PROPOSITION 39 JOB CREATION & QUALITY, 2014 – 2018

A REPORT TO THE CITIZENS OVERSIGHT BOARD OF THE CALIFORNIA CLEAN ENERGY JOBS ACT

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Table of Contents

2019 UPDATE: JOB CREATION THROUGH 6/30/18 1

Overview 4

Job Creation Results 4

Job Quality Results 6

Conclusion 9

Appendix 10

2019 UPDATE: JOB CREATION THROUGH 6/30/18

More than 19,000 jobs have been created from The California Clean Energy Jobs Act (CCEJA), created by Proposition 39 and legislated under Senate Bill 73. This update to the February 2017 jobs report estimates job creation based on K-12 clean energy projects that have been approved by the California Energy Commission (CEC) from the start of the program through the final approved energy expenditures at the end of June 2018. The CEC received the first energy plans in February of 2014. As of the end of June 2018, the CEC approved 2,189 clean energy retrofit projects for a cumulative investment of nearly $1.5 billion.

The job estimates are based on the disbursement of approximately $1.5 billion in grant funds, rather than on final program expenditures, which are not reported until a full year after project completion. The data was derived by deflating the 2018 approved grant total to 2016 dollars, in order to match the original jobs report, and used the same ratios for *job factor* (number of jobs created per million dollars invested) and *employment multiplier* (number of indirect and induced jobs generated per direct job created) as in the original study (included here in full).

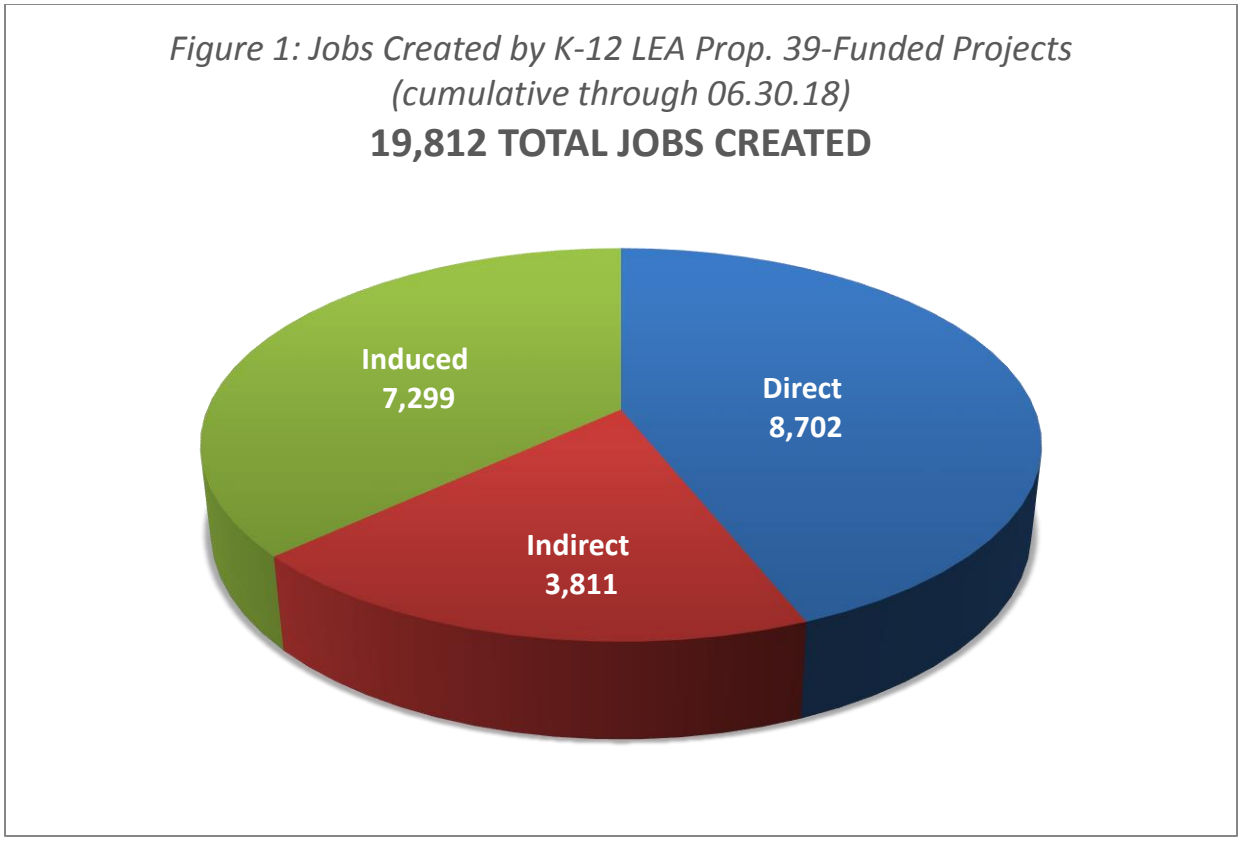


Figure 1 shows that through the end of June 2018, 8,702 *direct* jobs were created from the investment of about $1.5 billion, corresponding to 5.9 jobs per million dollars of investment. The spending on Prop 39 projects also has a multiplier effect as the investment stimulated additional economic activity. This resulted in the creation of an additional 3,811 *indirect* jobs in California in industries that provide supplies, materials, fuels, and other inputs into these projects. In addition, the spending of wages and business income from these investments created an additional 7,299 jobs in a variety of (mostly retail and service) *induced* jobs. This employment "multiplier" is estimated at 2.3 for these industries in California and indicates that a total of 2.3 indirect and induced jobs are generated for each new direct job created. This is a critical and authentic contribution of Proposition 39, because by closing a tax loophole, the law brings new spending, economic activity, and employment that would otherwise not have occurred. *Figure 1* shows the direct, indirect, and induced jobs, for a total of 19,812 jobs created through the end of June 2018.

Table 1. Economic and Employment Impact of Prop 39 on California.

Impact of Prop 39 grants (cumulative through 6/18)	**Economic Activity** (2016 dollars)	**Employment** (number of jobs created)
Direct	$1.481 billion[1]	8,702
Indirect	$711.3 million	3,811
Induced	$1.156 billion	7,299
Total	$3.349 billion	19,812

[1]Approved Energy Expenditure Plans (EEPs) through 2018.

Table 1 summarizes the economic and employment impact of Proposition 39 investment through 2017. In addition to the employment generated by the Proposition 39 projects, the spending of nearly $1.5 billion on Prop 39 K-12 projects stimulates roughly $711 million in indirect spending and another $1.2 billion in induced spending for a total economic impact of more than $3 billion.

This update shows continued and significant job creation from Prop 39 investments in California's clean economy. Early job quality measures, described below, are promising. But in future, in order to meet the methodological challenges outlined in the appendix, state partners charged with tracking the employment and economic co-benefits of energy efficiency investment need greater support and capacity – more funding, staff, and technology – for integrated data reporting, collection, and analysis.

OVERVIEW

The California Clean Energy Jobs Act (CCEJA), created by Proposition 39 and legislated under Senate Bill 73, provides funding for the planning and installation of clean energy measures such as energy efficiency upgrades and clean energy generation in public educational facilities in California. The program was funded by closing a loophole in California's corporate income tax code. Under the policy, half of projected tax revenue is allocated to the General Fund with the other half to the Clean Energy Job Creation Fund for five years (beginning in fiscal year 2013-2014).[1]

There are three component parts of Proposition 39's energy efficiency retrofit and clean energy program that are administered and tracked by three separate agencies; the K-12 program, the Community College Program, and the California Conservation Corps program. This report addresses the job impact only of the K-12 program which comprises over 80% of Proposition 39 funding. The K-12 program is administered by the California Energy Commission (CEC). The California Workforce Development Board (CWDB) is responsible for jobs reporting for this program.

This report uses economic modeling tools to estimate job creation based on K-12 clean energy projects that have been approved from the start of the program through the third quarter of 2016 (see Appendix for job creation methodology). The report also documents information on job quality including the wages, and occupational mix of jobs, and opportunities for trainees on Prop 39 projects, based on certified payroll records obtained from the Department of Industrial Relations (see Appendix for job quality methodology).

JOB CREATION RESULTS

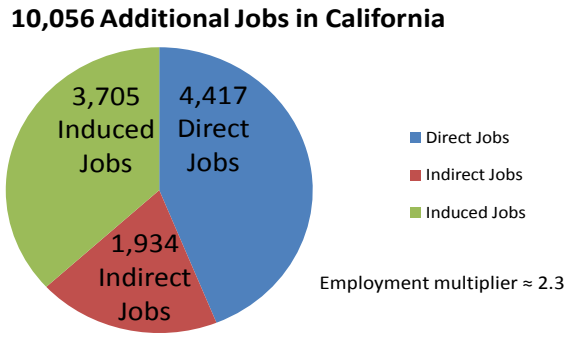
Jobs have been created from the three annual appropriations that have so far been made to support K-12 clean energy programs since the Prop 39 program began. The CEC received the first energy plans in February of 2014. As of 2016 QIII, 977 projects have been approved for a grant amount of $705.4 million ($752 million when adjusted to 2016 dollars).

The job estimates are based on the disbursement of the $752 million in grant funds, rather than on final program expenditures, which are not reported until a full year after project completion. We used IMPLAN, a standard economic tool, to estimate jobs created by this investment. Approximately 98% of these funds support construction activities while the remaining 2% ($15

[1] Senate Bill No. 73. (2013). Chapter 29. Retrieved From: http://www.leginfo.ca.gov/pub/13-14/bill/sen/sb_0051-0100/sb_73_bill_20130627_chaptered.pdf

million) support energy managers and training (see Appendix).

Figure 1: Employment Impact of K-12 LEA Proposition 39-Funded Projects, 2014 to Q3, 2016



Source: IMPLAN Economic Impact Software

Figure 1 shows that through QIII 2016, 4,417 *direct* jobs were created from the investment of $752 million, corresponding to 5.9 jobs per million dollars of investment. The spending on Prop 39 projects also has a multiplier effect as the investment stimulated additional economic activity. This resulted in the creation of an additional 1,934 *indirect* jobs in California in industries that provide supplies, materials, fuels, and other inputs into these projects. In addition, the spending of wages and business income from these investments created an additional 3,705 jobs in a variety of (mostly retail and service) *induced* jobs. This employment "multiplier" is estimated at 2.3 for these industries in California and indicates that a total of 2.3 direct, indirect and induced jobs are created for each new direct job. This is a critical and authentic contribution of Proposition 39, because by closing a tax loophole, the law brings new spending, economic activity, and employment that would otherwise not have occurred. Figure 1 shows the direct, indirect, and induced jobs, for a total of 10,056 jobs through QIII 2016.

Table 1. Economic and Fiscal Impact of Prop 39 on California.

Impact of Prop. 39 grants $752 million (2016 dollars)	Economic Activity	Employment
Direct	$751.7 million	4,417 jobs
Indirect	$361 million	1,934
Induced	$587 million	3,705
Total	1.7 billion	10,056
Tax Revenue	$88.2 million	NA
Multipliers	2.262	2.277

Source: IMPLAN and authors' calculation.

Table 1 summarizes the employment, economic and fiscal impact of Proposition 39 through QIII 2016. In addition to the employment generated by the Proposition 39 projects, the spending of $752 million on Prop 39 K-12 projects stimulates an additional $587 million in induced spending and another $361 million in indirect spending for a total economic impact of $1.7 billion. This increase in economic activity generates an additional $88 million in state and local tax revenue (from sales, personal and corporate income, property taxes, etc.).

JOB QUALITY RESULTS

Proposition 39 explicitly states that funds should "create *good-paying* energy efficiency and clean energy jobs in California" and should support training and employment for disadvantaged youth, veterans, and others for jobs on these projects. The following analysis of job quality and opportunities for trainees is based on certified payroll records reported to the California Department of Industrial Relations (DIR) as part of compliance with prevailing wage laws for public works. This data is derived from a sample of CPRs from projects approved through QIII 2016, and includes information on the job classification of each worker, the hourly wage rate, the number of hours each employee worked on each project, and other information on jobs and workers (see Appendix).

Occupations on Prop 39 Projects

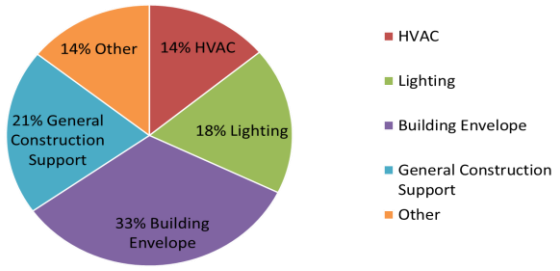
Table 2: Distribution of Hours Worked by Building System and Trade, K-12 LEA Projects.

Building System	Job Category	Hours
HVAC	Plumbers/Pipefitters	6%
	Sheetmetal Workers	8%
Lighting	Electricians	18%
Building Envelope	Asbestos Workers	4%
	Carpenters	16%
	Flooring Workers	2%
	Glaziers	1%
	Painters and Plasterers	5%
	Roofers	5%
General Construction Support	Laborers	21%
Other	Cement, HVAC, Iron, Operating, other Skilled and Unskilled construction workers	14%

Source: Authors' analysis of certified payroll records for K-12 LEA projects obtained from the Department of Industrial Relations

Table 2 and Figure 2 illustrate the main job classifications and their relative distribution on Proposition 39 projects. The data show the importance of the highly skilled specialty trades (electricians, plumbers/pipefitters and sheetmetal workers) who work on the two energy-using systems in buildings: lighting and HVAC (heating, ventilation and air conditioning). The data also show the prominence of trades that work on the building envelope (carpenters glaziers, roofers, etc.) on projects that reduce the leakage and waste of energy used for heating and cooling.

Figure 2: Distribution of Hours Worked by Building System Type, K-12 LEA Projects.



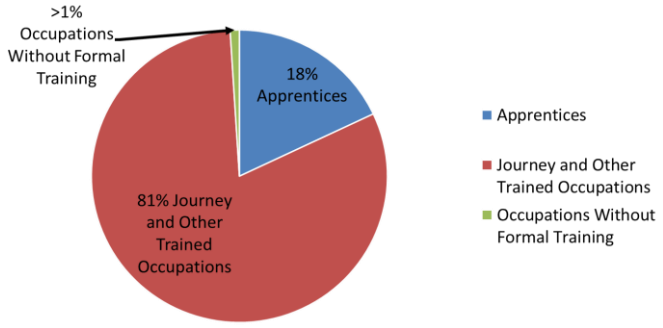
Source: Table 3

Training Opportunities

Public works contractors rely on the state-registered apprenticeship system for training.

Apprenticeships are industry-funded, "earn-as-you-learn" training programs that combine classroom instruction and paid on-the job-training with a wage progression tied to skill acquisition and an industry-recognized credential when apprentices "journey out." Apprentices earn a good salary while completing three to five years of training that teaches a broad, occupational skillset applicable to other sectors and projects.[2] The intensive educational program is supplemented with work in a range of settings that provides greater job security in the future as workers earn a versatile, industry-recognized credential. State-certified apprenticeships are the gold standard in workforce training and trade certification,[3] building a pipeline for trainees into career track jobs, and helping to fulfill the intent of the legislation.

Figure 3: Distribution of Hours Worked by Apprentices, Trained and Untrained Occupations, K-12 LEA Projects.



Source: Table 3

The CPR data confirms that Proposition 39 provides career-track training for construction workers through state-registered apprenticeships. From the CPR data, we identified apprentice and non-apprentice/journey-level workers employed on Proposition 39 projects in K-12 LEAs. Figure 4 shows that about 18% of the hours worked from the sample of K-12 clean energy projects were carried out by apprentices. This is a healthy ratio of apprentices to journey level workers and is comparable to other public works projects. This shows that Proposition 39 projects are providing an important opportunity for trainees in the construction trades. Figure 3 also reveals that almost all jobs created by Prop 39 K-12 projects either involve apprentices, or involve occupations that have formal training opportunities. Less than 1% of the hours worked on these projects involve construction occupations that do not have formal training opportunities.

[2] For a full list of apprentice wage rates see "Public Works Apprentice Wage Sheets," Department of Industrial Relations, State of California. Accessed at: http://www.dir.ca.gov/OPRL/PWAppWage/PWAppWageList.asp.
[3] Zabin, C. et al. (2014). Workforce Issues and Energy Efficiency Programs: A Plan for California's Utilities. Donald Vial Center on Employment in the Green Economy, University of California, Berkeley. Retrieved from: http://www.irle.berkeley.edu/vial/publications/WET-Plan14.pdf.

Wages of Workers

All construction workers employed on Proposition 39 K-12 projects are covered by California's prevailing wage policy.[4] As a consequence, these jobs are generally well-paid and include health and retirement benefits.[5] Wages range from $48.22 for journey electricians to $36.32 for laborers. Apprentices earn on average $28.31.

Table 3: Average Hourly Wage Rate for Apprentices and Selected Trades, K-12 LEA Projects.

Job Category	Average Wage Rate
Electricians	$48.22
Carpenters	$44.47
Sheetmetal Workers	$44.73
Plumbers/Pipefitters	$45.87
Laborers	$36.32
Other	$40.39
Apprentices	$24.75

*Average wages weighted by hours worked, adjusted to 2016 dollars.
Source: Authors' analysis of certified payroll records for K-12 LEA projects obtained from the Department of Industrial Relations.

CONCLUSION

Proposition 39 is a significant investment into clean energy and energy efficiency in California that creates multiple, positive benefits, including the creation of good jobs and substantial training opportunities for Californians. Investment into public infrastructure creates a ripple effect of associated benefits. Improved energy efficiency investment not only contributes to student and employee comfort, lower building maintenance and operating costs, and an extended lifetime for school buildings, but also provides family-supporting wages for construction workers and a pathway to middle class careers for apprentices.

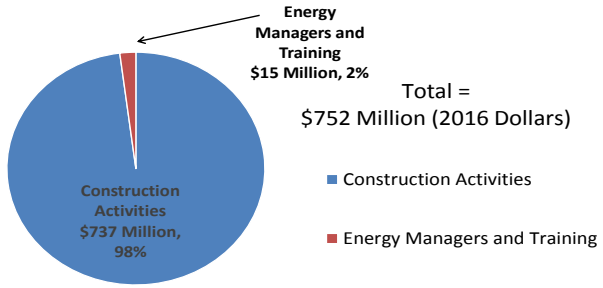
[4] See "Prevailing Wage Requirements," Department of Industrial Relations, State of California. Accessed at: https://www.dir.ca.gov/Public-Works/Prevailing-Wage.html .
[5] See "Index 2016-2 General Prevailing Wage Journeyman Determinations," Department of Industrial Relations, State of California. Accessed at: http://www.dir.ca.gov/OPRL/2016-2/PWD/index.htm#Journeyman

APPENDIX

Job Creation Methodology

Three annual appropriations have been made to support K-12 clean energy programs since the Proposition 39 program began. As of 2016 Q III, 977[6] projects have been approved for a grant amount of $705.4 million ($752 million in 2016 dollars).[7] The distribution of grant funds between construction, energy managers, and training activities is reported in Figure A1. This information was derived from the author's examination of final project reports obtained from the California Energy Commission and reveals that 98% ($737 million) of grant funds were allocated to construction activity with 2% ($15 million) spent on energy managers and training of school district personnel.

Figure A1: Distribution of K-12 LEA Proposition 39 Grants between Construction, Energy Managers, and Training Activities.



Source: Authors' analysis of final project reports obtained for the California Energy Commission.

The calculated jobs impact is based on the disbursement of $752 million in grant funds, as final program expenditures are not reported until one year after project completion. Data reported in Table 1 indicate that $752 million in grant spending and 4,417 direct jobs results in 5.9 million jobs per million.[8] The employment multiplier of 2.3 is based on the economic impact of $752 million in grant spending allocated to the construction, energy management, and training activities as reported in Figure 1.[9]

The economic impact of K-12 energy efficiency projects is measured using the IMPLAN economic

[6] See "Expenditure Plans Listing," Approved Energy Expenditure Plans, California Energy Commission. Accessed at: http://www.energy.ca.gov/efficiency/proposition39/.

[7] The adjustment to 2016 dollars is made to provide consistent measurement of the number of jobs per million over the period. Since 98% percent of approved grants are allocated to construction activity, the adjustment to 2016 dollars is based on the "Producer Price Index by Commodity for Construction," *U.S. Bureau of Labor Statistics*. Accessed at: https://fred.stlouisfed.org/series/WPU80.

[8] The data reported in Table 1 have been rounded to the nearest tenth (decimal point). More precisely, 4,417 direct jobs divided by $751.7 million equals 5.876 jobs per million in grant spending.

[9] The employment multiplier is rounded to 2.3 in Table 1. A more precise measure is 2.2767 (2.2767 x 4,4147 = 10,056).

impact software. This economic impact analysis is based on the ripple effect, or multipliers, associated with the flow of new tax revenues into California's economy. Specifically, this software is used to estimate the impact on state-level economic activity, employment, and state and local tax revenue. IMPLAN (IMpact analysis for PLANning) was originally developed by the U.S. Department of Agriculture to assist the Forest Service with land and resource management planning. The Minnesota IMPLAN Group (MIG) started work on the data-driven model in the mid-1980s at the University of Minnesota. The software was privatized in 1993 and made available for public use. The software contains an input-output model with data available at the zip-code, county, state, and national levels.

Input-output analysis measures the inter-industry relationships within an economy. Specifically, input-output analysis is a means of measuring the market transactions between businesses and between businesses and consumers. This framework allows for the examination of how a change in one sector affects the entire economy. In this way, input-output analysis is able to analyze the economic effects of the multistate business tax change by measuring the multiplier, or ripple effect, as Proposition 39 K-12 grant spending stimulates further changes in transactions between other businesses and households.

The results reported in this study are based on planned K-12 energy efficiency grants, information from the 2012 *Economic Census of Construction*, and the most recent IMPLAN data for the state of California (2015). IMPLAN deflators are used to adjust for changes in prices over time. The results are reported in 2016 dollars.

The 10,056 jobs that are created by K-12 Proposition 39 spending can be divided into direct, indirect and induced jobs. These details are reported in Figure 2 and indicate that 4,417 construction, energy manager, and training jobs directly involved in K-12 projects create and support an additional 1,934 *indirect* jobs in California industries that provide supplies, materials, fuels, and other inputs to these projects. The spending of wages and business income earned from work on K-12 projects induces an additional 3,705 jobs in a variety of industries (mostly retail and service).

Job Quality Methodology

The analysis of job quality is based on certified payroll records reported to the Department of Industrial Relations by contractors who were awarded Proposition 39 projects in K-12 schools, as part of compliance with prevailing wage regulations. The Department of Industrial Relations provided over 43,000 certified payroll records for K-12 energy efficiency projects extending from early 2014 to QIII 2016. These data are used to derive the job classification, hours worked, and wage information reported in the study. To clean this data, payroll records reporting zero or negative hour worked and wage rates less than $9.00 per hour (the minimum wage in California in 2014) and over $180 per hour were deleted. Also excluded from the analysis were payroll records

that indicated the job classification was "not provided" or if insufficient information prevented the determination of the type of work. Also deleted were supervisory positions that appeared in the certified payrolls, but are not covered by California's prevailing wage policy.[10] After these records were deleted, a sample of approximately 33,000 payroll records was used to derive the data reported in the report. Information on the construction jobs that have formal training opportunities (reported in Figure 5) was obtained from "Apprenticeship Program Information – Search," Department of Industrial Relations, State of California.[11]

Data Limitations

The researchers had originally hoped to estimate the number of direct jobs created from Proposition 39 investments using the DIR certified payroll records (CPRs) which record hours worked. If that had been possible, IMPLAN would have then been used to estimate total jobs, including the multiplier effect. However, using the CPRs for direct jobs required matching of the CPRs with the expenditure data from the clean energy grants disbursed by the California Energy Commission so that total investment could be directly linked to hours worked. The CPR data did not record the CEC project numbers so there was no way to match on project number. We also tried to match by project name, school address and worksite address but there was too much inconsistent information to match with an acceptable degree of certainty. We were unable to quantitatively assess the response rate due to the data matching problems just cited, but we believe it is very low because the total number of hours in the CPR data set is much lower than expected, given the grant disbursements and the jobs per million dollars of investment derived from our IMPLAN analysis. In addition, we were not able to verify, for each project, if all the CPRs were for that project were reported, and we believe there is a significant under-reporting issue somewhere in the CPR submission process.

Because of this, we used IMPLAN to estimate direct jobs from the disbursed grant dollar amounts rather than by tracking hours from the CPRs. We did use the CPRs to examine the job quality indicators documented in this report. We should note that while we were able to obtain 33,000 complete CPR observations for this analysis, it is not a random sample of CPRs, and may not reflect the entire universe of Proposition 39 projects.

[10] For additional information see "Prevailing Wage Requirements," Department of Industrial Relations, State of California. Accessed at: https://www.dir.ca.gov/Public-Works/Prevailing-Wage.html.
[11] Accessed at: http://das.ca.gov/databases/das/aigstart.asp.