# PY2013-2014 CALIFORNIA STATEWIDE WORKFORCE EDUCATION AND TRAINING PROGRAM

## WORKFORCE CONDITIONS DATA INVESTIGATION

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For the

**California Public Utilities Commission**
**Energy Division**

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# 1. Executive Summary

California's Long Term Energy Efficiency Strategic Plan was publicly released in 2008, and updated in January 2011, to "create a framework to make energy efficiency a way of life in California by refocusing ratepayer-funded energy efficiency programs on achieving long-term savings through structural changes in the way Californians use energy."[1] The Strategic Plan outlined a plan specifically for Workforce, Education and Training (WE&T) with a vision that, "by 2020, California's workforce is trained and fully engaged to provide the human capital necessary to achieve California's economic energy efficiency and demand-side management potential."[2] The Strategic Plan set two goals related to WE&T:

1. Establish energy efficiency education and training at all levels of California's educational systems
2. Ensure that minority, low-income, and disadvantaged communities fully participate in training and education programs at all levels of the demand side management (DSM) and energy efficiency industry[3]

Following the Strategic Plan direction, the CPUC directed the IOUs "to devise and implement outreach and training efforts to teach minority, low income and other disadvantaged communities the skills needed to succeed at jobs that support the Energy Savings Assistance (ESA) Program by acting as a catalyst to change by implementing several foundational activities that are necessary to accurately identify specific WE&T needs and recommendations for action"[4].

Subsequently, D.09-09-047 also called for the Statewide WE&T Needs Assessment to include a "detailed inventory of…workforce education and training programs across the state and [the identification of] collaborative opportunities to make the three-year portfolio of IOU training programs responsive to [Statewide WE&T] Needs Assessment findings[5]."

The Needs Assessment recommended to "modify program objectives to include workforce outcomes. Assess current workforce outcomes and if they are not adequate, use high-road agreements and sector strategies to pilot incorporation of the new national DOE skill standards and certifications or other strategies to improve both energy efficiency and workforce outcomes[6]". Further, the 2009 ESAP Process Evaluation Report, noted "incentive structures also may impact how installation contractors approached their work. Inspectors in PG&E territory stated that they had observed a difference between the quality of work performed by installation contractors paid by the job and those who earned hourly wages"[7]. The Statewide WE&T Needs Assessment also recommended that ratepayer dollars should be invested in improving worker skills rather than promoting competitive markets that drive costs (and wages) down to below a living wage standard.

Following this series of events, the California Public Utilities Commission (CPUC) directed the four IOUs[8] to begin collecting workforce condition data for the Energy Savings Assistance Program (ESAP).

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[1] *California Long Term Energy Efficiency Strategic Plan,* January 2011 Update, Section 1, p. 1.
[2] *California Long Term Energy Efficiency Strategic Plan,* January 2011 Update, Section 9, p. 70.
[3] Ibid.
[4] D12-08-044, p. 168.
[5] Ibid, p. 169.
[6] Ibid, p. 169-170.
[7] *Low Income Energy Efficiency Program 2009-2010 Process Evaluation;* Calmac Study ID: PGE 0298.01 by Research Into Action prepared for the CPUC, page 41
[8] Pacific Gas and Electric Company [PG&E], Southern California Edison Company [SCE], San Diego Gas & Electric Company [SDG&E], and Southern California Gas Company [SoCalGas]

> "The IOUs are directed to immediately begin collecting the following data in these seven WE&T areas: (1) contractor and subcontractor contract terms (competitive bid, direct award, etc.); (2) contractor and subcontractor compensation schemes (hourly, piecemeal, salaried, etc.); (3) number of inspection failures and the types of failures (including the number of enrolled customers later deemed ineligible, number of incorrectly assessed households and instances of measure installation inspection failures); (4) level and type of IOU training (including lead safety training) and screening (including background check) these specific contractors have completed; (5) customer feedback for these contractors, positive and negative; (6) demographic data of the current ESA workforce, including minority, local, low income, disabled, displaced, and other disadvantaged communities; and (7) the IOU's assessment of any other needs of the existing workforce to meet the current and future ESA Program demands."[9]

Subsequently, in Decision 12-11-015, the CPUC directed the IOUs to collect similar workforce condition data for all of their energy efficiency programs. However, the wording in the Decision caused some confusion amongst the IOUs as to whether this entire data requirement should apply to all energy efficiency programs.

> "In the meantime while a more comprehensive approach is being designed, **the utilities should emulate, for their energy efficiency programs, the data collection protocols with respect to workforce initiatives recently adopted by the Commission for the low-income programs in D.12-08-044**. This will assist us in evaluating new proposals for energy-efficiency program workforce efforts, based on a more robust set of data in the future."[10]

Following these decisions, the WE&T working group composed of IOU staff, Energy Division staff, and other stakeholders[11], has focused on developing and improving data collection under ESAP. However, the IOUs have been reluctant to extend data collection to all energy efficiency programs. In 2014, the CPUC hired Opinion Dynamics to determine potential methods for collecting the requested data and to assess the feasibility of data collection more broadly for programs other than ESAP.

A notable difference between ESAP and many other energy efficiency programs is the relationship between the contractors, who perform the work, and the IOUs, who request data from the contractors. In ESAP and some other Direct Install (DI) programs, the IOUs hire the contractor and are thus in a direct contracting relationship. Other energy efficiency programs do not have this direct contracting relationship, as it is usual for the customers to hire contractors directly.

A working group was established to explore data collection options for ESAP. At the time that Opinion Dynamics was hired to conduct this study, it was assumed that this working group would produce data collection options applicable to other programs in a direct contracting relationship. Therefore, as a complement to those efforts, we focused this research on two programs where the contractors are in an indirect contracting relationship with the IOUs.

This study can be described as a policy analysis, intended to explore the purpose, needs and options for collecting workforce condition data from programs that are not in a direct contracting relationship with contractors in light of recent policy decisions (described above) that asked for the IOUs to start collecting data that could be costly and extensive. We focused this study on two high-profile programs that do not have

[9] Decision 12-08-044, August 23, 2012. Available at https://drive.google.com/file/d/0B1N0yUljD6yQenlqQ0tlcjBvWEU/edit.

[10] Decision 12-11-015, November 8, 2012. Available at https://docs.google.com/document/d/11ZLXEZwQLGlBor9wzVenBZPzzjFkQ0jnA9D82l7nkgw/edit.

[11] Stakeholders included Brightline Defense Fund, Greenlining, El Concilio and DRA. The data collection efforts were managed as a Compliance Activity with regulatory therefore the Statewide Measurement and Evaluation staff was not involved to provide oversight.

a direct contracting relationship with contractors: the Residential Energy Upgrade California (EUC) Home Upgrade Program and the non-residential lighting programs.[12]. The goal of this study was to:

- Explore the issues around collecting workforce condition data in response to Decision 12-11-015 from energy efficiency programs that are not in a direct contracting relationship with contractors, using the Residential Energy Upgrade California (EUC) Home Upgrade Program and the non-residential deemed and custom lighting programs as examples, including:
  - What data are required to satisfy the Decision?
  - What are the benefits and drawbacks of collecting the information?
  - How is this data currently being collected if at all? Who is collecting the data? What are the gaps?
  - What were the lessons learned from past ESA, EUC Home Upgrade Program, and non-residential HVAC[13] data collection efforts?
- Document the perspectives among key stakeholders, and
- Determine if and how energy efficiency programs that are not in a direct contracting relationship should respond to Decision 12-11-015.

All research methods for this study were qualitative and exploratory. The overall objective of this study was to summarize all information known to date on this topic; and build from existing knowledge to provide additional insights into if and how the IOUs can begin to collect workforce condition data. As such, the research questions and study objective appropriately lead to conducting qualitative research while summarizing and analyzing several relevant policy decisions, reports and data collection efforts.

The overarching goal of the study was to determine what data should be collected for energy efficiency programs not in a direct contracting relationship with the IOUs. Based on all of the secondary information reviewed for this study and the qualitative interviews with contractors, stakeholders, program and implementation managers, we provide the following conclusions and recommendations. While the study herein highlights several challenges with collecting workforce condition data, we do see opportunities for collecting some of the data requested in the Decision. Please refer to Section 4 for more detailed information for each bullet below:

- There many challenges with collecting workforce condition data from contractors who are not in a direct contracting relationship with programs. Challenges include issues with contractor willingness to provide information, the cost of collecting such information, and validity and reliability concerns with most data collection methods.
- Electronic payroll tracking is the most valid and reliable method to acquire the demographic and wage information requested but this investment is not justifiable for all energy efficiency programs

[12] There are multiple IOU non-residential programs with lighting components. We use the general term "non-residential lighting program" to mean those non-residential retrofit programs that include lighting measures as a main focus. We focused on those that use deemed (e.g., prescriptive) or calculated (e.g., custom) savings approaches and direct incentives (as opposed to mid- or upstream programs).

[13] Workforce conditions data were collected for the ESA, EUC, and non-residential HVAC programs. Data were collected by the IOUs for ESAP and EUC, while Itron collected data for the non-residential HVAC programs.

unless there is a reliable concern regarding the workforce conditions or installation quality amongst the contractors supporting a specific program.

- A data intensive effort, such as electronic payroll records, is not warranted at this time for programs similar in design to the Home Upgrade and Non-Residential Deemed and Custom Core Programs given the lack of data available to date that indicates that there is a workforce condition or installation quality issue.

- Consider the learnings from this study when determining how to best collect demographic information from program contractors in the future. If a program does warrant an investigation into the demographics of supporting contractors, such as ethnicity or disadvantaged status, then the learnings from this study indicate that the data collection needs to carefully extract information from each employee within a contracting firm and the purpose of the data collection needs to be clearly communicated to contractors.

- Require energy efficiency programs in indirect contracting relationships with participating contractors to collect and submit select information from the Decision at this time. Information readily available to most energy efficiency programs such as customer satisfaction rates with contractors, publicly available wage statistics, contractor training requirements for participation, and QA/QC failure rates can easily be assembled through existing program operations. This information will help the CPUC determine if a reliable workforce condition or installation quality concern exists that would then trigger a need for deeper data collection.

- The IOUs need help to standardize the definition of work quality across the IOUs and the coding of inspection failures. Many of the programs do track QA/QC failure rates from installation inspections however the IOUs are not currently consistent in how they track failures, what constitutes a failure, and, most critical to this Decision, whether the failure was based on an installation quality issue. If the CPUC is to rely upon the IOUs QA/QC failure rates to determine whether there is an installation quality issue amongst supporting contractors then the IOUs need to align their failure rate tracking with this intended purpose.

- An administrative challenge amongst the IOUs needs to be addressed for WE&T. The WE&T program began as a program that included the IOU Energy Center education efforts and K-12 education program efforts. However, policy decisions and the CA Strategic Plan now go beyond just these two efforts and has evolved into a cross-cutting topic across all energy efficiency programs. This presents an administrative challenge amongst the IOUs because the IOU WE&T Program Team must now also be responsible for coordination and facilitating workforce concerns across the entire program portfolio.

# 2. Methods

All research for this study were qualitative and exploratory in nature. The objective of this study was to summarize all information known to date on this topic; and build from existing knowledge to provide additional insights into if and how the IOUs can begin to collect workforce condition data. As such, the research questions and study objective appropriately lead to conducting qualitative research and summary and analysis of several relevant policy decisions, reports and data collection efforts. As such, Opinion Dynamics reviewed existing wage and demographic data sources, past data collection efforts, and many secondary sources. We further interviewed representatives from the CPUC, the IOUs, and other stakeholders with experience in collecting workforce condition data. We also performed eight qualitative depth interviews with Home Upgrade Program contractors and seven interviews with contractors in the lighting segment. All interviews were conducted via telephone with experienced interviewers between August 2014-December 2015. Table 1 summarizes the study activities used to complete this study and Table 2 summarizes all of the secondary information that was analyzed for this study.

Table 1. Research Methods

| Task | Description | Objectives of Task |
|---|---|---|
| Review of secondary sources | ■ Review of multiple secondary sources, including existing databases<br>■ Review of past data collection attempts and associated databases<br>■ Review of the IOUs' applications for approval of the 2015–2017 low-income programs and budgets | ■ Understand existing workforce conditions data tracking endeavors<br>■ Understand data tracking challenges and successes<br>■ Investigate the feasibility of adding workforce conditions modules into existing survey efforts<br>■ Identify some potential workforce conditions data collection methods<br>■ Review the IOUs' recommendations for data collection under ESAP |
| Other non-IOU program manager interviews | ■ 3 interviews with representatives from Clean Energy Works Portland; Community Power Works Seattle, Washington; and Southern California Regional Energy Network (SoCal REN), LA County Workforce Pilot/Los Angeles Emerald Cities Collaborative who were experienced with their respect efforts to track workforce conditions | ■ Understand what data are collected and what methods are used to collect the data<br>■ Understand the feasibility and challenges related to collecting workforce conditions data from contractors<br>■ Understand the program, including the nature of the relationship between it and the contractors |
| CPUC staff interviews | ■ Interviews with 4 CPUC staff | ■ Understand what specific workforce conditions data are most needed and in what format<br>■ Understand the benefits and drawbacks of past efforts to collect this information<br>■ Identify the benefits of collecting this information and how it will be used |
| Stakeholder interviews | ■ Interview with 1 person at the DVC | |
| IOU and implementer staff interviews | ■ 8 interviews with 14 IOU program and implementer staff | ■ Understand the lessons learned from the ESA, EUC, and non-residential HVAC efforts<br>■ Understand what workforce conditions data are currently collected<br>■ Understand what the benefits and drawbacks are of collecting this information from the program staff's perspective<br>■ Understand what data can be collected<br>■ Identify the limitations and potential options for collecting this information |
| Contractor interviews | ■ 8 interviews with EUC Home Upgrade Program contractors<br>■ 7 interviews with Non-Residential Lighting Program contractors | ■ Gain contractor perspective on workforce conditions data collection topic<br>■ Test contractor acceptance of different approaches to collecting workforce conditions data |

Table 2. List of Secondary Sources

| No. | Source | Activity |
|---|---|---|
| 1 | Air Conditioning, Heating, and Refrigeration Institute (AHRI) 2012 Industry Profile Report | Extracted recent residential and non-residential HVACR production worker national wages |
| 2 | Application of PG&E for Approval of the 2015–2017 Energy Savings Assistance and California Alternate Rates for Energy Programs and Budget (U 39 M) | Reviewed the application and testimony related to recommendations for data collection under ESAP |
| 3 | Application of Southern California Edison Company (U 388E) for Approval of its Energy Savings Assistance and California Alternative Rates for Energy Programs and Budgets for Program Years 2015–2017 | Reviewed the application and testimony related to recommendations for data collection under ESAP |
| 4 | Application of SDG&E (U902M) for Approval of Low Income Assistance Programs and Budgets for Program Years 2015–2017 | Reviewed the application and testimony related to recommendations for data collection under ESAP |
| 5 | Application of Southern California Gas Company (U902G) for Approval of Low Income Assistance Programs and Budgets for Program Years 2015–2017 | Reviewed the application and testimony related to recommendations for data collection under ESAP |
| 6 | BLS Occupational Employment Statistics (OES) and Census of Employment and Wages (CEW) data | Downloaded and extracted relevant wage data for the HVAC, Insulation, Energy Rater, Remodeler, and Lighting industries |
| 7 | California Long Term Energy Efficiency Strategic Plan, January 2011 Update | Reviewed report |
| 8 | Decision 12-08-044 | Reviewed the Decision to identify the context and content related to the request to collect data in seven WE&T areas under ESAP |
| 9 | Decision 12-11-015 | Reviewed the Decision and Proceeding information related to the CPUC's directive to emulate ESAP data collection protocols |
| 10 | Department of Industrial Relations Labor Compliance Report | Reviewed annual reports of labor compliance programs |
| 11 | DVC *WE&T Guidance Plan* | Reviewed report and appendices<br>Extracted relevant findings from Appendix 5B to help contextualize prior ESAP and EUC data collection efforts<br>Used Appendix 4A as a starting point for contacting program managers already tracking job quality information to discuss data collection feasibility |
| 12 | Employment Development Department (EDD) | Downloaded and extracted relevant wage data for the HVAC, Insulation, Energy Rater, Remodeler, and Lighting industries |

| No. | Source | Activity |
|---|---|---|
| 13 | ESA data collection report | Reviewed survey instrument, dataset, and reports<br>Compiled existing reporting on this effort and added brief notes of our own |
| 14 | EUC data collection | Reviewed survey instrument, reports, and data submitted by SDG&E to the CPUC |
| 15 | Itron non-res HVAC survey report | Reviewed survey instrument and final draft dataset<br>Analyzed data in light of job quality data collection feasibility |
| 16 | WE&T Working Group Filing | Reviewed the ESAP Final Report and Recommendations from July 2013 |
| 17 | 2009 ESAP Process Evaluation report | Reviewed for reference to contractor work quality concerns that was referenced in the 12-08-044 Decision |

# 3. Detailed Findings by Research Question

## 3.1 What data are required to satisfy the Decision?

As mentioned above, Decision 12-11-015 directed the IOUs to collect data in seven areas, including workforce conditions data, training needs, and labor market characteristics. This was initially part of a directive to the ESA program as an exploratory effort to learn more about the workers supporting the program. The CPUC then directed the IOUs to emulate the data collection for energy efficiency programs. The formal 12-11-015 Decision described the purpose of this data collection as providing robust data in order to evaluate new proposals of WE&T initiatives.

Given this context, we collaborated with the CPUC to discuss what data should be collected at this time for the Home Upgrade Program and Non-Residential Lighting Programs. As stated on page 2, the Decision caused some confusion by stating that the IOUs should "emulate" the data requirements for all energy efficiency programs. The Decision wording was misleading and therefore we collaborated with the CPUC to determine how the IOUs might best respond to this Decision for the two example programs. Table 3 provides an overview of the data the CPUC requested from energy efficiency programs through Decision 12-11-015. The table shows the data points requested in the Decision, detail on how the data can be further defined, whether the data may be applicable the Home Upgrade Program and Non-Residential Lighting Programs, whether the data aligns with the Strategic Plan's WE&T goals and the evaluation team's assessment of the data's purpose. The CA Strategic Plan goals for Workforce, Education and Training are: Goal #1 is to "establish energy efficiency education and training at all levels of California's educational systems"; and Goal # 2 is to "ensure that minority, low income and disadvantaged communities fully participate in training and education programs at all levels of the DSM and energy efficiency industry"[14].

[14] *California Long Term Energy Efficiency Strategic Plan,* January 2011 Update, Section 9, p. 70.

Table 3. CPUC Required and Suggested Contractor Workforce Conditions Data (Decision 12-11-015)

| Data Categories | Data Details | Applicable to Home Upgrade and Non-Res Lighting Programs | Strat Plan Goal #1 | Strat Plan Goal #2 | Purpose |
|---|---|---|---|---|---|
| (1) Contractor and subcontractor contract terms | Contract terms: competitive bid, direct award, etc. | No | n/a | n/a | n/a |
| (2) Contractor and subcontractor compensation schemes | Salary dispersion: hourly, piecemeal, salaried | Yes | No | No | To determine if programs are supporting living wage jobs |
| | Wage levels* | Yes | No | No | |
| (3) Number of inspection failures and types of failures | Number of enrolled customers later deemed ineligible | No | n/a | n/a | Determine if program has an installation quality concern |
| | Number of incorrectly assessed households | No | n/a | n/a | |
| | Instances of measure installation inspection failures | Yes | Yes | No | |
| | Types of inspection failure | Yes | Yes | No | |
| (4) Level and type of utilities' training and screening | Level of training | Yes | Yes | No | Determine if level and type of training/screening is sufficient to support the technologies |
| | Type of training | Yes | Yes | No | |
| | Lead safety training | Yes | Yes | No | |
| | Screening including background check | Yes | Yes | No | |
| | Eligibility criteria* | Yes | Yes | No | |
| (5) Customer feedback for these contractors, positive and negative | Satisfaction with contractors and their work and suggestions for improvement* | Yes | Yes | No | Informs whether the program needs to give contractors more training or needs a new requirement |
| (6) Demographic data of the current program workforce | Minority status | Yes | No | Yes | Informs whether investments to boost demand for EE technologies are leading to employers hiring/training from minority, low-income and disadvantaged communities |
| | Local status | Yes | No | Yes | |
| | Low-income status | Yes | No | Yes | |
| | Disabled status | Yes | No | Yes | |
| | Displaced status | Yes | No | Yes | |
| | Other disadvantaged communities status | Yes | No | Yes | |
| (7) The utilities' assessment of any other needs of the existing workforce to meet current and future program demands | General workforce needs | Yes | Yes | No | Informs whether the program needs to give contractors more training or needs a new requirement |
| | Workforce sufficiency* | Yes | Yes | No | |
| | Mechanism to assess adequate staffing* | Yes | Yes | No | |
| | Workforce planning processes* | Yes | Yes | No | |
| | Workforce planning processes of contractors* | Yes | Yes | No | |

* This information was not specifically requested in Decision 12-08-44, but deemed important by the CPUC.

From the perspective of the Don Vial Center (DVC)—a consultant recently hired by the IOUs to support WE&T-related strategic planning—the purpose of collecting workforce conditions data is much broader than what is outlined in the Decisions and the Strategic Plan. The DVC believes this type of data can help measure the impact of WE&T approaches on the workforce, installation quality, and energy savings. As such, the DVC sees value in collecting this data in a more comprehensive fashion that would "provide definitive workforce demographics, causality between training and energy savings, and data on career ladders"[15] and "to best address the inclusion and workforce conditions goals of energy efficiency investments."[16] A more comprehensive approach would facilitate analyzing the connection between a specific worker's wage level, skill set, and training background and the quality of that worker's installation and the resulting energy savings. The DVC highlighted two main benefits to a more comprehensive approach to data collection:

1. Incorporation of workforce conditions data in a program's impact evaluation will allow analysts to see if there is a correlation between workforce conditions and work quality and/or energy savings. Improper installations reduce overall savings from energy efficiency programs. Data collection is necessary to assess the relationship between contractor competency, work quality, and energy savings.

2. IOU-led energy efficiency programs have workforce byproducts that may align with California's Strategic Plan goals in increasing employment among disadvantaged citizens.

To fulfill the first purpose, data (wage level, certifications/trainings held, and demographics) would have to be connected by specific worker and project. This more integrated approach does not lend itself to stand-alone surveys of workers' wages, training, and demographics unless the information can be directly tied to specific projects. This integrated approach is time consuming and can be too costly for a program to meet its cost-effectiveness requirements (i.e., the costs may outweigh the benefits). This approach would also drastically change how impact evaluations for programs are currently conducted, namely, at the measure level and not at the program level. To allow for this analysis in the future, an entirely different data collection strategy would need to be designed in impact evaluation plans or the programs themselves would need to add the installers' wage level, demographics, and skill level to the program-tracking data for each project.

However, the DVC acknowledged that comprehensive data requirements are challenging where no direct contracting relationships exist and therefore offered separate recommendations depending on the contractual context. Table 4 shows the DVC's recommended variables for data collection when there is no direct contracting relationship with contractors.

[15] *WE&T Working Group Final Report and Recommendations*, 2013, p. 8.

[16] *WE&T Guidance Plan*, 2013, p. 136.

Table 4. Don Vial Center Workforce Conditions Data Recommendations

| Programs with No Direct Contracting Relationship with Contractors |
|---|
| Workers employed by contractor and subcontractor, including average number of full-time, part-time, and "casual" employees |
| Use of independent contractors |
| Qualifications and experience of workers hired |
| Training provided to workers once hired |
| Wages paid, including starting wages and average wages for key positions |
| Employee turnover and tenure rates |
| Employee benefits, including employer contribution to benefits |

While the DVC recommendations are more appropriate for programs not in a direct contracting relationship with contractors, there are still some concerns with collecting all of the data recommended. There are great opportunities to collect some of the recommended data but some challenges with collecting others that are detailed in the following sections.

## 3.2 How is data currently being collected?

Opinion Dynamics asked program staff about current data tracking practices to examine what data the IOUs could leverage to address the Commission's request. Table 5 shows that the Home Upgrade and Commercial Lighting Programs track or could likely compile at least some information. However, notable gaps exist with respect to workforce wages and demographic information.

Table 5. Current Workforce Conditions Data Availability

| Workforce Conditions Data | Home Upgrade | Lighting |
|---|---|---|
| (1) Contractor and subcontractor contract terms | n/a | n/a |
| (2) Contractor and subcontractor compensation schemes | ○ | ○ |
| (3) Number of inspection failures and types of failures | ● | ◐ |
| (4) Level and type of utilities' training and screening | ● | ● |
| (5) Customer feedback for these contractors, positive and negative | ● | ◐ |
| (6) Demographic data of the current program workforce | ○ | ○ |
| (7) The utilities' assessment of any other workforce needs of the existing workforce to meet current and future program demands | ◐ | ◐ |

● Data available ◐ Not formally tracked, but could be provided with some effort ○ No data available

Below, we describe available data sources in more detail:

- **Number of inspection failures and types of failures (3):** In the Home Upgrade Program, implementers inspect a sample of projects and attach email communications to project records that could reveal the type of inspection failure. Program staff noted that it would be feasible to extract the project-level information. Data tracking in the Non-Residential Lighting Programs varies. Depending on the program, a sample or all installations are inspected and tracked in a spreadsheet. However, program

staff noted that data provision might be time consuming and challenging. Some fundamental issues for both programs are:

- There is no clear definition of what quality work is for each program;
- There is no one standard definition of what constitutes an inspective failure across all IOUs;
- The IOUs do not currently code the failures into categories; and
- Not all inspection failures relate to energy savings

Currently, the programs can say whether a project passed or failed inspection but why something failed is qualitative and not easily summarized at this time. The Home Upgrade program administrators conduct inspections that explore the quality of the work performed. However, the Non-Residential Lighting programs currently limit their inspections to whether the quantity installed matches program tracking records therefore the inspection failures are based on whether program tracking records are correct and not focused on whether the lighting was designed and installed properly. Therefore, some inspection failures for both programs will impact energy savings but other inspection failures will indicate other issues such as following application procedures. In order for this data to be useful, the IOUs need to provide the number of inspection failures that could have an impact on the energy savings and also the type of failure, e.g. "not designed for optimal energy savings" or "installed an over-sized system". The IOUs will need help to re-define inspection procedures and to categorize the reasons for inspection failure before providing meaningful data on the number and types of failures.

- **Level and type of utilities' training and screening (4)**: Program materials outline the level and type of program-specific training offered to contractors. As such, we expect that program staff can compile the level and type of training provided for each contractor.

- **Customer feedback (5)**: Home Upgrade Program implementers conduct customer satisfaction surveys upon project completion. These surveys ask for overall satisfaction and include open-ended questions for more detailed feedback. The IOUs have planned process evaluations and have the potential to ask customers more in depth about their satisfaction with the different program components or contractor interactions. In addition, Itron, under CPUC's direction, is conducting an impact evaluation of all non-residential lighting programs. As such, Opinion Dynamics added questions to this survey to gather data on customer ratings of the contractors' installation quality and overall performance. Therefore, Itron expects to have these data collected for the CPUC by the second quarter of 2015. The impact evaluation's sampling plan is by measure not by program; it is uncertain at this time, therefore, how much data each program will have regarding customer satisfaction with contractors.

- **Utilities' assessment of workforce needs (7)**: To our knowledge, program staff does not formally compile their assessment of workforce needs to support the technologies in programs. It is also uncertain as to whether the programs have a formal planning process to ensure that they have enough trained contractors to support their program goals. However, we expect that program and implementation staff could easily describe how they approach assessing the workforce and whether they have any known workforce training or workforce supply needs.

Based on the data that the program currently collect, either fully or partially, we see several opportunities to leverage existing data sources to fulfill some of the data requirements outlined in the Decision.

## 3.3 What were the lessons learned from past data collection efforts?

Three data collection efforts have gathered workforce data related to the CPUC data request in Decisions 12-08-44 and 12-11-015. These include ESAP, the EUC Home Upgrade Program, and Itron's survey of non-residential HVAC contractors. We reviewed survey instruments, datasets, and reports, and conducted four in-depth interviews (with PG&E, SDG&E, the DVC, and the CPUC) to inform the lessons learned through these efforts. This section summarizes the key findings and implications for future data collection.

### ESAP Data Collection

The IOUs developed a spreadsheet template that was emailed to ESAP contractors in early 2013. The spreadsheet asked contractors to list the number of workers per compensation type (e.g., hourly, salaried, per unit), employee activity (e.g., management/supervision, warehouse, office work, outreach, assessment, installer, inspector), and select demographic characteristics (e.g., gender, disabled, veteran, displaced, ethnicity, language fluency, CARE-program eligibility, background check performed, whether workers live and work in the same neighborhood, education, and select certifications). The spreadsheet also collected contractor-level information directly from the IOUs, including contract terms, inspection failure rates, the types of failure, and positive or negative customer feedback, as well as the companies' completion of utility training requirements.

The ESAP WE&T Working Group[17] and the DVC[18] reviewed the survey effort, and the parties shared some of the same specific critiques, including:

- The survey posed questions at the workforce level and did not ask for data by job category or individual worker, making it impossible to disaggregate the data to more granular levels or recombine them into other categories of interest.
- Self-reported data may be less reliable than data collected in other ways (e.g., those collected through electronic certified payroll reporting systems).
- The survey did not include questions on key workforce conditions topics, such as wage levels, career ladders, and health care coverage.

Opinion Dynamics' in-depth interviews with stakeholders involved in this data collection effort added the following:

- The spreadsheet approach worked well for a one-time survey effort. However, ESA staff had no means of verifying the self-reported data and decided to investigate a payroll-based system for future data collection.[19]
- It seemed feasible to collect some data from contractors, such as the number of employees or training certifications.
- Some stakeholders raised serious concerns about the legitimacy and properness of requesting demographic data from contractors, as employees should not be required to provide sensitive

[17] A.11-05-017. *Energy Savings Assistance Program Workforce Education & Training Working Group Final Report and Recommendations.* July 15, 2013.

[18] DVC *Guidance Plan Appendix 5B: Recommended Changes to IOU WE&T Data Collection Practices.*

[19] In their applications for low-income assistance programs and budgets for program years 2015–2017, filed on November 18, 2014, the IOUs explained that an off-the-shelf system was not deemed feasible.

information about their low-income status or other disadvantages to their employer. One respondent suggested an employee survey as a less contentious survey method.

- Some stakeholders raised concerns about the privacy of wage levels from a contractor's perspective. They explained that, to avoid biases in the competitive bid process, program staff or implementers should not see contractor data if they are not provided anonymously. Data collection with ESA contractors addressed this concern, and data collection was not done by program staff.

- Stakeholders addressed implications for future data collection:

  - A careful cost-benefit assessment is critical given that ESA ultimately carries the costs for subcontractors to gather the data. This includes the costs of system installation, upgrades, training, and trouble-shooting.

  - Future data collection efforts should clearly define the requested data. For the past data collection effort, the evaluation team received little guidance and had to define select terms.

  - WE&T data requests should leverage existing data from program implementers or other programs that require the submission of select data.

Since the ESA survey effort was already thoroughly reviewed by the DVC, Opinion Dynamics did not perform an in-depth analysis on the data. Instead, we add one note to the above findings. The survey achieved a response rate of 100%[20] and only a few contractors provided invalid (i.e., "declined to state") or blank responses. We therefore agree with the DVC that a survey approach with employers can be a feasible tool to collect workforce conditions data among contractors who have direct relationships with IOUs. While issues related to self-reporting remain, some risks of survey biases could be mitigated through careful survey testing and quality control of collected data through cross-referencing with secondary sources.

This data collection effort was reviewed extensively by the ESAP WE&T Working Group and their initial lessons learned were incorporated into the A.11-05-017: Application for IOU 2012-2014 CARE and ESA programs and budgets. The working group reported upon their lessons learned in a report. These lessons learned were included in the A11-05-017 proceeding and are as follows:

1. "Currently, the data collected for the ESA Program is not granular enough to provide definitive workforce demographics, causality between training and energy savings, and data on career ladders since it was not collected by individual work position. In order to meet the timeframe outlined by the D.12-08-044, efforts to revise the initial template have been limited, and while refined data collection is not "impossible," it would require more time. A refined template from the initial data collection efforts should make the workforce data more comprehensible. Additionally, self-reported data by participating ESA Program contracting firms and their employees may yield less reliable data than preferred".

2. "Adopted by the WE&T Working Group, the list of researchable questions should be addressed by the WE&T Consultant to hone the direction of workforce data collection and determine the workforce needs and successes within the ESA Program. The questions should be considered and revised as appropriate to reflect workforce needs and successes within the Mainstream Energy Efficiency portfolio".

3. "Future data collection would also benefit from the WE&T Consultant research plan development".

[20] DVC Appendices, p. 101.

4. "In order to begin to adequately answer the research questions posed, more granular and standardized data is needed. If data collection templates are found to be useful for answering the researchable questions, the data will need to be stored in a manner that facilitates analysis. As such, we recommend the creation of a database that will allow the researcher to offer a standardized format used to collect data which can easily be compared across contractors. The researcher can easily assign a random digit to each individual to conceal individual identities and data can easily be exported to a statistical program for more advanced analyses. The researcher can set constraints on the data to make sure data is entered in a standardized format. The researcher can choose from numerous off-the-shelf products that are relatively inexpensive and secure".

In addition, based on DVC's review and Opinion Dynamics' review of the initial data collection efforts, we add the following lessons learned:

- A spreadsheet approach to collect data from contractors was deemed feasible for a one-time survey effort. However, it represented a significant workload to IOU staff, which may not be cost effective for continuous data collection under ESAP or other energy efficiency programs.

- The survey posed questions at the workforce level and did not ask for data by individual worker, making it impossible to conduct any analysis at the employee level. Both the WE&T working group and the DVC saw this as a major disadvantage, as available data could not be used to address the working group's suggested list of researchable questions.

- Survey responses were generally present, suggesting that workforce data could be collected from contractors. However, the survey relied entirely on self-reported data from contractors, and IOU staff had no means of verifying the submitted information. IOU representatives believed that it would likely be feasible for employers to report accurate wage levels; however, they expressed serious concerns about the reliability of demographic data or the legitimacy of employers gathering such sensitive information from their workforce.

- Following the data collection effort, the WE&T working group reviewed alternative methods and concluded that the use of a reporting tool that utilizes certified payroll records would be the most cost-effective and reliable method to collect data from contractors.

Recently, in the California IOU's 2015 program applications, the IOUs do not recommend purchasing a specific off-the-shelf system. After discussing and demonstrating workforce tracking database options for ESAP contractors, the tool did not offer any enhancements that contractors needed for payroll or administration, and would in fact cause extra non-ESAP-related work for contractors. Not all ESAP contractors use payroll services and some of them perform this function in-house. Therefore, the IOUs believe that collecting workforce data is best accomplished through existing program resources. The IOUs' WE&T team is currently exploring their options and discussing the precise definitions regarding what data should be collected. They will engage an "inclusion consultant" to help in this effort and lead all efforts committed in the WE&T Tier-2 Advice Filing.[21]

[21] Application of PG&E for Approval of the 2015–2017 Energy Savings Assistance and California Alternate Rates for Energy Programs and Budget (U 39 M); Application of SCE (U 388E) for Approval of its Energy Savings Assistance and California Alternative Rates for Energy Programs and Budgets for Program Years 2015–2017; Application of SDG&E (U902M) for Approval of Low Income Assistance Programs and Budgets for Program Years 2015–2017; Application of SoCalGas (U902G) for Approval of Low Income Assistance Programs and Budgets for Program Years 2015–2017. All filed on November 18, 2014.

## Home Upgrade Program Data Collection

The IOUs developed a voluntary online survey that was sent to 367 contractors participating in the EUC Home Upgrade Program in 2013. The IOUs leveraged the ESAP survey instrument, but requested information on trainings and completed projects directly from contractors instead of program staff. The survey also requested all data by employee categories.[22] This survey was intended to gauge the feasibility of collecting workforce data from contractors. It should be noted, however, that this effort required a significant amount of time for program staff.

To comply with CPUC guidance, the IOUs developed a voluntary online survey for contractors participating in the EUC Whole House Program. This data collection effort was co-founded by the four IOUs and managed by SDG&E. The project based the survey instrument on a modified version of the low-income data collection template to meet the needs of the WE&T program. The main revision included a breakdown of the requested data by employee categories, including management, office work, marketing, installer, and other, in every question. Another difference to data collection under ESA was that Home Upgrade Program staff were not required to provide any information about the contractor. The evaluation team emailed the survey to 367 EUC contractors and received feedback from 57 of them.

The DVC reviewed the data collection effort and highlighted the following:

- The EUC contractor survey yielded a much lower response rate (16%) in comparison to the ESA data collection effort (100%). This experience showed that data collection through surveys is generally feasible, but participation rates are significantly higher if a direct contracting relationship exists between IOUs and subcontractors.
- The survey collected data on the compensation type (hourly, salary, per unit), CARE eligibility, training investments, and select demographics, but did not include data on wage levels.
- Using a survey to collect workforce conditions data may pose potential problems related to self-reporting, such as respondents estimating the information due to time constraints, varying interpretations of questions and concepts, and intentional misrepresentation of data.

Opinion Dynamics' in-depth interviews with program staff and implementers touched on the feasibility and implications of collecting workforce data more broadly:

- Program staff noted that contractors' ability and willingness to submit workforce data would strongly depend on the kind of information requested. They expected that the number of installers would not pose issues, whereas wage and demographic information would be more challenging.
- Program staff expected contractors to raise two key concerns:
  - **Additional workload:** One implementer had experienced data collection through certified payroll records outside of California and highlighted contractors' difficulties in adapting to such requirement.
  - **Revealing proprietary business data:** Program staff noted that contractors would likely raise concerns about revealing business information that may disadvantage their business operations. For example, sharing wage levels of employees could put them at disadvantage competitively. In

[22] These differed slightly from ESAP data collection and included the following: management, office work, marketing, installer, and other.

line with this, they expected more reluctance from smaller contractors who are trying to grow their business.

- The program team raised concerns of attrition due to added reporting requirements. They explained that the Home Upgrade Program already had lower contractor numbers in comparison to earlier years, which is problematic as the program depends on contractors to generate projects. Program staff explained that they are therefore hesitant to ask for too much data from contractors because they did not want to discourage contractor participation.

Overall, experiences from this data collection effort highlighted the following:

- The EUC contractor survey yielded a much lower response rate (16%) in comparison to the ESA data collection effort (100%). This experience suggests that it may be difficult to gather comprehensive data for programs that do not have direct contracting relationships unless data submission is mandatory.
- IOU program staff raised concerns regarding the sensitive nature of the data and that additional survey requests are "asking too much" from program contractors, as the program depends on contractors to generate project leads (which is a time-consuming task). The additional workload to contractors is an important consideration in designing future data collection tools.
- The data collection effort not did cover all requested topic areas: Inspection failures and customer feedback was not included in the contractor survey.

### Itron Non-Residential Contractor Survey

Itron conducted a telephone survey collecting workforce conditions data from non-residential HVAC contractors on behalf of the WE&T study effort[23]. The survey included a battery of selected WE&T workforce questions, including experience requirements, certifications and training requirements, hourly wages, and job benefits.[24] Itron provided the raw data to Opinion Dynamics to analyze for the first time. We analyzed the data for findings and for whether sensitive workforce conditions data could be collected from participating contractors as part of a larger survey, e.g., as a module in a longer evaluation program survey.

The survey appears to have collected valid data on a few key workforce conditions topics, yet it is uncertain how effective a survey approach is for workforce conditions data generally for the following reasons:

- While there were few "don't know" and "refused" responses, we do not know if the respondents are systematically biasing their answers one way or another due to the sensitivity of the topics, recall issues, etc. An additional approach (e.g., interviews with employees, review of pay stubs) could be used for triangulation and verification of the data.
- The survey included contractors who typically work in both residential and non-residential sectors, but residential-only contractors might respond to surveys differently.

[23] Itron provided the evaluation team data from its Joint HVAC Contractor Survey effort, which included a module of workforce conditions questions, along with the methodology and the survey instrument. However, these files were provided in draft form only. Nonetheless, the draft data were appropriate to analyze since they were weighted per Itron's sampling approach and are unlikely to change before the final report is released.

[24] The DVC developed the battery. Itron provided Opinion Dynamics with the survey instrument and survey data in draft form. Nonetheless, the draft data were appropriate to analyze since Itron had weighted the data per their sampling approach and they are unlikely to change before Itron releases its final report.

Generally, the respondents provided useful data on the following topics related to field technicians:

- Experience requirements
- Certification and training requirements and whether employers pay for these
- Hourly wages
- Whether health care is offered

### Experience, Certifications, and Training

The survey collected data on the level of experience contractors require when hiring field technicians. Table 6 shows that:

- At least half of the contractors require 2 or more years of experience for both residential and commercial field technicians at the time of hire.
- There were only a few "don't know" responses and no refusals, suggesting that a survey can collect this type of information.

**Table 6. Experience Requirement for Field Technicians at Time of Hire**

| | Residential (n=123) | Commercial (n=123) |
|---|---|---|
| ≥ 2 years | 50% | 56% |
| < 2 years | 49% | 41% |
| Don't know | 1% | 4% |
| **Total** | **100%** | **100%** |

Table 7 shows which certifications contractors require of field technicians when hiring them, and which they pay for.

- Generally, contractors do not require or pay for various certifications for their field technicians, but when they do pay for them:
  - Contractors most often require OSHA 10 (30%) and OSHA 30 (20%) for their field technicians.
  - After OSHA 10 and 30, North American Technician Excellence (NATE) certification and state apprenticeships are most often required for field technicians (~20%–22%).
  - Nearly a third of contractors (32%) pay for NATE certification for their field technicians even though they do not require it.
- The several "don't know" responses may reflect an ineffectiveness of the survey to collect this type of data. Alternatively, the responses may reflect the increased likelihood of a contractor lacking any of the multiple pieces of information that went into one of the response types (i.e., awareness of the certification, knowledge of whether it was a hiring requirement, knowledge of whether the company would pay for it).

Table 7. Contractor Hiring Requirements and Support for Certifications

| | Required and Pay | Required but Do Not Pay | Not Required but Do Pay | Not Required and Do Not Pay | Refused | Don't Know |
|---|---|---|---|---|---|---|
| A state-certified apprenticeship in sheet metal | 14% | 6% | 8% | 71% | – | 2% |
| A state-certified apprenticeship in plumbing, pipefitting, or steam fitting | 14% | 8% | 3% | 72% | – | 4% |
| OSHA 10 | 30% | 2% | 7% | 49% | < 1% | 12% |
| OSHA 30 | 22% | 2% | 6% | 51% | < 1% | 19% |
| NATE | 17% | 4% | 32% | 42% | < 1% | 5% |
| HVAC Excellence | 2% | 0% | 13% | 68% | < 1% | 16% |
| Refrigeration Service Engineers Society (RSES) | 1% | 2% | 17% | 74% | < 1% | 6% |
| Building Performance Institute (BPI) | 8% | 0% | 13% | 74% | < 1% | 5% |
| Service Technician, Air Conditioning, and Refrigeration (UA STAR) | 1% | 4% | 12% | 74% | < 1% | 9% |
| International Certification Board/Testing, Adjusting, and Balancing Bureau (ICB/TABB) | 0% | 0% | 8% | 87% | < 1% | 5% |
| National Environment Balancing Bureau (NEBB) | 0% | 0% | 6% | 87% | < 1% | 5% |
| Associated Air Balance Council (AABC) | 0% | 0% | 7% | 87% | < 1% | 5% |

Table 8 shows other field technician trainings that employees pay for.

- There were only a few "don't know" responses and no refusals, suggesting that a survey can collect this type of information.

Table 8. Other Training Contractors Pay for

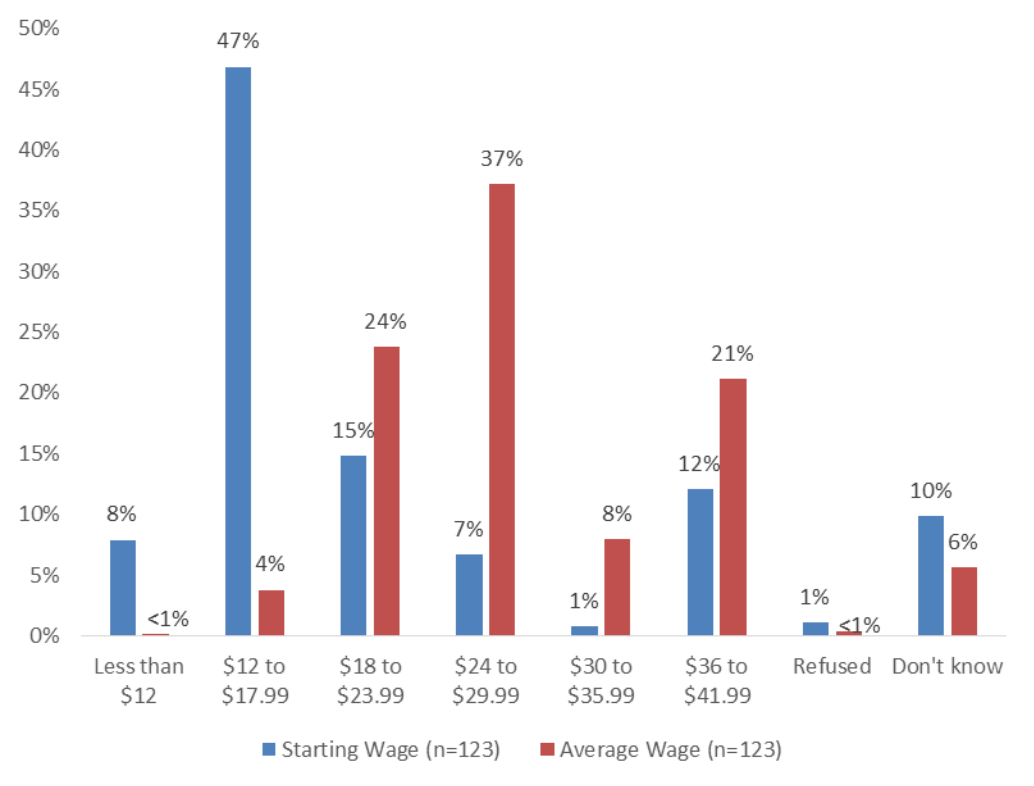
| | Percent (n=123) |
|---|---|
| No Others | 38% |
| Manufacturer/Dealer Classes | 29% |
| Association Trainings/Certifications | 24% |
| Utility Classes | 4% |
| General System Training | 3% |
| Critical Thinking/Common Sense | < 1% |
| Don't Know | 2% |
| Total | 100% |

## Hourly Wages

Figure 1 shows the starting and average hourly wages for field technicians.

- When midpoints in the ranges are used, the mean hourly starting wage is $19.51 and the mean average wage is $28.16.
- The number of "don't know" responses was limited and the number of refusals was very limited, suggesting that a survey can collect this type of information.

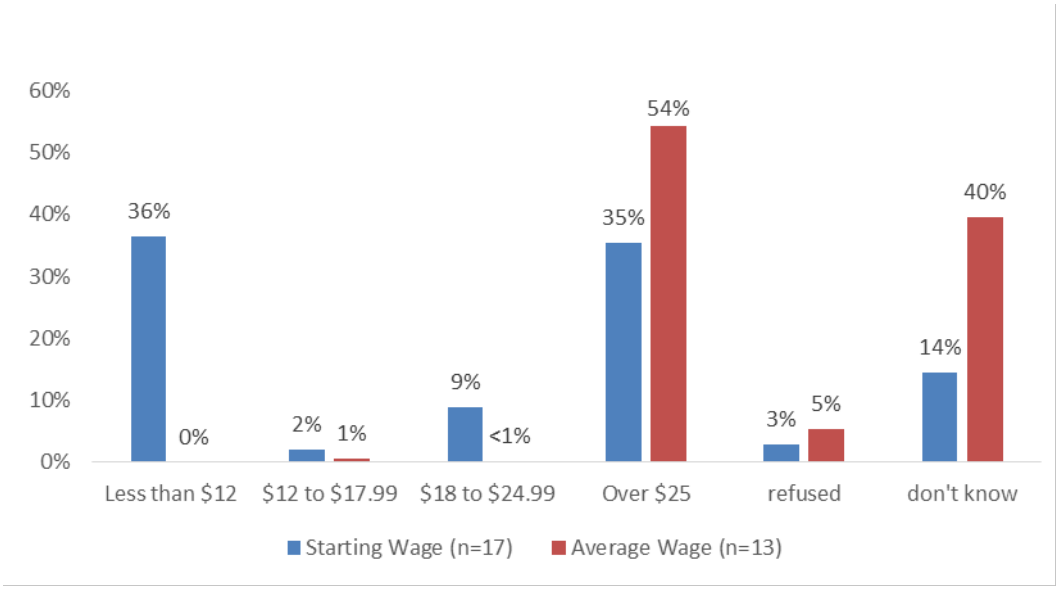
**Figure 1. Hourly Field Technician Wages**




The survey followed up with those contractors who did not provide responses in Figure 1 asking them instead whether the wages fell into one or another range. Thus, Figure 2 shows the starting and average hourly wages for field technicians among the contractors who did not initially provide a numeric answer.

- The high proportion of "don't know" responses and the limited number of refusals may be due to this subset not knowing the wage information, rather than the topic being too sensitive. However, these responses may also represent polite refusals.

Figure 2. Hourly Field Technician Wages among Those Not Providing a Numeric Answer




## Health Care Insurance

Table 9 shows:

- Nearly two-thirds (65%) of the contractors provide health care insurance to construction trades employees.
- There were no "don't know" responses and very few refusals, suggesting that a survey can collect this type of information.

Table 9. Providing Health Care Insurance

| | Percent (n=123) |
|---|---|
| Provide health care | 65% |
| Do not provide health care | 35% |
| Refused to answer | < 1% |
| Total | 100% |

We reviewed the collected data and found that the survey appears to have collected valid data on select workforce topics. Notably:

- It appears that the survey collected valid information about field technicians' entry-level and average hourly pay rates. Of the 123 respondents, only a small minority stated that they either did not know the answer (6%) or refused to answer (1%).
- Itron provided Opinion Dynamics with the dataset. At this time, however, it cannot be tied to any specific program or project. Therefore, these data stand alone at this time and cannot be correlated with any other project, installation quality, or customer feedback data. This would be needed to fill the DVC's vision of using these data for a broader purpose than what is outlined in the Strategic Plan or Decisions.

In summary, past data collection efforts suggest that both wage data and workforce demographics could be collected from contractors through a survey strategy. However, a methodology would have to be carefully designed to mitigate reliability and validity concerns. Major barriers lie in the validity of self-reported data, especially when one employee is asked to report on his co-workers' wages and demographic information, and in potentially low response rates in voluntary surveys. As such, we agree that a non-survey approach to collecting wage and demographic information, such as required program forms or software that leverages electronic payroll systems, might provide more accurate data and allow for more detailed data analyses and cross-references with other project-level information, such as energy savings and realization rates. However, we do not recommend that the CPUC require this intensive data collection effort until other data sources indicate a strong workforce condition issue for a specific program.

## 3.4 What are the benefits and drawbacks of collecting information from contractors?

### 3.4.1 Limitations to Collecting Workforce Conditions Data from Contractors

A review of current data collection in the Home Upgrade Program and Non-Residential Lighting Programs showed that the main gaps to workforce conditions data surround workforce wage and demographic information. While workforce wages are available in secondary sources, existing wage databases do not lend themselves to assess workforce conditions in energy efficiency programs since participating contractors are not easily identified in existing sources. Appendix A details the existing sources for wage information among these contractor types uncovered by the evaluation team. The above review of past data collection efforts to fill this gap highlighted a number of limitations, but suggested that some workforce data, such as wage levels and titles, could be collected from contractors. However, major concerns exist regarding the reliability of self-reported data and contractors' willingness to provide workforce data.

Opinion Dynamics conducted in-depth interviews with 15 contractors who participate in the Home Upgrade Program (8 interviews) or Non-Residential Lighting Programs (7 interviews) in December 2014. The purpose of these interviews was to test different ways of asking for wage and demographic information, to understand what data contractors already record, and to collect contractors' perspective on providing wage and demographic data.

#### Wage Data

The interviews revealed that most Home Upgrade Program contractors would be able to provide reliable wage data for the workers they employ directly, but lighting contractors had more difficulty. Of the seven lighting contractors, four were unable to provide wage data for installers because they subcontract to "labor only contractors" for installation. Table 10 and Table 11 show the job information collected through in-depth interviews with eight Home Upgrade Program and seven lighting contractors. Most installation crews consist of entry- or mid-level installers and a more experienced lead installer, foreman or crew lead. In the Home Upgrade segment, hourly wages start at $10 and tend to increase based on experience and performance. Mean wages in the lighting segment appear to be slightly higher.

Table 10: EUC Home Upgrade Contractor Wage Information (8 interviews)

| | Entry-level | Mid-level | Experienced |
|---|---|---|---|
| Title | Installer, Helper | | Installer, Lead installer, foreman, crew leads |
| Wage Floor | $10 | $12 | $16 |
| Wage Ceiling | $18 | $25 | $30 |
| Mean Wage | $13 | $16 | $22 |
| Advancement Criteria | Predominantly experience and performance, to some degree certifications and training | | |

Table 11: Lighting Contractor Wage Information (4 interviews)

| | Entry-level | Mid-level | Experienced |
|---|---|---|---|
| Title | Electrician, Technician, Installer | | Chief electrician, crew lead, foreman |
| Wage Floor | $11 | $13 | $16 |
| Wage Ceiling | $15 | $20 | $41 |
| Mean Wage | $14 | $16 | $27 |
| Advancement Criteria | Performance, certifications and trainings | | |

Home Upgrade Program contractors generally found it easy to provide the number of workers and their hourly pay rates, along with wage dispersion. All respondents noted that they record this type of information as part of their payroll records, but they could also easily convey this information when asked "on the spot" during the interview. However, we identified the following scenarios that pose limitations to collecting comprehensive or accurate wage data based on these qualitative interviews:

- **Subcontracting**: The use of subcontractors can pose major challenges to collecting workforce information, as contractors are unable to provide wage levels from workers who are not on their payroll. Contractors further explained that collecting wage information from their subcontractors would be extremely challenging, as subcontractors have no incentive to provide the data to them or the utility directly. This is especially an issue in lighting programs where subcontracting the installation is common.
  - Two of the seven lighting contractors noted that they work with subcontractors and could not speak about installers, as they are employed elsewhere. All seven contractors mentioned that they do the design and sales side of projects and then outsource all or some of the installation to "worker for hire" companies.
  - To assess the full extent of subcontracting in the home upgrade segment, further research is necessary. Nevertheless, our interviews suggest that subcontracting occurs on occasion, but is less common among Home Upgrade Program contractors.

- **Installers who work for multiple contractors:** While most installers in the Home Upgrade segment were full-time employees at the time of the interviews,[25] contractors in the lighting segment explained that they commonly hire electricians on a job-by-job basis.[26] These electricians often have two or three different employers at a given time contributing to their gross wages. As a result, the wage information provided by one employer may not accurately describe a worker's hourly wage. The ESA program also discovered this challenge among its participating contractors.

- **Piece-rate pay structures:** Contractors in the lighting segment reported that piecemeal pay is common in the industry. Although they had no difficulties in translating piece-rates to an average hourly pay, they acknowledged that piece-rates result in some variation, which made an ad hoc provision of workers' pay more difficult. Similarly, estimates of annual wages would be a manual calculation in the absence of payroll records.

- **Bonuses**: Some Home Upgrade Program contractors reported that they pay bonuses in addition to a worker's base hourly wage. In these cases, we can expect some variation in workers' hourly pay if bonuses are incorporated[27] and employers ad hoc responses may be inaccurate without payroll records.

Home Upgrade Program contractors' willingness to provide wage information varies. While most would not be discouraged to participate in the Home Upgrade Program if this information was required, two broader areas of concern emerged:

- **Possible repercussions of revealing private wage information**: While some consider wage levels as sensitive and private information, some are concerned that the information could become available to competitors and thus disadvantage future business operations. In this context, contractors noted that it would be important to learn the purpose of collecting this information and what will be done with it. When asked if it mattered who would collect the information, only one respondent noted that the information should not be collected by the IOU or program staff directly.

  - These findings suggest that it would be critical to demonstrate the security of data submission and that no competitive disadvantages could result from submitting the information. In addition, a detailed explanation as to the purpose and benefit (to contractors and/or the industry) is important.

- **Workload and time commitment**: Some contractors highlighted the additional workload related to accessing payroll records as a potential challenge to providing the information. Most would be willing to fulfill a data request once a year, but do not want to provide the information on a more frequent basis. One contractor noted that he would be willing to submit the data as long as the program would compensate the time spent.

## Demographic Data

Contractor interviews revealed that it would be challenging to obtain reliable workforce demographics from employers. In-depth interviews tested a set of possible demographics questions (Appendix B) and found that employers were generally able to provide information about the ethnicity of their workers. To a more limited

[25] Interviews occurred in November and December 2014.

[26] Lighting contractors explained they hire electricians on a job-by-job basis as a result of as gaps between jobs occur regularly due to production delays or delays in rebate programs.

[27] Bureau of Labor Statistics (BLS) data requests ask for the inclusion of bonuses, such as hazard pay or production bonuses.

degree, contractors could make judgment calls about the number of workers who were disabled, displaced, and/or veterans. However, they typically could not answer questions about the eligibility of their workers for certain welfare programs and explained that this was the result of having little knowledge about the eligibility criteria of these programs. At the request of the CPUC, the in-depth interviews asked directly for demographic information, such as ethnicity, but also tested an indirect approach of asking for their workers' participation in various welfare programs to see if that might be easier and less intrusive. We found that the direct approach was preferred by contractors, but that contractors still had difficulty answering this information for others.

Contractor interviews highlighted the following limitations to collecting reliable demographic information from contractors:

- **No formal records**: None of the interviewed contractors recorded workforce demographic information or provided the information to other parties. Although some did not find it difficult to answer questions about demographic characteristics, all noted that their answers were based on anecdotal evidence. As such, the chances of collecting unreliable data are high if asking one worker to report on the demographics of others in his organization.

- **Misinterpretation of disadvantaged status**: When asked about workers' eligibility for welfare programs, most respondent noted little knowledge of eligibility criteria. This was different for questions that asked about demographic characteristics. While these questions might seem easier to answer, they may "invite" respondents to make misinformed judgment calls. For example, many contractors did not think that any of their workers were disabled given the physical nature of the work.

In addition to the lack of knowledge, some contractors noted that they are reluctant to collect and share demographic information that they consider private.

- **Privacy concerns**: All contractors acknowledged that demographic information is a person's private matter. Their willingness to collect this information varied considerably. Some noted that they had no hesitation about asking their employees or making judgment calls, while others felt reluctant to ask their workers. Nevertheless, most would provide the information if required by the program. One respondent who might be discouraged to participate in the utility-led program felt that the information requested was intrusive, but the main reason for withdrawal from the program would be the additional workload and reporting requirements.

### 3.4.2 Potential Workforce Conditions Data Sources

Opinion Dynamics reviewed existing workforce conditions data and conducted in-depth interviews with program staff and contractors to examine the usefulness of secondary sources and primary data collection. This section discusses the benefits and drawbacks of possible data sources to collect the wage and demographic information highlighted in Table 12. Based on the benefits and drawbacks of each data source, we include an assessment of the difficulty level (ratings are based on relative difficulty of method options, 1 is a low level of difficult, 2 is mid-level and 3 is the highest level) and relevance of each source below.

Table 12. Possible Data Collection Methods

| Workforce Conditions Data | Potential Data Sources | Difficulty Level | Relevance |
|---|---|---|---|
| (1) Contractor and subcontractor contract terms | n/a | n/a | n/a |
| (2) Contractor and subcontractor compensation schemes | Secondary Data<br>Stand-Alone Contractor Survey<br>Process Evaluation Contractor Survey<br>Electronic Payroll Records<br>Mandatory Online Form<br>Contractor Survey (stand-alone)<br>Panel | 1<br>2<br>1<br>3<br>2<br>2<br>3 | Low<br>Mid<br>Low<br>High<br>Mid<br>Mid<br>Mid |
| (3) Number of inspection failures and types of failures | Program Tracking Data | 1 | High |
| (4) Level and type of utilities' training and screening | Program Team Summary | 1 | High |
| (5) Customer feedback for these contractors, positive and negative | Implementer Satisfaction Survey<br>Process or Impact Evaluation Customer Survey | 1 | High |
| (6) Demographic data of the current program workforce | Secondary Data<br>Electronic Payroll Records<br>Mandatory Online Form<br>Contractor Survey (process evaluation)<br>Contractor Survey (stand-alone)<br>Panel | 1<br>3<br>2<br>1<br>2<br>3 | Low<br>High<br>Mid<br>Low<br>Mid<br>Mid |
| (7) The utilities' assessment of any other needs of the existing workforce to meet current and future program demands | Program Team Summary | 1 | High |

Below, we describe the potential data sources specifically for wage and demographic information (item 2 and 6 in the Decision) given that these are the largest data gaps.

## Secondary Data Collection

We searched for existing workforce wage data for contractors participating in three types of retrofit resource programs: Residential HVAC, EUC Whole House, and Non Residential Lighting. The sections below describes the available databases in detail.

Among the different sources, the state and federal government datasets provide the most comprehensive information on workers' wages. Nevertheless, these databases do not include any indicators about participation in IOU-led programs. As a result, secondary wage data sources can unlikely replace primary data collection depending on the research purpose.

However, secondary data can function as a reference point to compare wage levels from contractors who participate in utility-led energy efficiency programs to industry standards. Secondary data can further be used in the design of a primary data collection instrument so that wage questions align with established data collection efforts. If this is of interest in the future, we recommend using the Occupational Employment Statistics (OES) from the Bureau of Labor Statistics as it provides for the most detailed search function including SOC type.

### Existing Wage Databases AHRI 2012 Industry Profile Report

AHRI's 2012 Edition of the HVACR and Water Heating Industry Statistical Profile relies on and presents U.S. Census Bureau and BLS industry data. The data include both residential and non-residential HVACR production workers at the national level, rather than being specific to the state of California. The following table extracts the most recent data from a larger table in the report.[28]

**Table 13. Residential and Non-Residential HVACR Production Worker National Wages (Extract of AHRI Report)**

| Year | Total production workers (in 000s) | Average Hourly Earnings | Average Weekly Earnings |
|---|---|---|---|
| 2006 | 110.5 | $13.84 | $584.94 |
| 2007 | 109.9 | $14.71 | $619.66 |
| 2008 | 105.8 | $15.90 | $670.27 |
| 2009 | 88.7 | $16.19 | $653.05 |
| 2010 | 86.3 | $16.16 | $663.64 |
| 2011 | 88.6 | $16.73 | $704.33 |

### Government Data Sources for Wages

Federal and state government datasets provide wage data, but no other workforce conditions data. Data are provided at the state and local levels, i.e., wage-level data by metropolitan area or county. There are no indicators in these datasets of which contractors are program participants, but future research could survey program participants to see how their employees' wages compare to average state or local wages.[29] We provide the BLS Occupational Employment Statistics (OES) survey instruments in Appendix A for reference. Future survey efforts should use the same wage questions to capture the same type of wage data so that comparisons are straightforward.

Both U.S. and California government datasets provide California wage data for occupations and industries relevant to the EUC and Non-Residential Lighting Programs. The BLS provides production worker-level data searchable by SOC codes in the OES datasets,[30] and provides all worker data (e.g., from admin to CEO) searchable by NAICS codes in the Census of Employment and Wages (CEW) datasets.[31] The State of

[28] Table extracted from "Table 3 Number of Production Workers and Average Hourly and Weekly Earnings" in the AHRI Profile Report. The AHRI report sources the data to the BLS *Quarterly Census of Employment and Wages* and the BLS *Current Employment Statistics Survey*.

[29] One limitation to this approach would be the matching of whole house auditors to engineers. There are no SOC or NAICS codes for energy auditors, so using those for engineers was the best option.

[30] The BLS creates the OES wage estimates from a national survey of employers, excluding the self-employed. The BLS uses a panel survey approach whereby individual respondents are interviewed only once every 3 years, but the survey collects data twice a year from other respondents in the panel. Wage estimates are based on data over the 3 previous years. All OES datasets also provide metropolitan area-level data (source: http://www.bls.gov/oes/oes_ques.htm).

[31] Extracted on 7/29 from http://www.bls.gov/cew/cewover.htm. "The Quarterly Census of Employment (QCEW) produces a comprehensive tabulation of employment and wage information for workers covered by State unemployment insurance (UI) laws and Federal workers covered by the Unemployment Compensation for Federal Employees (UCFE) program. Publicly available files include data on the number of establishments, monthly employment, and quarterly wages, by NAICS industry, by county, by ownership sector, for the entire United States. The QCEW program serves as a near census of monthly employment and quarterly wage information by 6-digit NAICS industry at the national, State, and county levels."

California Employment Development Department (EDD) also provides production worker-level wage data searchable by SOC code.[32] Table 14 provides a summary of the wage findings across these datasets.

[32] The EDD datasets are created from survey data. All EDD datasets also provide wage data at the 25th and 75th percentiles and at the county level, as well as outlook or demand projections. The datasets also list the top tasks (duties and responsibilities) per occupation.

## Table 14. California Wage Summary Table

| Dataset Name | Residential (Res), Non-Residential (Non-Res), or Combined (Comb) | Production Worker/Installer/Field Technician (PW) or All Employees (all) | Year | Median Hourly Wage | Mean Hourly Wage | Mean Weekly Wage | Mean Annual Wage |
|---|---|---|---|---|---|---|---|
| **Relevant to EUC Program** | | | | | | | |
| **HVAC** | | | | | | | |
| BLS OES[1] | Comb | PW: Heating, Air Conditioning, and Refrigeration Mechanics and Installers (SOC: 49-9021) | 2013 | $24.90 | $25.55 | – | $53,150 |
| BLS CEW[2] | Res | All: Residential plumbing and HVAC contractors (NAICS: 238221) | 2013 | – | – | $913 | $47,463 |
| EDD[3] | Comb. | PW: Heating/Air Conditioning and Refrigeration Workers (SOC: 49-9021) | 2013 Q1 | $24.71 | $25.45 | – | – |
| EDD[4] | Comb. | PW: Heating/Air Conditioning and Refrigeration Workers (SOC: 49-9021) | 2014 Q1 | $25.34 | $26.00 | – | – |
| **Insulation** | | | | | | | |
| BLS OES[5] | Comb | PW: Insulation Workers, Floor, Ceiling, and Wall (SOC: 47-2131) | 2013 | $15.35 | $19.47 | – | $40,500 |
| BLS OES[6] | Comb | PW: Insulation Workers, Mechanical (SOC: 47-2132) | 2013 | $21.25 | $24.15 | – | $50,220 |
| BLS CEW[2] | Comb | All: Drywall and insulation contractors (NAICS: 23831) | 2013 | – | – | $919 | $47,798 |
| EDD[7] | Comb | PW: Insulation Workers, Floor, Ceiling, and Wall (SOC: 47-2131) | 2014 Q1 | $15.53 | $19.70 | – | – |
| EDD[8] | Comb. | PW: Insulation Workers, Mechanical (SOC: 47-2132) | 2014 Q1 | $21.50 | $24.44 | – | – |
| **Energy Raters** | | | | | | | |
| BLS OES[9] | Comb | All: Architecture and Engineering Occupations (Major Group; SOC: 17-0000) | 2013 | $43.24 | $45.00 | – | $93,600 |
| BLS CEW[2] | Comb (?) | All: Engineering services (NAICS: 541330) | 2013 | – | – | $2,043 | $106,242 |
| **Remodelers** | | | | | | | |
| BLS CEW[2] | Res | All(?): Residential remodelers (NAICS 236118) | 2013 | – | – | $913 | $47,476 |
| **Relevant to Non-Residential Lighting Program** | | | | | | | |
| BLS OES[10] | Comb | All (?): Electricians (SOC: 47-2111) | 2013 | $29.31 | $30.60 | – | $63,650 |
| BLS OES[11] | Comb | PW: Electrical and Electronics Repairers, Commercial and Industrial Equipment (SOC: 49-2094) | 2013 | $27.48 | $27.13 | – | $56,420 |

| Dataset Name | Residential (Res), Non-Residential (Non-Res), or Combined (Comb) | Production Worker/Installer/Field Technician (PW) or All Employees (all) | Year | Median Hourly Wage | Mean Hourly Wage | Mean Weekly Wage | Mean Annual Wage |
|---|---|---|---|---|---|---|---|
| BLS CEW[2] | Non-Res | All: Non-residential electrical contractors (NAICS: 238212) | 2013 | – | – | $1,353 | $70,342 |
| EDD[12] | Comb. | All (?): Electricians (SOC: 47-2111) | 2014 1Q | $29.66 | $30.97 | – | – |

[1] http://www.bls.gov/oes/current/oes_ca.htm#49-0000
[2] http://www.bls.gov/cew/apps/data_views/data_views.htm
[3, 4] http://www.labormarketinfo.edd.ca.gov/cgi/databrowsing/occExplorerQSDetails.asp?searchCriteria=hvac&careerID=&menuChoice=&geogArea=0601000000&soccode=499021&search=Explore+Occupation
[5,6] http://www.bls.gov/oes/current/oes_ca.htm#47-0000
[7] http://www.labormarketinfo.edd.ca.gov/cgi/databrowsing/occExplorerQSDetails.asp?searchCriteria=insulation&careerID=&menuChoice=&geogArea=0601000000&soccode=472131&search=Explore+Occupation
[8] http://www.labormarketinfo.edd.ca.gov/cgi/databrowsing/occExplorerQSDetails.asp?searchCriteria=insulation&careerID=&menuChoice=&geogArea=0601000000&soccode=472132&search=Explore+Occupation
[9] http://www.bls.gov/oes/current/oes_ca.htm#17-0000
[10] http://www.bls.gov/oes/current/oes47-0000.htm
[11] http://www.bls.gov/oes/current/oes49-0000.htm
[12] http://www.labormarketinfo.edd.ca.gov/cgi/databrowsing/occExplorerQSDetails.asp?searchCriteria=lighting&careerID=&menuChoice=&geogArea=0601000000&soccode=472111&search=Explore+Occupation

### Disadvantaged Worker Data Sources

We searched for existing databases that contain demographic workforce data, including data on women, minority, local status, low-income, disabled, displaced, and other disadvantaged communities. We reviewed those listed below to see whether any might track this kind of information for program contractors. However, none appears helpful for the purposes of tracking current program contractors.

- **Minority and Women Business Enterprises (MWBE.com):** Appears to be a for-profit business helping various types of women, minority, disabled, etc. businesses get access to information (e.g., recommended reading, tele-classes, and workshops). The website has a searchable directory, but it was not operating when accessed on July 25, 2014. Judging from the fact that the company's website's (http://www.mwbe.com/) account has been suspended and the fact that it did not answer an inquiry email, the company is likely defunct.

- **CPUC's Supplier Clearinghouse:** This clearinghouse verifies business eligibility and enters it into a database sent monthly to participating utilities. The database is searchable by minority-owned business (MBE), women-owned business (WBE), white women/minority men-owned business (WMBE), disabled veteran-owned business (DVBE), and SIC code (http://www.suppliernetwork.net/public_search.php).

Based on the secondary data sources described above, federal and state government datasets[33] are the most developed existing sources pertinent to workforce conditions data, but they are generally limited to wage information. They provide mean hourly, weekly, and annual wages by Standard Occupational Classification (SOC) employee type at the state and county level, but do not include any indicators about participation in IOU-led programs. As such, secondary data can function as a reference point to compare wage levels from contractors who participate in utility-led energy efficiency programs to industry standards. Secondary data can further be used in the design of a primary data collection instrument so that wage questions align with established data collection efforts. However, it is unlikely that secondary wage data sources can replace primary data collection, because there are no means to assess program participation.

A search for existing databases with demographic workforce data revealed two potential sources: the Minority and Women Business Enterprises (MWBE) database and the CPUC's Supplier Clearinghouse.[34] While both databases track various characteristics that identify disadvantaged persons, none can readily track contractors participating in IOU-led energy efficiency programs. As such, secondary data on workforce demographics cannot replace primary data collection in the short term. However, the CPUC's Supplier Clearinghouse could be a possible source for data mining in the future, as it lists minority-owned and disabled veteran-owned business by Standard Industrial Classification (SIC) code.

## Primary Data Collection

There are several methods to collect wage and demographic information. We discuss some of the prominent ones below.

### Electronic Payroll Records

The WE&T working group and DVC guidance report recommended using an electronic certified payroll reporting and labor compliance system to retrieve workforce conditions data for ESAP. These electronic

[33] For example, the BLS Occupational Employment Statistics and the State of California Employment Development Department (EDD).

[34] We contacted the Division of Labor Standards Enforcement (DSLE) to learn about other potential data sources, but did not receive a response.

systems are largely used in the public works sector and automate the submission of payroll records. Various off-the-shelf products exist. However, a review by the WE&T working group concluded that an off-the-shelf system is not recommended at this time due to costly implementation issues for ESAP contractors. Electronic payroll systems have two key benefits in comparison to other data collection methods:

- They likely provide the most accurate workforce conditions data, as this method is not dependent on employers' self-reporting. Instead, the system can generate weekly wage reports per employee, including the zip codes of workers' residence and any demographic data once entered into the system.

- Once contractors install the software and complete a training, the time spent to submit workforce conditions data is expected to be minimal.

- Reactions from contractors we interviewed did vary regarding this method. The majority of Home Upgrade Program contractors thought this method would generally be feasible as long as data collection occurs only once a year. Two of the seven lighting contractors raised concerns because they were unable to access such reports from subcontractors or were reluctant to install such system.

The DVC recommended such a system specifically for programs that have a direct contracting relationship between the contractor and the IOU. The DVC also recommended that these programs provide quarterly reports of workforce data. Although electronic payroll reports are likely to be the "gold standard" for collecting workforce data, some limitations exist for programs without direct contracting relationships between the IOU and the contractor:

- Electronic payroll reports may be costly if data are not extracted on a regular basis, because the upfront investment related to software purchase and training is high in comparison to annual operating costs. As such, electronic payroll reports are more cost-effective when reporting occurs on a regular basis, as proposed by the DVC. However, in-depth interviews revealed that contractors do not support data collection more than once a year. It is further uncertain if more frequent data collection is needed for most IOU-led energy efficiency programs. If usage of payroll systems is limited, the benefits may not outweigh the costs of installing a reporting tool.

- The contractors we interviewed did not support data collection more than once a year, even when the time commitment would be limited. Using a tool like electronic payroll reporting may generate more resistance from contractors, as some may see automated data collection as additional "red tape" for programs, especially for the Home Upgrade Program, which already imposes an administrative burden on contractors via its application requirements.

The DVC's *WE&T Guidance Plan* provided a list of programs outside of the IOU's energy efficiency programs that track workforce conditions and work force inclusion data.[35] Using this list, we searched online for program contacts and reached out to three program managers.[36] In conversations with them and in reviewing program reporting, we focused on the feasibility and the best ways of collecting workforce conditions data from contractors. Table 15 provides a brief outline of the programs and findings. **It is important to note that these other programs are quite different from the Home Upgrade and Non-Residential Lighting Programs in that some have a direct contracting relationship with contractors and some have a specific training component that targets disadvantaged workers.** It is also important to note that the programs use these data to award more points to contractors in the application process, which favors those

[35] *WE&T Guidance Plan Appendix 4A.*

[36] Representatives from Clean Energy Works Portland; Community Power Works Seattle, Washington; and Southern California Regional Energy Network (SoCal REN), LA County Workforce Pilot/Los Angeles Emerald Cities Collaborative.

who enact high road job practices. Further, these programs track wage and demographic information but also track much more including data such as health coverage and career pathways.

Table 15. Findings from Non-IOU Energy Efficiency Programs Already Collecting Workforce Conditions Data

| Program Name | Description | Contractor Description | Data Collected | Ease/Sensitivity of Collection | Tracking Method |
|---|---|---|---|---|---|
| Clean Energy Works Portland | • Residential EE retrofit program that also includes a training program for disadvantaged workers<br>• Uses a Community Workforce Agreement focused on high-quality work standards and ensuring access and support for underserved populations<br>• Road standards: quality work standards and ensuring access and support for underserved populations to family-supporting jobs | • Pool of program-selected small, residential contractors<br>• Application process uses a point system to favor those who enact high road job practices and perform high-quality work | • Local worker status<br>• Wage levels<br>• Health coverage<br>• Workforce diversity<br>• Business diversity<br>• Career pathway opportunities | • At first very manual; all spreadsheets, Excel compiled; incredibly cumbersome, repetitive<br>• Generally easy after initial investment in training contractors and populating drop-down fields<br>• Minor issues among some subcontractors who were sensitive to providing the last four digits of social security numbers<br>• Providing race/ethnicity data has been a sensitive issue in a few cases | • Self-report using a custom-built database application tool<br>• Biannual audits of each contractor |
| Community Power Works, Seattle, Washington | • Residential EE retrofit program with a loan component<br>• Uses a Community High-Road Agreement for workforce development sets threshold criteria and wage rates<br>• Training programs that support career ladders, high quality efficiency installations | • Application process uses a point system to favor those who meet high road workforce criteria established by city.<br>• Pool of program-approved residential contractors, majority smaller businesses. | • Local workers<br>• Wage levels<br>• Health coverage<br>• Workforce diversity<br>• Business owner diversity<br>• Career pathway opportunities<br>• QA certifications<br>• Continuing education opportunities | • Generally easy after initial investment in training contractors and streamlining data entry (e.g. populating drop-down fields).<br>• Only 1 of 37 contractors has expressed dissatisfaction with providing sensitive data | • Self-report using a custom-built database application tool<br>• One-time audit of each contractor with additional random audits<br>• Monthly wage rate verification |

| Program Name | Description | Contractor Description | Data Collected | Ease/Sensitivity of Collection | Tracking Method |
|---|---|---|---|---|---|
| Southern California Regional Energy Network (SoCal REN), LA County Workforce Pilot/Los Angeles Emerald Cities Collaborative | • Wide-ranging program; however, discussion focused mainly on EE retrofit projects on LAUSD buildings<br>• Program awards "projects using a procurement strategy that promotes local, small contractor participation and an integrated workforce development strategy that stimulates the creation of local, highly skilled careers"[37]<br>• Training for small and minority contractors to compete for and perform EE projects | • Mix of types given many different project types | • Business diversity (size, local, etc.)<br>• Wage levels<br>• Workforce diversity<br>• Worker level (worker, journeyman, etc.)<br>• (list may be incomplete) | • At first, was a "very time-intensive activity"<br>• Later, after initial investment in training contractors and populating drop-down fields, became easier<br>• No contractors have expressed dissatisfaction with providing data | Early on used two custom-built, online tracking systems per different policy decisions—one to track small businesses, another to track workforce diversity; over time, transitioned to one commercially available application that used certified payroll records |

[37] Source: http://e-contractoracademy.com/. Retrieved 8/14/2014.

### Mandatory Online Form

Workforce data could be submitted through digital platforms that are linked to materials the contractors already submit to the IOUs. When presented with several data collection methods, most Home Upgrade Program contractors described a digital platform as the preferred and most feasible option. The following benefits emerged in discussion with Home Upgrade Program contractors:

- **Leverage existing data submission formats:** Some contractors mentioned that they already submit program documents electronically as part of rebate applications or their annual participation renewal. Piggybacking onto existing data submission forms would allow contractors to use familiar tools and to minimize the time spent submitting the data. It would also mean that IOUs could collect the data more independently, as established systems could be utilized.

- **Contractors noted that a digital form would likely yield more accurate responses** than ad hoc surveys, interviews, or panel discussions, as it allows time to gather the requested information and allows each worker to submit his or her own information individually.

- **A digital platform could incorporate additional features to improve data collection:** A few contractors suggested data storage so that they had to update information only for subsequent data requests. A contractor who hires subcontractors recommended a system that allowed his partners to submit additional workforce data to his records. Lastly, there was some mention of creating a tool that allowed the employer to submit wage information and have individual workers enter their more sensitive demographic details.

However, the following drawbacks need consideration:

- **The voluntary online survey with Home Upgrade Program contractors yielded a relatively low response rate of 16%:** To maximize data availability and reduce biases related to non-response, submission could be made mandatory for contractors. In this case, data forms should allow for item non-response so that contractors can refuse responses if they are unable or unwilling to gather the requested information.

- **Submitted data remain self-reported:** For example, employers can purposely misrepresent the requested data or base their responses on informal knowledge using judgment calls. While there are no means of checking directly submitted data, this approach would require referencing secondary sources to examine responses for potential biases.

- **Some contractors explained that they are willing to submit workforce data as long as revealing private information would not yield repercussions and would not be available to competitors:** Program staff aired similar concerns that contractor-specific information should not be visible to IOU staff if it could negatively affect the contractor's participation in the program. An IOU-led data collection effort should address these concerns and establish appropriate protocols.

### Contractor Surveys

Contractor surveys can collect workforce wage and demographic information from employers through a stand-alone survey or through contractor surveys that are part of process evaluations. Past research efforts suggest that surveys can collect the requested information. However, a number of drawbacks exist:

- **Response bias:** The collected information is based on self-reporting. We do not know if the respondents are systematically biasing their answers one way or another due to the sensitivity of the

topics, recall issues, etc. Interviews with contractors suggest that the accuracy of information provided might be more limited.

- **Validity of data:** Contractors acknowledged that they could provide more accurate wage and demographic information if they had knowledge of questions beforehand or if they had time to gather the information at their own time.
- **Self-selection bias:** We do not know if contractors who voluntarily participate in the survey differ significantly from contractors who don't participate in the survey.
- **Potentially low response rates**
- **Costly, unless piggybacked onto existing process evaluations:** While evaluation, measurement, and verification (EM&V) staff acknowledged that a few piggybacked questions should be feasible in general, there are issues with piggybacking onto other evaluation surveys, because they typically interview one person at a given firm instead of interviewing every installer/worker within a firm. This is particularly problematic if workers earn income from multiple employers.

### Contractor Panels

Contractor panels are a method to conduct several surveys with a group of contractors who have expressed their willingness to participate in multiple data collection efforts. The main benefit of this method is to collect workforce data continuously from a relatively stable pool of contractors so that possible changes in the workforce can be tracked. However, in addition to drawbacks described above in the Contractor Surveys section, this approach can be beneficial only if contractors stay in the program. In addition, contractor interviews revealed mixed responses when asked about their willingness to participate in a panel of contractors. About half stated that they would participate if time permits; others explained that they would not want to commit their time in advance or were more generally concerned about discussing the subject matter of wage levels and demographics.

# 4. Conclusions and Recommendations

The overarching goal of the study was to determine what data should be collected for energy efficiency programs not in a direct contracting relationship with the IOUs in light of the purpose and viable options. While the study findings highlight several challenges with collecting wage and demographic data, we do see opportunities for collecting some of the data requested in the Decision that will still help the CPUC determine if there are workforce condition and/or installation quality concerns. Based on all of the secondary information reviewed for this study and the qualitative interviews with contractors, stakeholders, program and implementation managers, we provide the following conclusions and recommendations:

### Electronic payroll tracking is the best method to acquire the demographic and wage information requested but investment is not justifiable for all energy efficiency programs

Based on this limited investigation, we generally agree with the DVC recommendation[38] that workforce conditions be tracked electronically through certified payroll records or other data tracker applications for programs where the IOUs have a direct contracting relationship with contractors. We believe this is the only way to achieve the true objective of determining the impact of program efforts on job quality or work quality. A statewide approach keeps contractors who work for multiple IOUs from having to input their workforce

[38] *WE&T Guidance Plan Appendix 5B.*

multiple times. However, such effort requires a long-term strategy and long-term commitment to provide the necessary resources and funding. We do not recommend that the CPUC require that investment unless they have reason to believe that there is a work quality or job quality issue for a specific program.

### Data intensive effort not warranted at this time for programs similar in design to the Home Upgrade and Non-Residential Deemed and Custom Core Programs

Based on the complications of acquiring wage and demographic information from contractors outlined in this study and the nature of the program designs we do not recommend that the Home Upgrade Program and Non-Residential Lighting Programs, or other similar programs where the IOU is not in a direct contracting relationship, invest the resources required to collect valid and comprehensive demographics or wages from the participating contractors. We recommend that the CPUC require a statewide effort to gathering wage and demographic information only if the CPUC has a reasonable concern over the contractors' work quality and/or wage levels in a specific program. When the evaluation team took a closer look at these two program examples we found a few more complicating issues that may also apply to the majority of other energy efficiency programs.

- The Home Upgrade Program requires highly skilled workers who are trained and who are typically paid fair living wages therefore a large data collection effort into wages would likely not show that the program is support low wage/low skill jobs. The Program also offers ongoing training and mentorship for all participating contractors.

- The Core and Deemed lighting programs are difficult in that the programs do not have a set list of participating contractors. Customers are allowed to hire their own contractors for installation. This program is intended as a self-service program for customers who can assess their own measure needs, navigate the application process on their own, and simply want to apply for an incentive. As such, there is no set list of participating contractors and the program does not do any specific training nor does it have training requirements for contractors.

### Consider the learnings from this study when determining how to best collect demographic information from program contractors in the future

In addition to the lessons learned from ESAP's previous data collection efforts summarized in this report, we offer further lessons learned from this study including:

- Contractor interviews revealed that employers cannot provide valid demographic data of their workforce. Based on the contractors we interviewed, collecting demographic information only from employers about their workers is not possible given their lack of knowledge about their employees' ethnicity, household income levels or disadvantaged status. Data should be collected from each worker within a company instead of asking a company representative to report on all of their workers.

- The use of subcontractors for the installation of program measures is common in the lighting segment and occurs to some extent among Home Upgrade Program contractors. Contractors do not have the requested information for installers who are not their own employees. As a result, data collection from contractors would not capture the entire installer workforce unless subcontractors are approached as well.

- Provide a clear and compelling argument for why contractors should provide this information to the state. Both IOU staff and contractors expressed some concerns regarding the collection of sensitive wage and demographic information. They are in general agreement that employees should not be

required to provide this information and requested a clear explanation as to why such information is needed and how it would benefit the industry.

- Use existing government wage data sources as context for program contractor findings. Compare reported wages to government wage data and check that workers participating in the programs are making a living wage or have higher-than-average wages.

Below are the lessons learned from interviews with program managers, outside of the IOUs, who employed an electronic software system for collecting workforce data that leverages existing payroll systems (Programs are described in Table 15). It is important to note that these other programs are quite different from the Home Upgrade and Core Lighting Programs in that some have a direct contracting relationship with contractors and some have a specific training component that targets disadvantaged workers. Lessons learned from those interviews were:

- **Project champion:** A program champion is critical to ensure that the early data collection design and implementation will achieve the overall objectives. A significant ramp-up period of up to 4 months is needed to build a data collection application or to integrate an existing one.

- **Setting expectations and providing vision early:** The programs set expectations and shared vision regarding workforce conditions and workforce goals early. They convened stakeholder groups, which included contractors. In these ways, they got buy-in from contractors who later became program participants.

- **Allure of EE dollars in the market:** Contractors will meet the requirements if it means that they will win contracts and be more competitive in the marketplace. If workforce conditions and workforce data collection becomes a participation requirement in IOU energy efficiency programs, one possible barrier to contractor participation is the size of the market opportunity. If contractors perceive that the market is too small or does not contain enough potential revenue, they may choose not to invest in committing to and learning the data collection systems, regardless of the relative ease or long-term advantages of doing so.

- **Point systems for awarding contracts or giving referrals:** To encourage workforce and business diversity and to encourage improved workforce conditions, the programs favor contractors who scored higher in point systems. These systems rated areas of highest interest to the program, including disadvantaged worker inclusion, business size, and past work quality.

- **Focusing on ease of use for contractors and giving something back to contractors:** Program managers remarked that it was important to keep the program as easy as possible for contractors. All the programs offered contractors multiple types of training, such as business development and application tool training. The residential programs also marketed the program, provided referrals to its contractor pool, fielded customer and contractor questions, and provided contractors with technical training.

- **Well-designed electronic data collection tool:** Start with the end in mind, i.e., know what data need to be tracked and how they will be used. Test the tool, provide training to contractors, and expect a ramp-up period as the tool becomes populated and contractors learn to use it. Include drop-down lists of employees and businesses to allow for quick entry. Ensure that necessary reports can be generated easily and that the tool provides contractors with immediate feedback around entry mistakes. Such capabilities help managers and contractors alike see anything that is not in compliance. Although all three programs built their own tool, one program manager specifically praised the commercially available LCPtracker tool. Compared to its competitors, the tool elicits

better contractor feedback, provides more responsive and timely technical support, and provides more in-depth reporting.

- **Improved business practices:** By using the electronic data collection tools, some contractors improved their business practices:
  - After the initial learning curve and investment of time, automated processes streamlined and increased the accuracy of record keeping that had sometimes been inefficient or paper-based.
  - The application tools include automated checks for common entry errors or wage-level discrepancies and highlight them for contractors.
  - Contractors use the tool to generate custom reports of their businesses. This allows them to make data-based business decisions, e.g., gauging future project costs and bidding appropriately.
- **Limitation for residential contractors:** Residential contractors have a diversity of business practices and range in their use of electronic record keeping. Their payroll records may not be available in a format that allows the program to collect wage data through electronic certified payroll submissions. This means that residential contractors may have to enter some wage data twice.

### Require indirect contracting relationship energy efficiency programs to collect and submit select information at this time

For programs not in a direct contracting relationship, similar to the Residential EUC Home Upgrade and the Deemed and Custom Non-Residential Lighting Programs, we recommend that these programs leverage existing data sources and program staff to collect the information that is readily available to them in 2015 (see **Error! Reference source not found.** below). This information will help the CPUC to continue to monitor the training, work and job quality of contractors supporting these programs and to determine if further data collection is necessary.

Table 16. Workforce Conditions Data Collection Recommendations For Programs NOT in a Direct Contracting Relationship

| Workforce Conditions Data | What | Why | Recommendation |
|---|---|---|---|
| (3) Number of inspection failures and types of failures | The percentage of inspections that fail due to installation quality issues and the reasons for failure | Determine if program has an installation quality concern | Collect through implementation QA/QC process throughout 2015; provide to the CPUC at end of 2015 |
| (4) Level and type of utilities' training and screening | Description of the screening the program does to allow contractors to participate; description of the training/ skills required for contractors to participate; description of the training that the program provides to participating contractors | Determine if level and type of training/screening is sufficient to support the technologies incented by the program | Program staff description provided to the CPUC at end of 2015 |
| (5) Customer feedback for these contractors, positive and negative | Customer satisfaction scores with contractors' performance overall and the quality of the work performed; open-ended responses for why customers are not satisfied | Informs whether the program needs to give contractors more training or needs a new requirement | Process and impact surveys in 2015; provide to the CPUC at end of 2015 |
| (7) The utilities' assessment of any other needs of the existing workforce | Program description of any workforce needs to support the program technologies; program staff assessment of whether the participating contractor pool is sufficient to meet program goals; program description of how they determine the number of contractors needed to fulfill program goals | Informs whether the program needs to give contractors more training or needs a new requirement | Program staff description provided to the CPUC at end of 2015 |

### The IOUs need help to standardize the definition of work quality across the IOUs and the coding of inspection failures

Notably, there is some preliminary work that needs to be done before the IOUs can execute on the directive to begin collecting and reporting upon the number of inspection failures and the types of inspection failures for the EUC and Core Lighting Programs. See Section 0 for more detail.

### An administrative challenge amongst the IOUs needs to be addressed for WE&T

Notably, the IOUs raised an administrative challenge in response to receiving the draft results from this study. The WE&T program began as a program that included the IOU Energy Center education efforts and K-12 education programs. However, policy decisions and the strategic plan now goes beyond just these two efforts and has evolved into a cross-cutting topic across all energy efficiency programs. This presents an administrative challenge amongst the IOUs because the IOU WE&T Program Team must now also be responsible for coordination and facilitating workforce concerns across the entire program portfolio.

# Appendix A. Bureau of Labor Statistics Wage Data Collection Instruments

54130_Occupationa
l Employment Repor

238000_Occupation
al Employment Repc

# Appendix B. In-Depth Interview Guides

WET Job Quality Contractor Interview

WE&T Job Quality IDI Guide - EUC_NR

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