Glenn, Butte, Plumas, Tehama, Humboldt, Trinity, Shasta, Lassen, Modoc, Siskiyou, and Del Norte.

**Table 13: Rest of Southern California (Not Part of MSA) LMI Forecast<sup>30</sup>**

SOC Code	Occupation	Total Projected Job Openings 2013-2023
47-2111	Electricians	1,791
47-2061	Construction laborers	881
47-2031	Carpenters	607
47-2152	Plumbers, pipefitters, and steamfitters	526
47-1011	First-line supervisors/managers of construction trades and extraction workers	413
49-9021	Heating, air conditioning, and refrigeration mechanics and installers	408
43-4151	Order clerks	363
49-9012	Control and valve installers and repairers, except mechanical door	337
43-4051	Customer service representatives	306
51-8021	Stationary engineers and boiler operators	304

The LMI forecasts for the state and each region indicated that the top 5 jobs based on total projected openings are consistent across the state: Electricians, Construction Laborers, Carpenters, Plumbers, Pipefitters, and Steamfitters, and First-line Construction Supervisors. As indicated by Table 14, the top 5 jobs represent nearly half of the openings for the 78 occupations across the state in the taxonomy. This represents a critical mass of openings from which a minimum of three career pathways can be built.

**Table 14: Comparison of Top 5 Jobs by Opening to All 78 Jobs in Taxonomy**

Region	Projected Openings for Top 5 Jobs 2013-2023	Projected Openings for All 78 Jobs 2013-2023	% of Job Openings – Top 5 to All 78 Jobs
Statewide	82,390	184,217	45%
Los Angeles MSA	55,778	79,616	70%
San Diego MSA	7,179	20,935	34%
San Francisco MSA	17,339	34,590	50%
Rest of Northern California	14,469	29,611	49%
Rest of Southern California	5,936	19,464	30%

The occupation “Heating, air conditioning, and refrigeration mechanics and installers” has high energy-efficiency impact<sup>31</sup> and was almost consistently the 6th highest occupation in terms of job openings (7th in the Los Angeles MSA). Based on this recurring ranking, the ICF Team felt this occupation merited consideration for inclusion in a fourth recommended pathway.<sup>32</sup>

### REAL-TIME JOB POSTING DATA

Forecasts do not always reliably predict hiring patterns, therefore the ICF Team used current job postings as a validation measure against the forecasts. The ICF Team used the Burning Glass Technologies’ *California*

<sup>30</sup> Consisting of the Counties of Santa Barbara, San Luis Obispo, Monterey, Kings, Fresno, Tulare, and Inyo.

<sup>31</sup> Validated through industry expertise and literature review, including California Community Colleges Centers of Excellence report on Energy Efficiency Occupations; California Workforce Education and Training Needs Assessment; Lawrence Berkeley National Labs Energy Efficiency Services Sector Workforce Education Training and Needs; and, Southern California Edison HVAC Educational Needs Assessment.

<sup>32</sup> As noted earlier, two solar occupations were not included in the taxonomy. However, had they been included, they would have fallen outside the top 10 occupations by projected job openings. Solar PV Installers are projected to increase by 60 openings annually, and Solar Thermal Installers by 130 (though the forecast Solar Thermal Installers is consolidated with two other occupations and is likely even lower).

Metropolitan Service Area dataset to obtain six years (2010 – 2016) of job postings information for eight of the top 10 jobs by total projected openings across the state. These eight occupations are captured in Table 15. All Burning Glass data may be found in Appendix 5 – Burning Glass Technologies Data.

**Table 15: Occupations Validated Through Burning Glass**

SOC Code	Occupation
47-2111	Electricians
47-2061	Construction laborers
47-2031	Carpenters
47-2152	Plumbers, pipefitters, and steamfitters
47-1011	First-line supervisors/managers of construction trades and extraction workers
49-9021	Heating, air conditioning, and refrigeration mechanics and installers
51-2092	Team assemblers
49-9071	Maintenance and repair workers, general

The occupation “Customer Service Representatives” was omitted from the Burning Glass analysis because it was considered outside typical IOU WE&T efforts, and the “First-line supervisors/managers of mechanics, installers, and repairers” occupation was omitted because it was not as well-aligned as the “managers of construction trades” occupation to IOU WE&T efforts. Additionally, that occupation was not prevalent throughout the regions in the state by total projected openings, and while management positions may fall into the career pathways of workers entering this field, they were not the focus of this study.

Two benefits are derived from this analysis. First, LMI forecasts use historical reports to project future outcomes; real-time job posting data yield what employers are asking for right now, and thus provide a check against the reliability of the forecast of employer demand. Second, the data provided an indication of which employers are hiring and can be used in conjunction with state employer databases to identify key stakeholders for engagement. The real-time job posting data is summarized in Table 16.

**Table 16: Comparison of Job Postings to Average Annual Job Openings**

SOC Code	Occupation	Postings 2-1-15 to 1-31-16	Average Annual Job Openings <sup>33</sup>
47-2111	Electricians	3,182	3,843
47-2061	Construction laborers	3,050	1,658
47-2031	Carpenters	1,423	1,121
47-2152	Plumbers, pipefitters, and steamfitters	1,760	930
47-1011	First-line supervisors/managers of construction trades and extraction workers	1,645	688
49-9021	Heating, air conditioning, and refrigeration mechanics and installers	2,135	508
51-2092	Team assemblers	2,712	431
49-9071	Maintenance and repair workers, general	18,069	328

Again, while not all job postings yield a hiring (and vice versa), it is to be expected that postings would, on average, exceed actual hiring levels and on average, the forecast number of job openings. A variance in this expectation existed for “Electricians” by a small amount (postings were 17% less than average forecast openings). This does not constitute a significant variance that would alter the analysis, as there are still a significant number of job postings and forecast job openings for this occupation.

<sup>33</sup> Average Annual Openings is Projected Total Openings (including replacements) for the 10 year forecast period divided by 10.

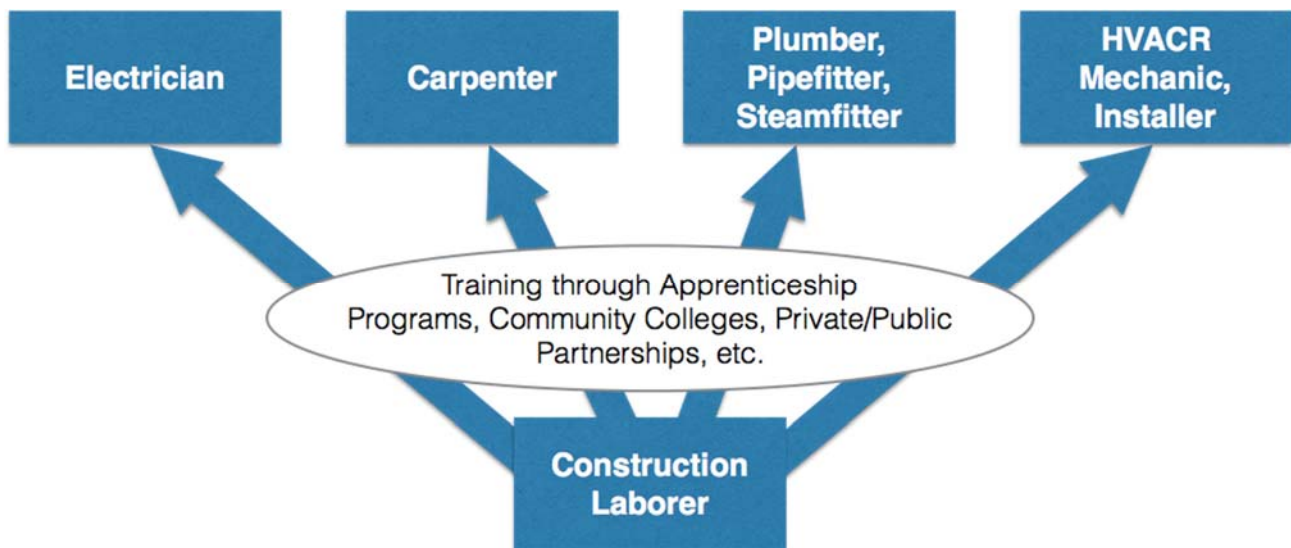
A more significant variance is when postings exceed openings by an amount large enough to call the data into question. The “Heating, Ventilation, Air Conditioning & Refrigeration (HVACR) Mechanic” and “Team Assembler” postings exceeded average forecast openings by four and six times, respectively. This difference may not be enough to call the forecast into question, but since “HVACR Mechanics” is an occupation of particular influence on energy efficiency, it may merit a deeper investigation into job postings (e.g., research into employers who are hiring to gauge actual demand).

“General Maintenance and Repair Workers” was the number one occupation by annual job postings, but fell out of the top 10 occupations by total annual openings in the LMI forecast (12<sup>th</sup> statewide). O\*NET classifies this as a Job Zone 3 occupation, which means it typically requires medium preparation (about one third of hiring employers across the country required education or job experience past high school diploma).<sup>34</sup> As this is a “general” occupation that lacked specificity and had numerous postings from a variety of companies in its definition as occupations like “Electrician” or “HVACR Mechanic,” the ICF Team concluded that the gap in the data was more with the postings than the forecast. If General Maintenance and Repair Worker was truly an entry-level EE occupation, it would merit consideration as an entry point into a recommended career pathway. It should be noted that this occupation as well as other entry-level occupations can be in pathways to other emerging EE occupations, for example Building Operator. Unfortunately, supporting data are not available at the time of this study, however, it is known that focus around training and certifications is emerging in the efforts of the California Community Colleges and with other related certifying agencies. Given this emerging interest, it could be a potential investigation point in the future.

**MAPPING CAREER PATHWAYS**

The ICF Team asserts that the literature review of energy efficiency impact by considered occupations, coupled with the LMI forecast validated through job postings, and the alignment of these occupations with the IOU WE&T programs affirmed the following five occupations form four EE career pathways that address a significant percentage of jobs in each IOU region (see Exhibit 4):

**Exhibit 4: Four Career Pathways**



<sup>34</sup> United States Department of Labor, O\*NET Online database



The pathways leading to the careers selected through data analysis and literature review – “Electrician,” “Carpenter,” “Plumber,” and “HVACR Mechanic” – all begin with the entry-level occupation, “Construction Laborer.” “Construction Laborers” could have exposure to all four of the higher skilled occupations in the pathways, and therefore can aid an entry-level worker in selecting a career that best matches their skills, interests, and abilities. In addition to Lawrence Berkeley Labs’ inclusion of each occupation in its energy efficiency occupations taxonomy, the DOL considers all recommended occupations to be “Green”, indicating they have Green Economy and/or Energy Efficiency impact.<sup>35</sup>

Career advancement opportunities exist beyond these occupations into operational and general management positions that still have energy efficiency impact, however these occupations are outside the scope of this study.

### 2.1.3 Characterization of Entry Level and Growth Opportunities in Four Selected EE Promising Career Opportunities

To characterize the entry level and growth opportunities in the four selected energy efficiency promising career opportunities, the ICF Team focused on wage expectations and training opportunities. Regional and statewide median wage expectations<sup>36</sup> are presented in Tables 17 and 18.

**Table 17: Regional and Statewide Annual Wage Expectations for Selected Occupations**

SOC Code	Occupation	Los Angeles MSA			San Diego MSA			San Francisco MSA		
		Low Wage	Median Wage	High Wage	Low Wage	Median Wage	High Wage	Low Wage	Median Wage	High Wage
47-2111	Electricians	\$32,640	\$57,226	\$89,045	\$37,263	\$64,147	\$98,228	\$41,689	\$70,355	\$101,198
47-2061	Construction laborers	\$21,232	\$36,520	\$72,207	\$21,684	\$35,662	\$61,547	\$26,303	\$43,757	\$66,830
47-2031	Carpenters	\$29,260	\$46,899	\$77,808	\$30,368	\$50,138	\$77,906	\$36,257	\$61,069	\$88,745
47-2152	Plumbers	\$29,905	\$52,858	\$88,093	\$32,209	\$51,698	\$77,126	\$38,979	\$63,476	\$113,532
49-9021	HVACR	\$30,872	\$48,771	\$73,970	\$35,090	\$54,319	\$70,938	\$38,813	\$61,558	\$93,454
00-0000 <sup>37</sup>	All Occupations	\$23,384	\$36,784	\$62,558	\$22,385	\$34,615	\$61,135	\$29,604	\$49,048	\$84,380
SOC Code	Occupation	Rest of Northern California			Rest of Southern California			California Statewide		
		Low Wage	Median Wage	High Wage	Low Wage	Median Wage	High Wage	Low Wage	Median Wage	High Wage
47-2111	Electricians	\$36,885	\$57,069	\$89,541	\$38,754	\$58,705	\$86,559	\$34,632	\$61,402	\$98,134
47-2061	Construction laborers	\$23,587	\$35,918	\$60,098	\$22,769	\$33,179	\$56,469	\$22,235	\$37,627	\$67,891
47-2031	Carpenters	\$30,821	\$48,868	\$74,821	\$26,766	\$48,280	\$82,593	\$29,370	\$49,587	\$86,486
47-2152	Plumbers	\$30,104	\$51,408	\$83,718	\$34,448	\$50,967	\$80,208	\$32,635	\$57,346	\$100,339
49-9021	HVACR	\$29,680	\$46,390	\$74,067	\$32,347	\$49,646	\$70,737	\$31,886	\$52,957	\$80,350
00-0000	All Occupations	\$23,699	\$35,914	\$57,624	\$22,293	\$33,933	\$56,280	\$24,910	\$39,830	\$69,190

<sup>35</sup> IBID

<sup>36</sup> IBID

<sup>37</sup> Note that for SOC 00-0000, “Low Wage” represents 25th percentile and “High Wage” represents 75th percentile wages.



With a statewide median wage for All Occupations (SOC 00-0000) of \$39,830,<sup>38</sup> “Construction Laborers” earn from 79% to 115% of the comparable statewide wage (low, median, high) for all occupations. At the low end of the scale, this occupation earns just above the state minimum wage of \$10 per hour and 179% of the Federal individual poverty level of \$11,880 (comparison only).<sup>39</sup> Statewide, median earners in this occupation fare better, at \$18 per hour and 317% of the Federal individual poverty level.

The other occupations in the pathways provide opportunities for wages that compare favorably to the median wages for all occupations as one progresses. Statewide, the median wage for “Electricians” is 154% of the median wage for all occupations; “Carpenters:” 124%; “Plumbers:” 144%; and “HVACR Technicians:” 133%.

The Burning Glass Technologies data also provided mean advertised salary data with job postings, which can be compared with statewide median wage (see Table 17) as a barometer of wage expectations for the selected occupations:

**Table 18: Comparison of Statewide Mean Advertised Salary versus Statewide Median Wage**

SOC Code	Occupation	Mean Advertised Salary	Median Wage
47-2111	Electricians	\$60,283	\$61,402
47-2061	Construction laborers	\$47,066	\$37,627
47-2031	Carpenters	\$51,319	\$49,587
47-2152	Plumbers, pipefitters, and steamfitters	\$60,838	\$57,346
49-9021	HVACR mechanics and installers	\$58,549	\$52,957

Employers appear to be offering wages near or just above the median statewide wage for these occupations. The most significant variance between mean advertised salary and median wage is for “Construction Laborer,” where the mean advertised salary is 25% higher than the statewide median wage. This may indicate positive demand pressure for workers in this occupation, which is another validation point for including this occupation as the entry job to the selected pathways.

To progress from “Construction Laborer” to another occupation, training, licensing, and certifications may be required. Community colleges and apprenticeship programs are sources for such training and certifications. Public/private partnerships typically focus their efforts on getting disadvantaged workers into work rather than training for higher technical skills. Appendix 7 – Relevant Licenses – and Appendix 8 – Relevant Certifications – list a selection of licenses and certifications for Electricians; Carpenters; Plumbers, pipefitters, and steamfitters; and HVACR mechanics and installers according to O\*NET.

Apprenticeship programs may be entered through multiple channels. In 2014, 75 registered apprenticeship programs with 149 different apprenticeship programs in the four selected skilled trades reported 1,368 completers.<sup>40</sup> Licensing, certifications, and apprenticeships are valuable means of career and wage advancement for disadvantaged workers, but can also be barriers to entry. For this reason, the ICF Team focused on an entry-level occupation with few barriers and greater exposure to higher-skilled trades, and on publicly funded training resources like the California Community Colleges. The ICF Team did not look shorter courses as they often are not tied directly to apprenticeship entry. A listing of Registered Apprenticeship Programs for Electricians; Carpenters; Plumbers, pipefitters, and steamfitters; and HVACR mechanics and installers from the California Division of Apprenticeship Standards may be found in Appendix 9 – Relevant Apprenticeships.

<sup>38</sup> United States Bureau of Labor Statistics, California Occupational Employment and Wage Estimates, May 2015.

<sup>39</sup> United States Department of Health and Human Services, Federal Poverty Level 2016. [Note: Not adjusted for California cost of living]

<sup>40</sup> From the California Division of Apprenticeship Standards (<https://www.dir.ca.gov/das/>); all programs and completers provided as an appendix to this report.

Public training resources for the skilled occupations in the pathways are available throughout the state through the California Community Colleges, which partner regionally with apprenticeship training programs. Table 19 indicates regionally the number of course sections offered in the last four school terms corresponding with these occupations:<sup>41</sup>

**Table 19: Community College Inventory for Selected Occupational Program Areas**

Region	Electrical			Carpentry		
	Colleges Offering	Total Sections Count	Apprenticeship Only	Colleges Offering	Total Sections Count	Apprenticeship Only
LA MSA	9	215	69	8	328	288
Rest of No Cal	8	46	23	6	66	52
SD MSA	3	189	162	3	122	120
SF MSA	6	102	92	6	49	5
Rest of So Cal	3	21	4	1	2	0
Occupation	Plumbing			HVACR		
	Colleges Offering	Total Sections Count	Apprenticeship Only	Colleges Offering	Total Sections Count	Apprenticeship Only
LA MSA	6	49	23	13	282	2
Rest of No Cal	3	28	27	5	73	0
SD MSA	2	34	17	3	54	0
SF MSA	5	105	101	6	161	37
Rest of So Cal	1	4	4	3	22	0

As the course inventory suggests, the major metropolitan regions have community colleges that actively offer courses supporting the four skilled occupations. Non-metropolitan regions, particularly in Southern California, are not as well equipped, particularly in “Carpentry” and “Plumbing.” More information may be found in Appendix 6 – California Community College Inventory.

### 2.1.4 Conclusions

The ICF Team has presented four career pathways comprised of five occupations: an entry-level occupation (Construction Laborer) that requires minimal preparation and four skilled trades (Electrician; Carpenter; Plumber, Pipefitter, Steamfitter; and HVACR Mechanic and Installer) that require higher levels of training and certifications. The IOU WE&T centers currently provide training to infuse energy efficiency education into all four of these skilled trades to varying degrees.<sup>42</sup> Selecting these four career pathways for IOU support will require minimal strategic adjustment in terms of IOU WE&T curriculum.

The career pathways selected have an impact on residential, commercial, and industrial energy efficiency. The ICF Team added entry-level jobs related to occupations in the Lawrence Berkeley Labs taxonomy to identify opportunities for new job market entrants, and then filtered the taxonomy to consider only O\*NET Job Zone 2 or 3 occupations, i.e., those that are suitable for entry- to mid-level career occupations. All occupations fell within the top 6 by projected job openings statewide, further validated by analysis of current job postings.

<sup>41</sup> California Community College Chancellor’s Office, Management Information System Datamart. [Note: Winter, Spring, Summer, and Fall terms of 2015 included as an appendix].

<sup>42</sup> Validated through a review of IOU training offerings at <http://www.pge.com/en/community/energycenters/index.page>, <https://www.sce.com/wps/portal/home/business/consulting-services/energy-education-centers>, <http://www.sdge.com/business/learn-and-save>, and <https://www.socalgas.com/for-your-business/education-and-training/energy-resource-center>.

Each of the career pathways selected have growth potential in terms of job demand and wage advancement. Median wages for recommended pathway occupations compared favorably with the statewide median wage for all (not just energy-related) occupations. Mean advertised salaries were mostly higher than statewide median wages for these occupations, 25% higher in the case of Construction Laborers.

Furthermore, all career pathways have training resources for disadvantaged workers to pursue for higher skilled occupations once employed in the field. An inventory of the California Community College system courses related to these occupations demonstrated ample availability of publicly funded training in most regions for all selected occupations. The Energy, Construction, and Utilities Sector<sup>43</sup> of the Doing What Matters program in the California Community Colleges Chancellor’s Office funds a team to align the educational programs of the Community Colleges with industry needs. The ICF Team highlights this Sector Team as a valuable resource for any engagement between the IOUs and Community College faculty.

The ICF Team advises four career pathways for the IOUs consideration, all launching from the entry-level Construction Laborers occupation:

**Table 20: Selected Career Pathways**

Entry Level Occupation	Progressing To
Construction laborer	Electrician
	Carpenter
	Plumber, pipefitter, and steamfitter
	HVACR mechanic and installer

The entry occupation to the four pathways, Construction Laborer, has broad exposure to the skilled construction trades, and therefore gives workers a chance to learn on the job to which occupation they are best suited.

The ICF Team concludes the IOUs should concentrate their efforts on the four selected career pathways.

## 2.2 What is the Definition for “Relevant” Inclusion-Related Work in California? What is the Definition of “Working Relationship” with the IOUs? What Qualifies as Inclusion-Related Working Partners for the IOUs?

### 2.2.1 Background, Purpose, and Methodologies

To meet the demand for skilled labor, a 2011 report<sup>44</sup> *California Workforce, Education, and Training Needs Assessment for Energy Efficiency, Distributed Generation, and Demand Response* by the Don Vial Center recommended the IOUs implement supply-side strategies that ensure California has an adequate workforce of qualified workers to perform energy upgrades, along with demand-side strategies to ensure that trained workers are employed in the broader energy efficiency market. The Don Vial Center report highlights the importance of creating meaningful job opportunities and careers in the energy efficiency sector for California’s disadvantaged workers. These recommendations were rooted in California Public Utilities Commission (CPUC) 2008 adoption of a Long Term

<sup>43</sup> California Community College Chancellor’s Office, Energy Construction and Utilities Sector Strategy [Note: Information at: <http://ecusectordwm.com/>].

<sup>44</sup> University of California, Berkeley, Donald Vial Center on Employment in the Green Economy, *Workforce Issues and Energy Efficiency Programs: A Plan for California Utilities*, May 2014.

Energy Efficiency Strategic Plan<sup>45</sup>, its goal to “ensure that minority, low-income and disadvantaged communities fully participate in training and education programs at all levels of the energy efficiency industry.”

The ICF Team assessed the WE&T inclusion landscape in the IOUs’ territories and developed two methodologies to assess potential inclusion partners, expounded in section 2.2.4. To accurately “assess the landscape of WE&T inclusion in California and the IOUs service territories and identify potential inclusion-related partners/implementers,” the ICF Team identified energy efficiency inclusion workforce training programs and collected information about the programs.

### 2.2.2 Definition of “Inclusion-Related Work”

Inclusion-related work was defined for this study as “programs targeted at workers from disadvantaged communities that guide them towards rewarding careers in energy efficiency jobs and occupations. The focus is on identifying training programs that are preparing workers from disadvantaged communities with the skills needed by industry to perform jobs in the energy efficiency sector.”<sup>46</sup>

The ICF Team confirmed the project’s definition for disadvantaged communities was the same that was presented at an IOU WE&T Stakeholder Engagement Forum held on September 23, 2015. An individual living in a targeted community is considered to be disadvantaged. The term “disadvantaged community” is defined by either: 1) a **high unemployment zip code** where the unemployment rate is either at least 150 percent of the median unemployment rate for the county or for the state, or 2) a **low income zip code** where average household income is 50% below Area Median Income (AMI).

The ICF Team used the U.S. Census Bureau, 2013 American Community Survey (ACS) to determine the household median income, metropolitan service area, and unemployment rate both by zip code and for the state of California. The ICF Team mapped the findings for the state and each of the IOUs’ service territories using the GIS shape files for Zip Codes and Counties from the U.S. Census Bureau Topologically Integrated Geographic Encoding and Referencing (TIGER) program. ArcGIS software from Esri<sup>47</sup> was used to create the maps identifying geographies that met the definition of disadvantaged communities. All zip codes in California in the Census Bureau’s database were included in the data. A summary of target zip codes identifying the number of disadvantaged communities is outlined in Table 21. Detailed information including maps of disadvantaged workers by IOU territory is provided in Appendix 10 – American Community Survey (ACS) Data – and Appendix 11 – Inclusion Maps.

Table 21: Number of Disadvantaged Communities Identified by Target Area Zip Codes

	Income Eligible Zip Codes	Unemployment Eligible Zip Codes	Zip Codes Meeting Both	Total Disadvantaged Communities	Total Zip Codes
<b>IOU</b>					
PGE	33	88	13	108	898
SCE	8	26	4	30	376
SDGE	2	15	1	16	106
SCG	24	42	8	58	631
<b>Total Zip Codes</b>	<b>67</b>	<b>171</b>	<b>26</b>	<b>212</b>	<b>1,614<sup>48</sup></b>

<sup>45</sup> California Public Utilities Commission, *California Long Term Energy Efficiency Strategic Plan*, September 2008.

<sup>46</sup> ICF Statement of Work for Inclusion Consultant Scope-A and -D, submitted via email by Lisa Shell on November 12, 2015.

<sup>47</sup> www.esri.com

<sup>48</sup> There are 1,614 unique zip codes within the combined IOUs service territories--397 are served by more than one IOU--and 213 “disadvantaged target” zip codes (after elimination of duplicate zip codes that meet both facets of the definition) which represent 13% of the entire service area.

### 2.2.3 Definition of “Qualified Inclusion Partner”

Partnerships and collaboration are strategic alliances intended to achieve greater impact than any organization could generate on its own. In the context of the agreed upon definition of a qualified inclusion partner, the ICF Team identified and presented to the IOUs the seven characteristics of a high quality inclusion partner. These seven criteria were identified by the United States Department of Health and Human Services Self-Sufficiency Research Clearinghouse as promising practices:

- Training by itself doesn’t guarantee success.<sup>49</sup> Providing disadvantaged individuals with occupational training by itself does not guarantee successful job placement and retention. Wraparound services that teach soft skills, address individual barriers to employment, help an individual prepare for and seek employment, and post-placement follow-up are required for a more holistic approach.
- Simply offering generic post-employment job coaching, guidance, advice, and training referrals is unlikely to make a difference.<sup>50</sup> Instead of trying to be all things to all people, post-employment job coaching, guidance, advice, and training referrals should be specific to the target sector, industry, or occupation.
- Subsidized employment alone hasn’t proven successful.<sup>51</sup> At a minimum, disadvantaged individuals should receive soft and hard skills training, help with job search and placement, and case management throughout and after their training.
- Work-focused strategies with support services may be more promising than using either work-focused strategies or support services alone.<sup>52</sup>
- Provide a mix of job search activities and short-term education/training, and include a strong focus on quick employment.<sup>53</sup>
- Financial work incentives combined with job coaching and guidance after being placed in a job may strengthen employment retention.<sup>54</sup>
- Hard-to-serve need, unpaid work experience, job placement, and education services to recipients with health conditions had longer-term gains.<sup>55</sup>

In addition to the characteristics of a high quality inclusion partner, the ICF Team referenced the document, *Workforce Issues and Energy Efficiency Programs: A Plan for California’s Utilities* (Guidance Plan). Guidance Plan Recommendation 2.1.2.2 states, “for workforce inclusion, the process should identify the demand for entry-level EE workers, career advancement paths, and regional need, and prioritize programs with strong job placement track records.”

The ICF Team used these guidelines to create 9 metrics the IOUs can use to assess an inclusion implementer training provider. These metrics are:

1. Trains in High Projection Fields – Does the inclusion implementer’s training focus on the high-demand EE career pathways?
2. Targets Disadvantaged Workers – Does the inclusion implementer’s mission target disadvantaged workers?
3. Trains Disadvantaged Workers – Does the inclusion implementer train disadvantaged workers whether or not they specifically target them?

<sup>49</sup> MDRC, *Promoting Employment Stability and Advancement Among Low-Income Adults*, March, 2013.

<sup>50</sup> MDRC, *Meeting the Needs of Workers and Employers: Implementation of a Sector-Focused Career Advancement Model for Low-Skilled Adults*, October, 2014.

<sup>51</sup> IBID

<sup>52</sup> MDRC, *What Strategies Work for the Hard-to-Employ? Final Results of the Hard-to-Employ Demonstration and Evaluation Project and Selected Sites from the Employment Retention and Advancement Project*, March, 2012.

<sup>53</sup> MDRC, *Providing Earnings Supplements to Encourage and Sustain Employment*, May, 2011.

<sup>54</sup> National Fund for Workforce Solutions, *Characteristics of a High Performing Industry Partnership*, May, 2014.

<sup>55</sup> Mathematica Policy Research, *The Implementation of the Welfare-to-Work Grants Program*, August, 2002.

4. Placement Rate – Does the inclusion implementer have up-to-date information on their post-training placement rate?
5. Job Readiness – Does the inclusion implementer conduct a job readiness assessment on both skills as well as barriers to employment?
6. Address Barriers – Does the inclusion implementer have a plan to address a worker's barriers to work? Common barriers including: transportation, child care, mental health, domestic violence, substance use, education needs.<sup>56</sup>
7. Supportive Services – Does the inclusion implementer have supportive services that are aligned with a worker's barriers?<sup>57</sup>
8. Job Placement Support – Does the inclusion implementer provide supports once a disadvantaged worker is placed in a job to maintain retention, including guidance and job coaching?<sup>58</sup>
9. Type of Training – Does the inclusion implementer provide both entry level and midlevel or continuing education training?<sup>59</sup>

#### 2.2.4 Identification of Energy Efficiency Inclusion Training Programs

There is no single source or directory that listed energy efficiency workforce training programs or training providers targeting disadvantaged<sup>60</sup> populations in California. To identify energy efficiency inclusion workforce training programs, the ICF Team employed several approaches outlined below.

Initially, the ICF Team used previous and secondary research to determine which of the 49 local Workforce Investment Boards (WIBs) adopted energy efficiency sector strategies. Based on this review, if a WIB was suspected of having created an energy efficiency sector strategy, a follow-up interview was conducted. Contact information (including telephone numbers and email addresses) for the local WIBs was obtained from a previous survey conducted by ICF Team member Craft Consulting Group. Based on this review, the ICF Team identified a preliminary list of 35 local WIBs as potentially having a sector strategy in energy efficiency, energy, green building, construction, or other relevant sectors (see list of WIBs in Appendix 12 – Inclusion Implementers). All 35 WIBs on the preliminary list were contacted by telephone to confirm whether they currently had an energy efficiency training program. If they had a program, the ICF Team asked about their program including the name of the program operator, the target population, and type of training provided. While many of the WIBs did not respond within the study timeframe, 13 of the 35 WIBs responded and information on six additional programs were obtained from their websites or secondary sources.

Since the energy efficiency inclusion workforce training landscape includes organizations other than WIBs, the ICF Team identified additional training programs through internet searches, literature review of third party reports, and examination of relevant organizations' websites such as the California Workforce Development Board, The California Eligible Training Provider List (ETPL)<sup>61</sup>, California Energy Commission, Environment California Research & Policy Center, American Council for an Energy-Efficient Economy (ACEEE), and the U.S. Environmental Protection Agency. The ICF Team focused on identifying inclusionary training programs that were specific to energy efficiency or construction skilled trade jobs and occupations. The primary objective was to develop an inventory of energy

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<sup>56</sup> University of Maryland School of Social Work, *Online Work Readiness Assessment Barriers to Work and Post Assessment Experiences*, August 2011.

<sup>57</sup> IBID

<sup>58</sup> IBID

<sup>59</sup> MDRC, *Opening Doors: Expanding Educational Opportunities for Low-Income Workers*, May 2001.

<sup>60</sup> For purposes of this study, disadvantaged workers was defined as: Low Income, Long-term Unemployed, Underserved or Troubled Youth, Women, Minority Populations, Previously Incarcerated, Veterans, Single custodial parents

<sup>61</sup> California's Eligible Training Provider List (ETPL) was established in compliance with the Workforce Investment Act (WIA) of 1998 and amended by the Workforce Innovation and Opportunity Act (WIOA) of 2014 to provide customer-focused employment training resources for adults and dislocated workers. Training providers who are eligible to receive Individual Training Accounts (ITAs) through WIOA Title I-B funds are listed on the ETPL.



efficiency job training programs targeting disadvantaged workers. The IOUs also contributed a list of training providers. The secondary research resulted in a preliminary list of 76 program operators potentially having a qualified energy efficiency inclusion training program. Website searches and telephone calls were made to determine whether or not these were qualified energy efficiency inclusionary training programs and that they were still in existence. The preliminary list of program operators identified by secondary research was then adjusted to a final list consisting of 72 organizations (see list of additional program operators in Appendix 12 – Inclusion Implementers).

Additionally, at the request of the IOUs, the ICF Team conducted secondary research on community-based organizations that had been awarded a federal contract from either the United States Department of Labor or United States Department of Health and Human Services or had received a grant from a philanthropic foundation. ICF identified 60 such community-based organizations. These organizations were not asked specific questions about their training programs but the list is included in Appendix 12 – Inclusion Implementers – for future reference.

### 2.2.5 Data Collection to Map Current Inclusion Implementers

The ICF Team contacted program directors (or other knowledgeable people familiar with the program) from the preliminary list of 72 program operators and training providers. After conducting an initial web search, the ICF Team contacted all 72 and conducted telephone interviews asking a series of questions based on the 9 metrics (see Appendix 13 – Inclusion Implementers Questions). The ICF Team held phone conversations or email exchanges with 39 of the community-based and private organizations. The questions assisted the team in gathering necessary, relevant information about the EE inclusion training landscape. This information was captured in an Excel database (Appendix 12 – Inclusion Implementers) consisting of:

1. Program or training location.
2. Name of the program.
3. Type of training offered.
4. Certifications and licenses offered.
5. Occupations targeted.
6. 'Continuum of services' offered (pre-training skills assessment; remedial education; training; job readiness; job placement; on-the-job training).
7. Organization's Mission.

Each training program was grouped by IOU service territory.

### 2.2.6 Assessment of the Inclusion Landscape

Guidance Plan Recommendation 2.1.2.2<sup>62</sup> stated, "for workforce inclusion the process should identify the demand for entry-level EE workers, career advancement pathways, and regional need, and prioritize programs with strong job placement track records." Classifying inclusion implementers into a category will assist the IOUs in developing a partnership strategy for each program. Currently, there is no set standard for evaluating a program.

The ICF Team developed two methodologies that can be used by the IOUs to categorize inclusion implementers. The first is a Quadrant-Matrix approach where the IOUs categorize inclusion implementers based on their focus on disadvantaged workers (y-axis) and the training alignment with high demand EE jobs (x-axis). A second is a Yardstick-Approach where the IOU develops a binary evaluation criteria and assesses an inclusion implementer against the metric.

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<sup>62</sup> University of California, Berkeley, Donald Vial Center on Employment in the Green Economy, *Workforce Issues and Energy Efficiency Programs: A Plan for California Utilities*, May 2014.

The Quadrant-Matrix approach provides a way to quickly assess an inclusion implementer but it is limited in its ability to rank inclusion implementers within the quadrant. Exhibit 5 outlines the criteria used for the Quadrant-Matrix inclusion implementer approach. Providers falling in Quadrant 1 have the greatest alignment with goals of bringing energy efficiency training to disadvantaged populations.

**Exhibit 5: Quadrant- Matrix Inclusion Implementer Methodology**  
 (High Low)

Inclusion Focused  (High)          (Low)	<b>Quadrant 1</b>  Trains in High Projection Fields Targets Disadvantaged Workers Trains Disadvantaged Workers Knows Placement Rate Conducts Job Readiness Assessment Addresses Barriers Provides Supportive Services Provides Job Placement Support Entry Level and Mid-level Training	<b>Quadrant 2</b>  Doesn't Train in High Projection Fields Targets Disadvantaged Workers Trains Disadvantaged Workers Knows Placement Rate Conducts Job Readiness Assessment Addresses Barriers Provides Supportive Services Provides Job Placement Support Entry Level and Mid-level Training
	<b>Quadrant 3</b>  Trains in High Projection Fields Doesn't Target but May Train Disadvantaged May Know Placement Rate May Conduct Job Readiness Assessment Doesn't Address Barriers May Provide Supportive Services May Provide Job Placement Support May Provide Either Entry Level or Midlevel Training	<b>Quadrant 4</b>  Doesn't Train in High Projection Fields Doesn't Target but May Train Disadvantaged May Know Placement Rate May Conduct Job Readiness Assessment Doesn't Address Barriers May Provide Supportive Services May Provide Job Placement Support May Provide Either Entry Level or Midlevel Training

A second assessment methodology is known as the yardstick methodology. In this approach, the ICF Team developed two "yardsticks." Each of the two yardsticks are divided into "dimensions," or major aspects of an evaluation area based on the 9 metrics. For each metric, a course may score 1 (yes), 0 (no), or "na" (not applicable). If a criterion is not applicable to a given inclusion implementer, that criterion is not considered in the scoring. An implementer's overall score in a dimension is determined by the actual score divided by the total possible score.

1. *Qualified Inclusion Partner*
  - 1.1. *Mission States Targeting Disadvantaged Workers*
  - 1.2. *Trains Disadvantaged Workers from Targeted Zip Codes*
  - 1.3. *Job Skills Assessment*
  - 1.4. *Barrier Identification and Removal*
  - 1.5. *Supportive Services*
  - 1.6. *Job Placement Support*



## 2. Training Alignment with High Demand Energy Efficiency Careers

### 2.1. Trains in High Demand Careers

### 2.2. Placement Rate

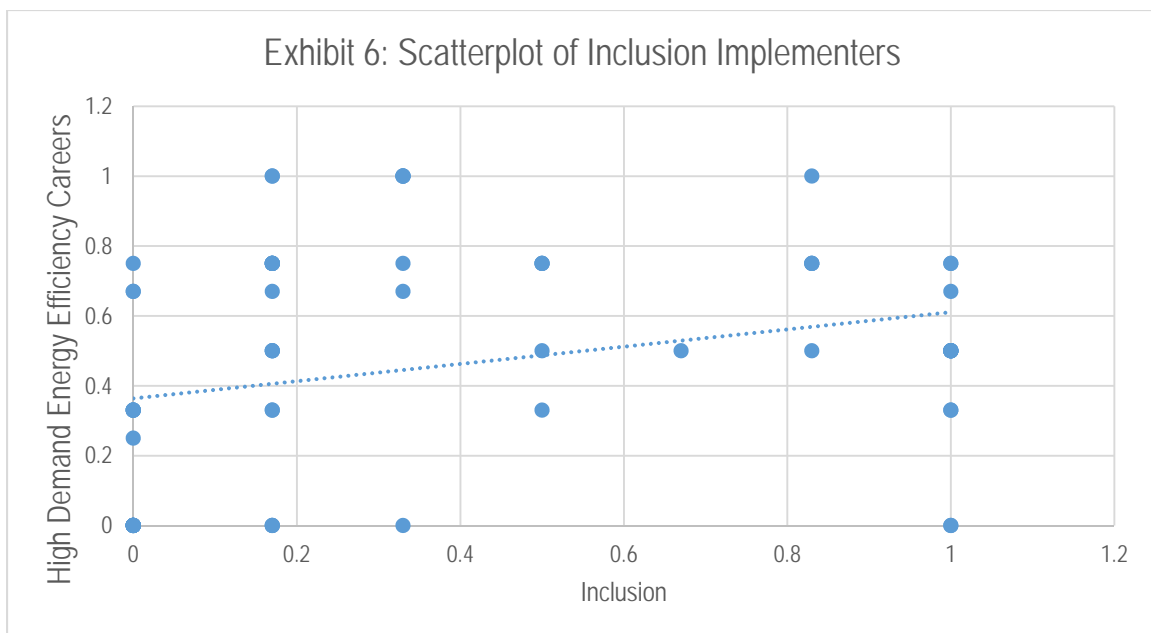
### 2.3. Certification

### 2.4. Multiple Training Levels Including Continuing Education

Providers plotted higher on the X (Inclusion) and Y (Quality Program) axes of the scatterplot have the greatest alignment with goals of bringing energy efficiency training to disadvantaged populations.

The scoring was conducted by two different raters with Masters in Organizational Design, both independently scoring the inclusion implementer based on the web search materials and information gained from interviews. Both raters are experienced in criterion-referenced evaluation using similar instruments. If there was a discrepancy between the raters' scores, they met to discuss their scoring rationale and agree on an appropriate resolution.

The challenge for the ICF Team is that a number of the dimensions needed further clarity and discussion. There are several criteria the IOUs may want to add to the metrics including program cost, which can be an enrollment deterrent for disadvantaged workers. However, the methodology does hold promise for IOUs searching out ways to find inclusion implementers. The advantage of the yardstick methodology is it allows the IOUs to compare one program against another. Results of the rankings are modeled in Exhibit 6, and results of yardstick evaluations are in Appendix 12 – Inclusion Implementers. The regression line indicates there is a correlation between focused on inclusion and training alignment with energy efficiency careers.



For organizations that rank high in terms of meeting the needs of disadvantaged workers and training in high demand EE careers (e.g., Quadrant 1 in the Matrix Methodology), the IOUs use Guidance Plan Recommendation 2.1.1.1 to consider potential partner options. Potential ways to partner that align with the Guidance Plan Recommendation 2.1.1.1.1. include:

- Curriculum review/improve of EE training program.
- Instructor training on new technology.

- Marketing of inclusion implementers' existing training.
- If desired, allowing of WE&T space to conduct training.

Additionally, several programs rank high in training in high demand jobs but do not place a priority on training disadvantaged workers (e.g., Quadrant 3 in the Matrix Methodology). The IOUs can partner with these organizations through Guidance Plan Recommendation 2.1.2.1., which states, "for energy savings, the process should identify priority occupations, skills gaps, skills standards and certifications, and intervention strategies, and prioritize interventions by energy savings potential and scale of impact." These partnership opportunities may include:

- Curriculum review/improve EE training program.
- Instructor training on new technology.
- Marketing of existing training.
- If desired, allowing of WE&T space to conduct training.

For organizations that targeted disadvantaged workers but may not necessarily be training participants in high-demand EE careers (e.g., Quadrant 2 in the Matrix Methodology), the IOUs can align their partnership opportunities with Guidance Plan Recommendation 2.2.2.3. A number of inclusion implementers in this area target disadvantaged workers but provide short-term skills training not aligned with high-demand EE careers. Potential partner opportunities with these inclusion implementers include:

- Share information on high-demand EE careers.
- Link inclusion implementers with high quality programs so disadvantaged workers can align training with career pathways.
- Provide EE training content for inclusion implementer to use.

The last category of programs does not focus on disadvantaged workers and is not focused on high-demand careers (e.g., Quadrant 4 in the Matrix Methodology). Our research indicated that programs in this quadrant many fall into two categories: 1) the program is currently not operating due to lack of funding or low enrollment; 2) the program targets mid and senior level workers for skills upgrades. For these programs, the IOUs may align their partnership goals with Guidance Plan Recommendation 2.1.2. Partnership opportunities can include:

- Supporting inclusion implementer in developing a new training program aligned with high-demand EE careers.
- Instructor training on new skills needed for addressing Energy Efficiency savings above code
- Marketing of existing training
- If desired, allowing of WE&T space to conduct training
- Train-the-trainer programs offered by the IOUs

### 2.2.7 Conclusion

Findings from the ICF Team's research indicates that there are four types of entities when it comes to training disadvantaged workers:

- Local workforce development boards;
- Non-profit community-based organizations;
- Educational institutions (technical/vocational schools & community colleges); and

- Labor union apprenticeship programs.

Common entry points for disadvantaged workers into EE or construction skills training programs tend to be local workforce development boards and community-based organizations. These types of organizations are not only located in or near communities with large populations of disadvantaged workers, but they are also directly involved with assisting them based on their stated missions, charters, and policies. They also contain the knowledge, expertise, and resources in the areas of social and soft skills that have been deemed necessary to successfully address the needs of disadvantaged individuals prior to entering the workforce.

A common issue with training programs targeting disadvantaged workers is sustainability, both in terms of participant demand and financing. Since the programs exist to serve disadvantaged workers, a program will not be successful unless it has a steady source of participants. Marketing, recruiting, and worker demand are all important to the success of these training programs. The lack of money to sustain the costs of a training program has also been a problem for both local workforce development boards and community-based organizations. Federal, State, and Foundation grants have been used to build and operate occupational training programs, but grants are not sustainable and too often the training program disappears when the grant expires. Community-based organizations, which are non-profits, obtain their funding through donations, sponsors, and grants, which may not be consistently provided to the organization over time. In a follow up to a 2014 Craft Consulting Group survey approximately one-quarter of the identified programs were no longer in operation.

The ICF Team developed two methodologies (see Exhibits 5 and 6) the IOUs can use to assess inclusion implementers' program alignment with the goals and priorities of the IOUs. Both methodologies have limitations and need additional discussion on the indicators or metrics but are starting points to developing a framework for working with inclusion implementers.

## 2.3 What is an effective inclusion infrastructure for California and what is the IOUs' role in this vision and infrastructure?

### 2.3.1 Project Background, Purpose, and Methodologies

California's vision is to have a workforce by 2020 that is trained and equipped to achieve California's economic energy efficiency and demand-side management potential.<sup>63</sup> To achieve this vision, it is important to improve access to energy efficiency jobs, identify career pathways, refine skill and training requirements, and collaborate with program implementers who can deliver. Goal 2 of the CPUC's WE&T Plan is to "ensure that minority, low income and disadvantaged communities fully participate in training and education programs at all levels of the Demand Side Management and the energy efficiency industry."<sup>64</sup> Implementation strategies include training that increases participation from disadvantaged workers and provides career pathways leading to middle income opportunities.

The Statewide WE&T Program represents a portfolio of education, training and workforce development strategies and programs funded by or coordinated with the California IOUs. Education and training is a vital component in supporting the achievement of the IOUs' energy savings targets and the workforce objectives set forth in the California Long Term Energy Efficiency Strategic Plan. WE&T has become an important crosscutting activity for the IOUs in an effort to not only educate and train current workers, but to prepare future workers to successfully perform the jobs needed to help achieve the near- and long-term and energy savings targets planned for by the IOUs and California's clean energy goals.

<sup>63</sup> CPUC, "California Energy Efficiency Strategic Plan", Workforce Education and Training, January 2011 Update

<sup>64</sup> 2013-2014 Energy Efficiency Plan, Statewide Workforce, Education and Training Program, Program Implementation Plan, found at: [http://eestats.cpuc.ca.gov/EEGA2010Files/SCG/PIP/2013/Clean/7%20SW%20-%20SCG%20SW%20WET%20PIP%2014\\_13.pdf](http://eestats.cpuc.ca.gov/EEGA2010Files/SCG/PIP/2013/Clean/7%20SW%20-%20SCG%20SW%20WET%20PIP%2014_13.pdf)

The ICF Team conducted secondary research of existing inclusionary training programs’ websites, a literature review of third party research reports and studies, and Internet research to identify relevant inclusionary training programs. In reviewing the current landscape, the ICF Team reviewed inclusionary training programs that are specific to energy efficiency. Given the tendency of workforce development practitioners to integrate energy efficiency training and practices into various other occupations, the ICF Team also reviewed existing literature on the skilled trades (such as electrician, HVAC technician, etc.) inclusionary training programs around the country. Third, the ICF Team researched reports/studies on construction training programs, inclusionary programs for disadvantaged workers, and skills training that were not specific to a particular demographic group.

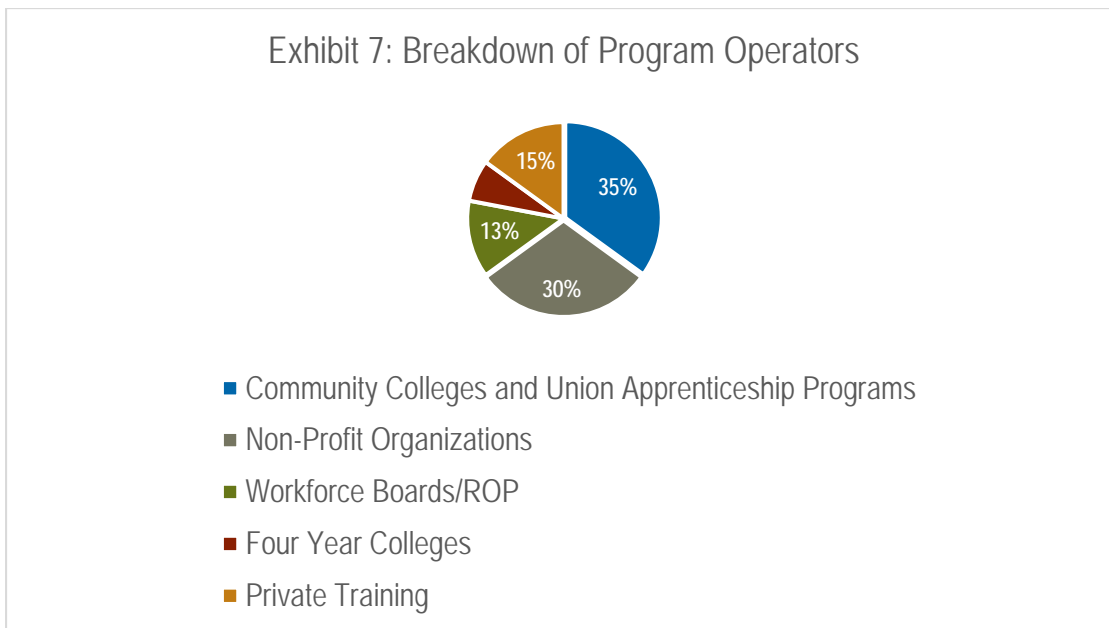
To identify the energy efficiency inclusion training infrastructure in California, the ICF Team conducted Internet searches and literature review of existing reports and documented sources included in Appendix 15 – Secondary Research Resource Documents.

### 2.3.2 Definition of an Effective Inclusion Infrastructure

The Oxford English Dictionary defines “effective” to mean *“successful in producing a desired or intended result.”* To achieve the State’s long-term energy efficiency WE&T goals and vision, it is important to understand the existing training landscape, how it’s working, and whether there are best practices that would improve outcomes.

### 2.3.3 Current Energy Efficiency Workforce Development Training Infrastructure in California

According to a 2010 Report by Environment California Research & Policy Center, there are about 298 clean energy education and training programs in California<sup>65</sup>. These programs range from single-course to multi-course programs and include multi-year apprenticeships, community college programs for career entry, and short-term certification-preparation courses for unemployed or underemployed workers. Energy efficiency training is a subset of clean energy education and training programs and accounts for approximately 17% of the total or roughly 51 of the 298 programs. The breakdown of program operators is displayed in Exhibit 7.



<sup>65</sup> Environment California Research & Policy Center, *Building a Clean Energy Workforce: Preparing Californians for New Opportunities in the State’s Green Economy*, Spring 2011.

A study by Lawrence Berkeley National Laboratory (LBNL) defined the Energy Efficiency Services (EES) Sector Workforce, Education and Training programs to include “labor union and trade association training programs, community and technical college programs, specialty energy efficiency targeted programs developed through ratepayer funding sources, third-party and trade association programs supporting energy efficiency, third-party certificate and accreditation efforts that focus on energy efficiency, and four-year and post-baccalaureate programs. These offerings span various occupational categories due to the multidisciplinary nature of energy efficiency and are being refined as the EES Sector becomes more established.”<sup>66</sup>

The majority of green job training programs in the state target entry-level workers, with relatively few programs available for teachers, trainers, or program administrators. The most robust and thorough technical or hard skills training for EE occupations and related skilled trades is provided by a few types of institutions. Labor Unions operate multi-year registered apprenticeship programs that have begun to incorporate energy efficiency skills training into their existing curricula for new electricians, plumbers and other skilled workers in the construction trades. These apprenticeship programs emphasize high-quality training and ongoing education while incorporating new technologies. Both community colleges and technical or vocational schools have the ability to create training programs that culminate with the student obtaining certification(s) in the related field. With their strong presence throughout the state, their flexibility in accommodating students from all backgrounds, and their rich pool of faculty expertise, community and technical colleges are major providers of energy efficiency training in California. These institutions are not only important because they provide a stepping-stone to higher-level careers, but also because they work closely with community-based non-profits, unions, and utilities to broaden access to training programs.<sup>67</sup>

### 2.3.4 Training Programs that Target Disadvantaged Workers

Research indicates that there are challenges with fragmentation and coordination in the California workforce system. Commenting on preliminary results from the Don Vial Needs Assessment, RJW Consulting found, “California’s present workforce system is characterized by poorly aligned funding streams and often ill-defined roles for the institutions involved in carrying out the range of workforce development functions. This fragmentation and lack of coordination has resulted in concerns that many programs are “chasing” after workforce dollars without sufficient attention to coordination.”<sup>68</sup> There are a few types of organizations that specifically recruit or have a vested interest in recruiting disadvantaged workers for job training. Community-based organizations (CBOs) and workforce development boards provide services to disadvantaged workers, but are best suited to provide soft skills training and other job search resources. Often these organizations partner with technical or hard skills training institutions for their constituents.

The roles of recruiting disadvantaged workers, providing soft skills training and other supportive services, and technical training may be played by different providers, but for a successful job-training program for disadvantaged workers, all elements need to be included. Therefore, partnering or collaboration to deliver a comprehensive solution is important. Industry partnerships are highly effective at solving workforce development challenges and tend to share a number of common characteristics.<sup>69</sup>

### 2.3.5 Best Practices for Inclusion-Related Work in the Nation

Construction sector best practices for inclusion of disadvantaged workers revolve around sector strategies, pre-apprenticeship programs, and the development of career pathways to create a pipeline of skilled workers in the construction trades. These programs are typically aimed at target populations including at-risk and disadvantaged youth and women, low-income individuals, the long-term unemployed, the previously incarcerated, minority

<sup>66</sup> Lawrence Berkeley National Laboratory, *Energy Efficiency Services Sector: Workforce Education and Training Needs*, March 2010.

<sup>67</sup> Ibid

<sup>68</sup> RJW Consulting, *California’s Workforce Education and Training Needs Assessment: An Interim Update*, August, 2010.

<sup>69</sup> National Fund for Workforce Solutions, *Characteristics of a High Performing Industry Partnership*, May 2014.

populations, military veterans, and single custodial parents. The target population will depend on various factors such as the mission of an organization, what funding source is being used, or the circumstances of certain individuals in a particular community. Examples of successful programs can be found online at the National Association of Workforce Boards website: [http://www.nawb.org/promising\\_practices.asp](http://www.nawb.org/promising_practices.asp) and the Building California Construction Careers (BC3) website: <http://www.buildingc3.com/doc.asp?id=2885>.

A best practice is commonly defined as “a technique or methodology that, through experience and research, has been proven to reliably lead to a desired result.”<sup>70</sup> A best practice represents a tested and proven method, technique, or process that has consistently shown results superior to those achieved by other means. The ICF Team’s research identified five research-supported best practice elements for disadvantaged workers including:

- Workforce Sector Strategies
- Pre-Apprenticeship Training;
- Skill Standards and Credentials
- Career Readiness and Supportive Services; and,
- Job Placement and Follow-up Support Services.

Documented best practices are discussed under each of these topics.

Through workforce sector strategies and quality pre-apprenticeship programs employers are reporting increases in worker productivity, reductions in customer complaints, and declines in staff turnover, all of which reduce costs and improve the competitiveness of their companies.

### WORKFORCE SECTOR STRATEGIES

Workforce boards and CBOs are adopting sector strategies to help disadvantaged workers find living wage jobs in occupations with career ladders for advancement. Sector strategies are industry partnerships with employers, training and education institutions, labor and community stakeholders, and others who come together to plan and implement training programs.<sup>71</sup> Sector strategies are considered a best practice approach<sup>72</sup> and are designed to meet the needs of employers for skilled workers, while benefitting workers through placement in career-track jobs and career advancement opportunities. Employer involvement includes identifying skill gaps, but also in committing to co-fund training of incumbent workers and/or hire graduates of training programs.<sup>73</sup> The Energy Efficiency Workforce Sector Strategy portal, coordinated by PG&E, also believes the implementation of a sector strategy approach to be a successful method to address the needs of workers for good jobs and the needs of employers for skilled workers. The Don Vial Needs Assessment recommended that IOU WE&T programs adopt the sector strategy framework for their WE&T programs.<sup>74</sup>

### BEST PRACTICE EXAMPLE

Workforce Sector Strategies incorporating best practices identified through a review of third party research reports include:

**PG&E PowerPathway™** is a program developed by PG&E to deal with the shortage of skilled workers and trained professionals to meet growing demand. PowerPathway is a collaboration between local colleges, the public

<sup>70</sup> Bitpipe Definition.

<sup>71</sup> Corporation for a Skilled Workforce and National Governors Association, *State Sector Strategies Toolkit: Introduction*, January, 2013.

<sup>72</sup> National Governors Association, *State Sector Strategies Coming of Age: Implications for State Workforce Policymakers*, January, 2013

<sup>73</sup> Public/Private Ventures, *Job Training That Works: Findings from the Sectoral Employment Impact Study*, May, 2009.

<sup>74</sup> University of California, Berkeley, Donald Vial Center on Employment in the Green Economy, *California Workforce Education & Training Needs Assessment for Energy Efficiency, Distributed Generation, and Demand Response*, 2011.

workforce development system, and internal PG&E partners to enlarge the talent pool of qualified candidates for entry-level opportunities. Programs developed by PG&E and their training partners are designed to help new and incumbent workers grow and develop along skilled gas and electric operations career paths while providing a reliable pipeline of skilled workers that PG&E and other industry employers can count on. PowerPathway utilizes PG&E training and educational resources and shares those resources with community colleges and community-based training organizations. These organizations develop industry-informed career pathways, training, and curriculum in response to growing energy industry and utility workforce needs. Courses target three primary educational outcomes:

- Soft Skills Training: Company culture, communication, team building, diversity and inclusion, interview preparation, resume refinement, and networking;
- Test Preparation: For written pre-employment tests and post-employment physical assessments; and
- Industry-Informed Technical Training: Most modules include specific utility gas or electric information such as plastic pipe fusion, pole climbing, traffic control, digging procedures, or underground locate-and-mark activities.

Industry employers, workforce investment boards, two-year postsecondary educational institutions, and community-based training organizations contribute to make these programs possible. PG&E provides technical support, curriculum design, co-delivery of classroom instruction, student field visits, in-kind donations of training equipment, employment and/or enlistment of additional employers to advise and hire, as well as program management, administration and funding. Community partners offer job placement support for one year after program completion and PowerPathway Program Managers continue to offer placement support for up to three years after program completion to ensure program participants are able to not only find jobs but to build careers in the utility industry.<sup>75</sup>

### PRE-APPRENTICESHIP TRAINING

The overall objective of best practices for a pre-apprenticeship training program is to attract, introduce, prepare, and train new entrants for careers in the aligned trades. There are many programs around the country that identify themselves as a pre-apprenticeship training program. Many focus on career exploration programs. The Aspen Institute surveyed 260 pre-apprenticeship programs across 40 states and found that many of the programs, while reporting apprenticeship placement as a goal, do not place substantial numbers of graduates into apprenticeship programs. This is primarily due to the lack of openings in certain trades and lack of substantive relationship between the pre-apprenticeship program and the union apprenticeship programs. As evidenced by Aspen's research, many "pre-apprenticeship training programs" do not prepare their graduates for employment in entry-level positions in the construction industry, except perhaps as laborers or helpers.

United States Department of Labor's Employment & Training Administration Training and Employment Notice No. 13-12 (see Appendix 17 – US training and Employment Notice No. 13-12) outlines a quality pre-apprenticeship program as one that incorporates training and curriculum based on industry standards and approved by the documented Registered Apprenticeship partner(s), provides strategies to increase Registered Apprenticeship opportunities for under-represented, disadvantaged or low-skilled individuals, ensures access to appropriate support services during the pre-apprenticeship program and Registered Apprenticeship program; and when possible, formalizes agreements with Registered Apprenticeship sponsors that enable individuals who have successfully completed the pre-apprenticeship program to enter directly into a Registered Apprenticeship program.

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<sup>75</sup> PowerPathway information may be found at <http://careers.pge.com/career-training-development>; summary information sourced from <http://www.aspeninstitute.org/policy-work/economic-opportunities/skills-americas-future/models-success/pge-powerpathway>



## BEST PRACTICE EXAMPLES

Inclusionary training programs incorporating best practices identified through a review of third party research reports include:

**Wisconsin Regional Training Partnership (WRTP/BIG STEP)** is a national leader in developing sector-based workforce solutions that enhance the ability of private sector organizations to recruit and develop a more diverse, qualified workforce. The partnership between WRTP and BIG STEP combines the respective strengths of their two organizations. WRTP specializes in the development of hands-on pre-employment training certificate programs, while BIG STEP focuses on individualized tutoring in academic skills and works closely with the labor union Joint Apprenticeship Committees to prepare candidates for their respective apprenticeship exams.

Through a comprehensive plan for workforce training, the **Los Angeles Department of Water and Power (LADWP)**, aligned various training programs with the utility and labor unions to address impending labor shortages and a rapidly changing industry. The Utility Pre-Craft Training program (UPCT) provides pre-apprenticeship training for entry-level workers that may be interested in careers with the utility. UPCT provides the opportunity for trainees to learn a wide variety of skills and to explore various career options within the utility. The curriculum was developed by the LADWP in conjunction with the International Brotherhood of Electrical Workers (IBEW). Following an extensive intake, assessment, and orientation process, candidates enter a four-week, 40-hour, basic skills and weatherization training program. Upon completion of the in-classroom training, trainees work full time for 18 months in a special pre-civil service classification job, earning trainee wages in an “earn-as-you-learn” approach. Trainees attend civil service exam preparation classes and learn about career pathways within the utility. The goal is to help each candidate to qualify for as many civil service examinations as possible, increasing their chances for permanent jobs with the utility after their participation in the UPCT program. Organizational partners include International Brotherhood of Electrical Workers Local 18, the South East Los Angeles County WorkSource Center, and RePower LA Coalition, which helps with coordination and outreach by recruiting candidates from marginalized and underserved communities.

**RichmondBUILD Academy** is a public-private partnership focused on developing talent and skills in the high growth, high wage construction and renewable energy fields. The program has become a nationally-recognized green building training program model for effective public-private partnerships. Its partners contribute to the program in a variety of ways. For example, Rising Sun Energy Center contributes instructional components that educate participants in energy efficiency, water conservation, home performance testing, and retrofitting. All of RichmondBUILD participants come from low-income households. Ninety-five percent are minorities and over 30 percent have a history with the justice system. The programs reputation for placing graduates in well-paying jobs means over 100 residents compete for the 35 available seats in each class. RichmondBUILD participants complete the core Carpentry Pre-Apprenticeship track, and then choose from one of five electives including energy efficiency. RichmondBUILD has achieved an impressive job placement rate of nearly 80% of graduates with an average starting wage of \$17 per hour.

**Cypress Mandela Training Center, Construction Pre-Apprenticeship Program** offers a 16-week pre-apprenticeship program for Bay Area men and women over 18 years old. Training is both hands-on and in the classroom and prepares students for skilled trades jobs that are relevant to today’s construction industry. The program provides training, skills assessment and testing, as well as job placement. In the past two years, over 85% of the graduates were placed in jobs. The program has received local and national recognition and has established itself as the foremost pre-apprenticeship construction training center of its type in the United States.

**Oakland Green Jobs Corps Partnership** is a job training program providing “green pathways out of poverty” for young adults in Oakland facing barriers to employment. The program provides job-readiness training, ongoing support services, and on-the-job training, enabling trainees to pursue careers in green industries. Its partners include Laney College, Cypress Mandela Construction Training Program, and Growth Sector, Inc. The program includes



outreach, recruitment, and assessment to recruit low-income young adults; pre-construction and basic skills training; classroom instruction on solar and green construction, and paid on-the-job training and work experience.

### 2.3.6 Skill Standards and Credentials

Energy Efficiency training programs from around the country recognize that there is a need to incorporate industry-recognized workforce skill standards into training program requirements. The Guidance Plan recommended “the IOUs require specific skills certifications where there is expert consensus and present alternative approaches where they do not exist or there is lack of consensus.”<sup>76</sup>

According to the U.S. Environmental Protection Agency website,<sup>77</sup> “although no national certification standard exists” for energy efficiency and green building occupations, there is a wide range of certifications currently used in many states related to specific industries and occupations. In some cases, such as the energy efficiency industry, there are multiple overlapping certifications, a situation due in part to rapid growth and change in the industry. A partial listing of credentialing bodies may be found in Appendix 14 – Energy Efficiency Credentialing Bodies. Certifications include:

- Building Performance Institute (BPI) certifies weatherization auditors, energy efficiency installation personnel, and other professionals in the residential and multifamily building performance contracting industry.
- North American Board of Certified Energy Practitioners (NABCEP) offers national certification programs for solar electric and solar thermal installers.
- Building Operators Certificate offers national certification for building engineers and maintenance operators.
- HERS and HERS Phase II (Home Energy Rating System)
- NATE (North American Technician Excellence)
- LEED Professional, U.S. Green Building Council
- Build It Green Certification
- National Advanced Lighting Controls Training Program
- General certifications (not specific to green industries) – OSHA safety training – First Aid/CPR

Any certification needs to be recognized by employers. The ICF Team conducted a review of 50,000 job postings from February 1, 2015 to January 31, 2016 to determine which of the common national certifications are present in job postings. Findings of most requested certifications, number of postings and rank out of 200 certifications are outlined in Table 22.

**Table 22: Certifications Required in Job Postings (February 1, 2015 – January 31, 2016)**

Certifications	Job Postings	Rank
Electrician Certification	1,208	1
Environmental Protection Agency Certification	884	2
HVAC Technician Certification (e.g. EPA 608)	467	4
Refrigeration Technician Certification (e.g. CFC Type 2)	378	7
North American Board of Energy Practitioners (NABCEP)	364	9
First Aid/CPR	286	11

<sup>76</sup> University of California, Berkeley, Donald Vial Center on Employment in the Green Economy, *Workforce Issues and Energy Efficiency Programs: A Plan for California Utilities*, May 2014.

<sup>77</sup> United States. Environmental Protection Agency, State and Local Climate and Energy Program, Workforce Development, “*What Certifications are Used?*”, February, 2009.

Certifications	Job Postings	Rank
Electrical Certification (e.g. electrical installation)	127	20
Occupational Safety and Health Administration Certification	113	21
Leadership in Energy and Environmental Design (LEED)	53	31
Building Performance Institute (BPI)	14	65
Building Operator Certification	11	76

Currently there are no statewide training standards in California. Each program has its own curriculum and may issue a certificate upon completion that may not be accepted industry-wide across the state. The Guidance Plan recommends<sup>78</sup> the establishment of a Statewide EE Workforce Steering Committee to provide guidance on the appropriate skills standards and certifications for energy efficiency work. The research on the demand for current certifications in job postings indicate employers may not be requiring current certifications.

Below are examples of both a common pre-apprenticeship and a career pathway skills standard that are aligned with industry-recognized credentials. Some of the more notable certifications and credentials offered by job training programs in California are related primarily to construction, energy efficiency, renewable energy, and green building.

### BEST PRACTICE EXAMPLES

Uniform skill training programs incorporating best practices include:

The **New York State Energy Research and Development Authority's (NYSERDA) Career Pathways to Energy Efficiency Training Program** provides an example of a broad statewide education/training model. The program provides paid, experiential learning opportunities such as an internship or placement in a New York State Registered Apprenticeship program. Training partners prepare workers with training that leads to certifications for clean energy jobs in the fields of energy efficiency, renewable energy, and advanced technologies. NYSERDA partnered with more than 20 training organizations adept at serving disadvantaged workers through remedial education in math and literacy followed by nationally recognized certifications in energy efficiency. Disadvantaged workers include: at risk youth aged 16-24, the long-term unemployed, formerly incarcerated individuals or individuals in alternatives to incarceration programs, veterans, and members of ethnic minorities. Training providers were encouraged to initiate teaming arrangements with technical training providers, including community colleges, organized labor and professional associations that can offer the next level of training leading toward employment. The technical training component supports training that leads to a national certification including those from, but not limited to, the BPI, United States Green Building Council, North American Technician Excellence, Association for Energy Engineers, and the National Council on Qualifications for the Lighting Professions. Training partners provide the intermediate curriculum that creates a successful transition between basic skills education and entry-level technical training or advanced technical training.

**Multi-Craft Core Curriculum (MC3):** In 2007, the Building Trades' National Standing Committee on Apprenticeship and Training created an Apprenticeship Readiness Program (ARP) that would empower participants to make informed decisions about which craft they would pursue. These training programs are sponsored by State and Local Building Trades Councils, Training Coordinators and JATCs in cooperation with local community groups, government agencies, and schools. The program's goals are to (1) increase the number of candidates for apprenticeship across all crafts, (2) increase the diversity of apprenticeship candidates by recruiting women, people

<sup>78</sup> University of California, Berkeley, Donald Vial Center on Employment in the Green Economy, *Workforce Issues and Energy Efficiency Programs: A Plan for California Utilities*, May 2014.

of color and veterans, and (3) increase the retention rate among apprentices by providing them with a deeper understanding of both the industry and the role of craft unions in construction. The Multi-Craft Core Curriculum is a comprehensive, 120-hour apprenticeship preparation curriculum that provides a gateway for community residents to gain access to Building Trades registered apprenticeship programs. The MC3 curriculum is offered in cooperation with state and local Building Councils, which are essential participants in any MC3 program. More information is available in Appendix 16 – MC3 Overview.

### 2.3.7 Career Readiness and Supportive Services

Many disadvantaged workers need more than occupational skills training to find and retain a job. These workers often face barriers such as limited English proficiency, or a lack of requisite math/reading skills, and/or high school diplomas or equivalent credentials. Wrap-around support services and career readiness skills training are also needed along with basic math and English language skills, a high school diploma, GED credential, or equivalent. Wraparound support services are comprehensive case management services provided by trained counselors or social workers. These services are critical for supporting people who face barriers to employment. Counselors develop individualized plans based on an assessment of a full range of needs, such as childcare, transportation, housing, mental health, physical health, financial stability, and educational achievement. Wraparound services can be instrumental for success as students go through a training program. They are equally important for program graduates as they find jobs and adjust to the realities and challenges of employment.<sup>79</sup>

#### BEST PRACTICE EXAMPLES

The **WorkAdvance** model includes a career readiness component that is adjusted for each class based on information from employers. From program entry through job search and beyond, providers are expected to build in opportunities for participants to develop résumés and prepare for job interviews through role-playing, learn workplace norms, develop soft skills, and build their knowledge of the industry. While technical/hard skills training can be a pathway into specific occupations such as energy efficiency occupations, with disadvantaged workers it's not as simple as offering the technical or hard skills training and not worrying about other issues they face. Wraparound services may be needed in addition to career readiness skills.<sup>80</sup>

The **Gateways to Green Building (GGB)** Program was developed to “create a well-trained workforce for the home energy retrofit and green building segments of the Los Angeles County construction industry.” Training offerings are developed to respond to local employers’ needs, and currently focus on energy-efficient construction, construction industry safety, and hazardous-waste operations and emergency response. The South Bay Workforce Investment Board (SBWIB) is responsible for GGB Program management, including oversight of participant outreach, basic skill and career interest assessments, occupational training, case management, and job development services. The Gateways to Green Building workforce partnership provides residents of high-poverty neighborhoods interested in employment in green construction with multiple occupational training tracks. The program provides pre-apprenticeship training in basic construction, including home weatherization, with instruction on energy efficiency retrofit fundamentals and soft-skills training provided by El Camino College using an industry-recognized curriculum developed by SBWIB. The program also includes Building Analyst certification by the Building Performance Institute, and a Construction Health and Safety track leading to seven stackable certificates. Funds from Pathways out of Poverty provides essential support for jobseeker expenses such as books, parking, apprenticeship initiation fees, tools, uniforms, and other incidentals. These costs can often be prohibitive to successful participation by members of low-income households in training, apprenticeship programs, and stable employment.<sup>81</sup>

<sup>79</sup> Ella Baker Center for Human Rights, *Making Green Work: Best Practices in Green Collar Job Training*, Spring, 2010.

<sup>80</sup> MDRC, *WorkAdvance: Testing a New Approach to Increase Employment Advancement for Low-Income Adults*, June, 2013.

<sup>81</sup> Jobs for the Future, *Creating Career Pathways in the Green Economy*.

### 2.3.8 Job Placement and Follow-up Support Services

Having the inclusionary training infrastructure in place is not sufficient for placing disadvantaged workers in good paying energy efficiency jobs and occupations. Workers that have been trained and possess the necessary skills and qualifications need to be supported with job placement programs.

#### BEST PRACTICE EXAMPLE

The **Northwest Energy Efficiency Council (NEEC)** teamed up with the Seattle-King County Workforce Development Council (WDC) in a partnership to recruit, assess, train, and mentor a cohort of experienced but unemployed building operators to earn industry-recognized credentials that would lead to job placement. The partnership tapped the resources of the national Building Operator Certification program and the local chapter of a professional association comprised of facilities directors, and the International Facility Management Association. The partnership model was built around three critical implementation activities: 1) recruitment, screening and job search support, 2) training and certification, and 3) mentoring and oversight of participants to complete building project assignments required for the certification. Each partner contributed expertise and resources to the activities.<sup>82</sup>

### 2.3.9 Conclusion

Energy efficiency occupations offer a promising opportunity to build middle income career pathways for disadvantaged workers with barriers to employment. “Employer and industry engagement in job training programs can take many forms, including the direct involvement of employers in determining training demanded by the labor market, developing curricula, providing worksite internships, making equipment and technology available for programs, and developing and teaching courses. Strong partnerships among the public workforce system, education providers, and employers in key sectors appear to be critical for improving employment and earnings outcomes for workers.”<sup>83</sup> For an inclusionary program to have the intended consequences, national best practices<sup>84</sup> advocate investing in pre-apprenticeship programs, supporting registered apprenticeship programs, forming partnerships, and creating inclusive, equitable and realistic target hire goals that can be clearly communicated and measured.

An effective energy efficiency inclusionary training infrastructure landscape for California would include best practices and lessons learned from around the country. Specifically, the ICF Team has presented best practice examples in five areas:

- **Workforce Sector Strategies:** Coalitions of industry, education, and other workforce stakeholders to plan and implement training programs targeted at specific industry needs;
- **Pre-Apprenticeship Training:** To attract, introduce, prepare, and train new entrants for careers in aligned trades;
- **Skills Standards and Credentials:** While there is broad acceptance that skill standards are needed and that industry recognition of credentials is beneficial, there is less evidence of industry coordination around standards and credentials;
- **Career Readiness and Supportive Services:** Disadvantaged workers face barriers other than hard skills training; comprehensive case management provides the supportive services framework necessary to help disadvantaged workers find and prepare for the workforce; and,
- **Job Placement and Follow-up Support Services:** Once trained, disadvantaged workers need assistance in finding and retaining employment.

<sup>82</sup> American Council for an Energy Efficiency Council, *Job Placement for the Unemployed through Partnerships with Industry-recognized Credential Programs*, August 2012.

<sup>83</sup> United States Department of Labor, *What Works In Job Training: A Synthesis of the Evidence*, July 2014.

<sup>84</sup> UCLA Labor Center, *Exploring Targeted Hire: An Assessment of Best Practices in the Construction Industry*, March 2014.

Assisting disadvantaged workers in finding employment in the energy efficiency sector can be achieved through local industry partnerships comprised of training providers, credentialing entities, and community-based organizations that collectively bring the elements necessary to participant success – statewide or nationally recognized certification, hands-on experiential learning, mentorships, job search support, apprenticeship committees, and industry experts to identify skill and training standards, and career pathways.

Potential IOUs' role in this vision and infrastructure would be to engage with qualified partners to identify skill and training standards, career pathways, and statewide or national industry recognized certification. Quality Workforce education and training involves at least three main activities: 1) determining the knowledge, skills and attitudes necessary to be successful in a specific occupation; 2) designing instruction that will develop the requisite knowledge, skills and attitudes; and 3) identifying certifications, credentials, and licenses that are required or important in being hired.<sup>85</sup>

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<sup>85</sup> Interstate Renewable Energy Council, *Renewable Energy Training Best Practices Recommended Guidelines*, February 2010.