

Market Opportunities for Entry Level Energy Auditors

MARKET BRIEF PREPARED FOR THE CALIFORNIA COMMUNITY COLLEGES

Report Prepared by:

Staff and Students at the
UC Davis Energy Efficiency Center
West Village
1605 Tilia Street, Suite 100
Davis CA 95616
eec.ucdavis.edu

List of Key Contributors:

Principal Investigator:
Siva Gunda, Director of Research

Project Manager:
Katherine Bannor, Assistant Program Manager

Research Contributions from:
Sarah Outcalt, Director of Market Transformation, Western Cooling Efficiency Center
Hilary Beckman, Graduate Student in Business
Joseph Sit, Graduate Student
Ryan Taylor, Undergraduate Student
Carlos Rangel, Undergraduate Student
Nikki Emam, Undergraduate Student
Maya Cohn, Undergraduate Student

Special Thanks to:
Carlos Santamaria, Advisor on Phase 1 work

Table of Contents

<u>Abstract</u>	4
<u>Executive Summary</u>	5
<u>Background</u>	5
<u>Overall Project Goals and Objectives</u>	5
<u>Summary of Findings</u>	6
<u>Market Opportunity for Entry-Level Energy Auditors</u>	6
<u>Perspective of Industry Experts on the Business Case</u>	7
<u>Recommendations for the Community Colleges</u>	7
 <u>Background</u>	 9
<u>Project Overview</u>	11
<u>Overall Project Goals and Objectives</u>	12
<u>Content and Organization of the Report</u>	12
<u>Market Opportunities for Entry-Level Energy Auditors</u>	13
<u>A Continued Push for Improving Building Efficiency of Existing Buildings</u>	13
<u>Market Push Drivers</u>	13
<u>Market Pull</u>	15
<u>Market Enablers</u>	15
<u>California Represents a Very Large Commercial Building Sector</u>	16
<u>The Curious Case of the “Energy Corps” Model</u>	17
<u>Perspective of Industry Experts</u>	19
<u>Expert Perspectives on Understanding the Current Auditing Landscape</u>	20
<u>Expert Perspectives on Future Trends in Auditing Needs</u>	23
<u>Expert Perspectives on Opportunities for Entry-Level Energy Auditors</u>	24
<u>Recommendations for Community Colleges on Potential to Engage</u> <u>ELEA Training Offerings</u>	 27
<u>Potential Opportunities for Community College Engagement</u>	27
<u>Appendix</u>	30
<u>City Ordinances</u>	30
<u>Interview Questions</u>	32
<u>Survey Questions</u>	33

Abstract

California is widely considered a leader in efforts to improve building energy efficiency. With a combination of strong political will, enacted through aggressive legislative mandates and policy, and an innovative business landscape, California has been able to sustain a steady increase in implementing efficiency upgrades over the last four decades. California's community colleges play a critical role in delivering these public and private goals by developing the workforce necessary to meet market needs.

To this end, the California Community Colleges Chancellor's Office (CCCCO) developed a strategic partnership with the Energy Efficiency Center (EEC) at the University of California, Davis to research opportunities of interest to the community colleges and recommend programmatic- and curriculum-based solutions.

This report is a continuation of previous work (Phase 1 and 2) focused on investigating the potential opportunity for community colleges to develop a building auditing program that specifically targets entry-level workforce opportunities for energy assessments of existing commercial buildings.

Phases 1 and 2 of this project primarily relied on gathering available market data through secondary sources and quantitative and anecdotal evidence to establish the premise that there is, indeed, a need for "Entry-Level Energy Auditors" in the market. The current work (Phase 3), serves as a high-level summary of the work done in Phases 1 and 2 and fills in key information gaps through interviews of industry experts.

Executive Summary

■ BACKGROUND

Energy audits are critical to maximizing building efficiency, however, they are in great need of an effective strategy to enable the process to be expanded to additional buildings that are not being audited. Currently, there are a tremendous number of buildings, particularly small- and medium-sized ones, in which a building audit is not practical because the potential energy savings will not counteract the cost of the audit, as is often the case in larger buildings. The building audit must be cost-effective as well as actionable. While advances in technologies such as the “no-touch” audit platforms have helped with improving efficiencies in the audit process and are becoming better at providing actionable information on operations and maintenance related to efficiency opportunities, it is widely accepted that there continues to be a need for auditors on-site to gather technology-specific data in order to produce high quality reports with specific recommendations.

This report gathers information from primary and secondary sources to demonstrate that a new class of workforce - Entry Level Energy Auditors (ELEAs) - can support the necessary market transformation of building audits as well as understand the potential for community colleges to support such a training program.

■ OVERALL PROJECT GOALS AND OBJECTIVE

The overall goal of this project was to develop a **Market Brief** that informs decisions as to whether the community colleges should offer ELEA training. The overall objectives of the project were to:

- Develop an understanding of the market opportunity for entry-level energy auditors;
- Develop pro forma business cases that will motivate different market players, such as contractors, to hire ELEAs; and
- Develop recommendations on the potential role(s) for community colleges to support the development of such a workforce.

The content of the following report was organized to systematically address the above objectives:

- **Market Opportunity for Entry-Level Energy Auditors:** The first section establishes the market opportunity for ELEAS through a discussion of the drivers that are pushing a continued need for energy auditing activities and presents California’s large building footprint as a key indication of this need. Additionally, this section uses the California Conservation Corp’s Energy Corps Program as a case study to discuss lessons learned for the development of an ELEA workforce.
- **Perspective of Industry Experts on the Business Case:** The second section establishes the business case for an ELEA workforce through interviews with approximately 20 industry experts and survey results collected from a group of 40

experts. The figure below summarizes some of the main results.

- **Recommendations for Community Colleges:** The final section of the report discusses the opportunity for the Community Colleges to play a role in the development of this workforce in such a way that it addresses the market needs found in section one and is responsive to the industry parameters discussed in section two.

Understanding the Current Auditing Landscape	Future Trends in Auditing Needs	Opportunities for Entry-Level Energy Auditors
<ul style="list-style-type: none">• Half of interviewees defined an auditor as one who collected data only. The other half included analysis and report writing in their definition.• No consensus among interviewees as to the current saturation of the auditing market. Some believed there was a great need for additional audits while others saw no evidence of this in their professional experiences.• The word ‘auditor’ has a negative connotation that can turn off potential customers. The word ‘assessor’ or ‘analyst’ was seen as a better fit.	<ul style="list-style-type: none">• Almost all interviewees believe that the need for building energy auditors will grow in the next 5-10 years.• There will specifically be a need for auditors in small and medium buildings as ESCOs and other large companies typically do not serve these customers.• Efficiency in older buildings is much less well-understood than efficiency in new construction. Auditors have an important role to play in increasing efficiency in the older building stock.	<ul style="list-style-type: none">• For entry-level auditors to positively affect efficiency in the state, the workforce needs to be well versed in methods to turn audits into action. Reports need to be straightforward and the benefits to the customer need to be clearly communicated.• In addition to having the requisite technical skills and building knowledge, the entry-level workforce must have excellent soft skills that allow them to provide timely and accurate customer service.

■ SUMMARY OF FINDINGS

The industry experts interviewed were unanimous in their view that finding capable energy auditors is challenging and that there is a dearth of skilled auditing professionals in the market place. The interviewees also agreed that California Community Colleges are probably best positioned to address this need in the marketplace. What follows is a section-by-section summary of the researchers’ conclusions.

Market Opportunity for Entry-Level Energy Auditors

- Experts broadly categorized the need for two types of building auditors:
Generalist – focused more heavily on soft skills with sufficient technical knowledge and experience
Specialist – focused on one technical area in larger buildings
- Most employers have in-house intensive training to align the incoming skills of the employees with the specific needs of the employer’s services and clientele.

- The majority of existing training programs that carry credibility in the market are geared toward incumbent professionals, often with advanced degrees. Therefore many of these well-regarded programs are not appropriate for community college students.

Perspective of Industry Experts on the Business Case

- Due to the proliferation of auditing programs, industry has a need to ensure quality
- Audit reports alone do not achieve savings. It is critical to bridge the gap between “awareness and action.” To achieve this end the auditing workforce needs to be qualified enough to recognize the opportunities. In the words of one industry expert,
“...Unless you know where your low cost, medium cost, and high cost measures are located and how that energy is broken down in the built environment or in the building you don’t really know when and how to start implementing ideas and strategies...”
- Since many of the existing programs are online-based and/or have short engagement periods, entry-level professions do not gain the necessary network and the needed support to pursue job opportunities.

Recommendations for the Community Colleges

- Of the training programs that are accessible to entry-level professionals, almost none incorporate soft-skills training. Experts emphasized these non-technical skills as a high priority for this workforce. As one expert put it:
“A lot of the hiring supervisors have two requirements: do you have a driver’s license? Do you have soft skills? A lot are saying, if they have those 2 they are trainable and we will invest in them.”
- Hands-on training is a must, the Energy Corps program is one of the only existing entry-level workforce training programs that incorporates field audits. Trainees should have a minimum of 5 site audits under their belts by the time they graduate from the program.

There are two actionable pathways for developing pilot training programs within the community colleges:

- Infusion of auditing curriculum into existing trade programs; and
- Creation of a new, market-aligned Commercial Buildings Assessor Program.

As noted above, there is a need for two distinct types of entry-level energy auditors: 1) Generalists that have a general knowledge of building energy systems, and 2) Specialists that have a deep set of knowledge, skills, and abilities as it relates to a specific area of a building’s energy system, such as HVAC or lighting. Providing training opportunities on both fronts, with a significant focus on hands-on curriculum within each, will allow the community colleges to develop a workforce that is responsive to the increasing need for building audits. According to the research conducted for this report, the state’s aggressive energy reduction goals are the driving force behind this increased need.

The table below provides a summary of the key elements of the recommended pilot programs for the community colleges.

Program Type		Develop a new training program	Infusion into existing trade-specific programs
Goal	Programmatic Opportunity	Train a workforce that represents "skilled generalist" aimed at serving small and medium commercial market segment	Develop "specialists" through well-rounded trade-specific workforce programs (HVAC, lighting etc.) with basic knowledge in building science and trade-specific energy opportunity assessment skills.
Minimum Preferred KSAs	Sales & customer service	Medium to High Proficiency	Basic to Medium Proficiency
	Energy efficiency & building science	Medium to High Proficiency	Basic to Medium Proficiency
	Building and management systems & ECMs	Medium to High Proficiency	Medium to High Proficiency
	Knowledge of trade-specific systems	Low to Medium Proficiency	High Proficiency
	Critical thinking and analytical skills	Medium to High Proficiency	Medium to High Proficiency
	Data analysis and reporting skills	Medium Proficiency	Basic Proficiency

Background

In sharp contrast to the rest of the United States and much of the developed world, per capita energy consumption in California has remained relatively unchanged since 1974. Much of this stability can be attributed to the building codes and standards that were implemented during the 1970s and have been revised regularly since that time.

Despite the enormous success to date, however, achieving California's aggressive long-term energy and climate goals requires significant improvement in the energy performance of existing buildings (California Energy Commission, 2015). Approximately five billion square feet of commercial building space exists in the state that is required to be zero-net energy by 2030. If the state is going to reach this goal, a massive effort to audit this square footage is necessary. Energy audits can cover a range of activities from building benchmarking to developing a value proposition for building decision makers to invest in retrofits and thereby improve efficiency. As noted in The Comprehensive Energy Efficiency Program for Existing Buildings Scoping Report (California Energy Commission, 2012), regulatory solutions in isolation are insufficient to meet California's energy goals. Success will require participation from a diverse set of stakeholders to define and implement a wide range of solutions.

In response to these goals and the increased market pull for efficiency, a number of innovative public and private solutions have been developed and deployed. The benchmarking ordinances that are being adopted by a number of local governments to better promote awareness among customers are an example of these innovative solutions. In addition, in the financing arena, new companies such as THIRDACT are gaining traction that nicely complements existing financing strategies such as PACE. Apart from these solutions, technology advancements have facilitated improvements in customer engagement and targeting.

In response to Proposition 39 retrofits for K-14 schools, the California Conservation Corps' (CCC) Energy Corps program was created. This program provides a basis for an entry-level auditing workforce that can both be cost-effective and fulfill the need to gather information on-site. The combination of no-touch audit technologies, with a well-trained Energy Corps could provide an effective strategy for transforming the building audit process.

California's Community Colleges are the state's backbone to developing a workforce that meets the needs of California's labor market and the state's efficiency goals. The recent release of the Existing Buildings Energy Efficiency Action Plan by the California Energy Commission (CEC) (California Energy Commission, 2015) highlights the need for a focused approach to workforce development for the existing building energy sector.

This *Market Opportunities for Entry Level Energy Auditors* report gathers information from primary and secondary sources to demonstrate that an entry level auditing workforce can support the market transformation of building audits, as well as understand the potential for community colleges to support such a training program.

Project Overview

As a part of an agreement between the UC Davis Energy Efficiency Center (EEC) and the California Community Colleges Chancellor's Office (CCCCO), the EEC research team prepared this **Market Brief** on the demand for energy auditors (specifically entry-level) and the feasibility of implementing an entry-level auditing curriculum through the California Community Colleges. This study was conducted in three successive phases:

- **Phase 1** – the team gathered cursory information supporting the case that there is indeed anecdotal evidence that points to the opportunity in the marketplace for entry-level energy auditors (ELEAs) and warrants continuing research to quantify the opportunity.
- **Phase 2** – the team expected to gather secondary data to characterize the auditing market, existing training programs, and the demand for entry-level auditors to quantify the demand for entry-level energy auditors. While some of the information was available in secondary sources, the team was unable to find credible data published on the number of current auditing jobs in the state or expected growth of such jobs.
- **Phase 3** – the team gathered expert opinions through interviews and surveys.

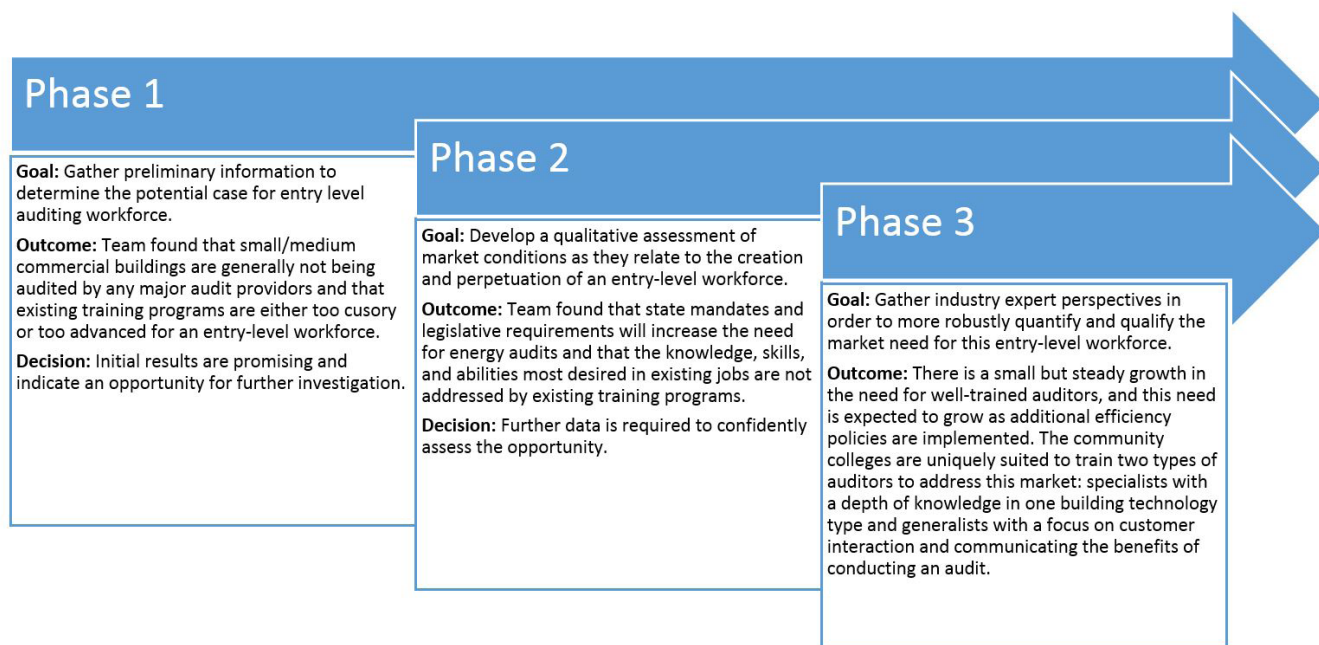


Figure 1. Summary of the different phases of work.

■ OVERALL PROJECT GOALS AND OBJECTIVES

The overall goal of the project is to develop a **Market Brief** that will inform decisions on whether the community colleges should offer ELEA training. The overall objectives of the project are to:

- Develop an understanding of the market opportunity for entry-level energy auditors;
- Develop potential a business case through expert interviews and a survey that will motivate different market players such as contractors to hire ELEAs; and
- Develop recommendations on the potential role(s) for community colleges to support the development of such a workforce.

■ CONTENT AND ORGANIZATION OF THE REPORT

- Drawing upon the work done over the three project phases, the core content of this report is organized to best answer the overall objectives of the project. The content of this report has been organized to systematically discuss the following three topics:
- Market Opportunity for Entry-Level Energy Auditors
- Perspective of Industry Experts on the Business Case
- Recommendations for Community Colleges

Market Opportunity for Entry-Level Auditors

The following section describes the key elements that provide the rationale for the development of an Entry-Level Energy Auditor workforce. Building energy auditing represents just a small portion of the energy services that are provided through various programs in the state of California. These audits, however, represent a vital step in the effort to increase the state's efficiency. While building improvement suggestions can be made based on most-likely scenarios, it is only through an on-site building audit, performed by a trained auditor, that the true potential for energy savings can be determined.

■ A CONTINUED PUSH FOR IMPROVING BUILDING EFFICIENCY OF EXISTING BUILDINGS

The push for improving energy efficiency is continuing. With strong policy goals in place, supported by technological advances and state-wide and local regulations, stakeholders across California have made the improvement of building energy efficiency a concrete and high-priority goal.

This section is divided into three categories of drivers: Market Push Drivers, Market Pull Drivers and Market Enabling Drivers.

Market Push Drivers

Legislative Goals & Governmental Programs

A comprehensive understanding of the energy efficiency policies affecting California must take into consideration both state and city regulations. State-level policies set the baseline for overall building energy efficiency objectives, and city ordinances can either meet or surpass these requirements. The Assembly and Senate bills outlined below show the intent of the legislature to improve energy efficiency in buildings and are currently in the initial phases of implementation. We chose to study the three largest cities in California by population (San Francisco, Los Angeles, and San Diego), as well as Berkeley because of its advanced policy directives, to understand how cities are responding to state-level policy. The cities of San Francisco and Berkeley have surpassed the standards set by state-level policies, while San Diego and Los Angeles have less developed building code regulations that are expected to expand to reach the targets mandated by state policies.

State Policies

Assembly Bill 758 (2009)

The goal of this bill is to make existing buildings more energy efficient. This bill requires the California Energy Commission (CEC) to develop an energy efficiency program for all residential and commercial buildings that fall significantly below the Title 24 building standards. Additionally, the law requires the California Public Utilities Commission (CPUC) to authorize each electrical company to incentivize a targeted number of low-

or no-cost energy efficiency audits each year for commercial buildings. These audits will be an integral part of the successful implementation of the law by identifying and addressing energy efficiency in buildings. The law will be implemented with a three-phase process and will ultimately institute mandatory approaches that will move energy efficiency practices into the mainstream.

Senate Bill 350 (2015)

This bill aims to increase clean energy investment and reduce pollution in California by significantly increasing energy efficiency in the residential, commercial, and industrial sectors. The bill requires the CEC to establish annual targets for statewide energy efficiency savings and the CPUC to identify cost-effective electricity saving measures and mandatory efficiency targets for all electric utilities starting November 2017. Additionally, the bill will mandate a cumulative doubling of energy efficiency in electricity and natural gas final end uses of retail customers by January 1, 2030. The bill specifically addresses the need for a sufficient number of auditors for the residential and commercial sectors, as buildings are a large part of the electricity consumption in the state. Subsequently, these mandatory increases in energy efficiency for retail customers are expected to create more demand for energy audits in order to identify energy saving opportunities.

Assembly Bill 802 (2015)

This bill supports strategies that enhance energy efficiency by increasing building owners' access to their energy use information. The disclosure of information should result in improved building management decision, as owners will conceivably be able to better understand their building's energy performance. Also, the bill will create a benchmarking and disclosure program through which owners of commercial and multi-family buildings above 50,000 square feet will be able to compare energy consumption against similar buildings. The bill will also direct utilities to provide incentives and rebates for audits, as well as technical assistance and support to their customers to increase the energy efficiency of their buildings using the data gathered through the benchmarking and disclosure program. Additionally, the energy savings achieved through audits, retrofits, and other authorized programs would count towards overall energy efficiency goals established for utilities by the CPUC. These incentives, as well as the targets for the reduction of energy consumption for utilities established in SB 350, are expected to increase the demand for energy audits to improve building efficiency.

City Ordinances

The cities of San Francisco and Berkeley have their own set of building efficiency ordinances that surpass the state-wide regulations outlined above. In contrast, Los Angeles and San Diego have less aggressive ordinances. The San Francisco regulation requires commercial buildings greater than 10,000 square feet to have an energy audit conducted every five years. However, the city also has strict guidelines as to who is qualified to perform these audits, potentially limiting the impact this ordinance will have for entry-level auditors. The Berkeley Energy Savings Ordinance (BESO) was adopted into law in 2015 and requires building owners to complete energy efficiency assessments and publicly report the information with the goal of saving energy through whole-building efficiency programs. As with the San Francisco program, auditor requirements may preclude entry-level individuals. Further details on these two programs, and the

less-advanced programs in Los Angeles and San Diego, can be found in the Appendix of this report.

Utility Programs

The state provides support to utility programs that stimulate the demand for auditing services. The CPUC has oversight over the Electric Program Investment Charge and administers funds through the CEC and the state's electric investor-owned utilities. In 2014, over \$1.7 billion was budgeted for energy efficiency programs. The CPUC has set energy reduction targets for public utilities, mandating a reduction of a certain percent of consumption in retail end-use in order to double energy efficiency in California by 2030. Additionally, the CPUC has been authorized to allot funds to utilities so they can provide incentives, rebates, technical assistance, and support to their customers to increase the energy efficiency of their buildings. The energy savings achieved through the authorized programs would count towards overall energy efficiency goals established by the CPUC.

Market Pull

Economics

Initially, the incentive for improving energy efficiency was the high cost of energy. This financial incentive pushed large consumers to hire in-house auditors and identify conservation measures in order to reduce their net energy costs. Because of the high cost of conducting audits, this driver only incentivized the largest energy consumers that had both the economic incentive and financial capital for energy conservation measures to be cost-effective. While reducing annual costs of consumption continues to drive the market for energy audits and conservation, the main driver for building energy efficiency and subsequently energy auditing has shifted to legislative drivers and incentives from utilities.

Organizational Goals Around Environmental Stewardship

Large associations and organizations are drawn to energy conservation programs for a variety of reasons. Some of this is certainly due to the economic incentives of energy savings, but stewardship and positive publicity in a time of increased public concern as to the effects of climate change is another undeniable pull towards greater building efficiency. The Building Owners and Managers Association of the United States, for example, is placing a much greater degree of focus on helping their members achieve greater efficiency. Additionally, the University of California system has placed significant emphasis on finding ways for campuses to achieve even greater efficiency than the state is mandating. Finally, large corporations such as Apple, Google, and others have their own energy reduction goals that stem from the desires and values of their customers and those they are trying to reach.

Market Enablers

Improvements in Technology

The ability to easily collect, analyze, and visualize building energy use information is an extremely important piece of the energy conservation puzzle. Companies such as FirstFuel and OPower have created an effective business model that allows them to streamline and scale the usefulness of energy data in buildings across the state.

In addition to these higher-cost options, the EEC has developed an online tool that simplifies the data collection process so that it is possible for entry-level auditors to efficiently collect data that can then be handed over to more advanced personnel for analysis. Improvements in audit platform technology have helped improve the building audit process itself, but at this stage these technologies can only support the work of trained audit personnel to conduct an on-site audit. As of yet, these technologies are incapable of replacing an in-person assessment.

■ CALIFORNIA REPRESENTS A VERY LARGE COMMERCIAL BUILDING SECTOR

As one of the largest states in the country – both in terms of population and area – California has a tremendous amount of commercial building square footage. The UC Davis research team estimated the total size of the building stock as a part of its Phase 2 research using Commercial Building Energy Consumption Survey data, US Census data, and California Commercial End Use Survey data.

The results indicate a total market size of over 10 billion ft² and a total of 693,419 buildings (See Table 1 and Table 2). Table 1 is organized by total square footage. Those buildings with either small or medium building square footage of over 100,000,000 are bolded as this is likely the primary market for entry-level energy auditors.

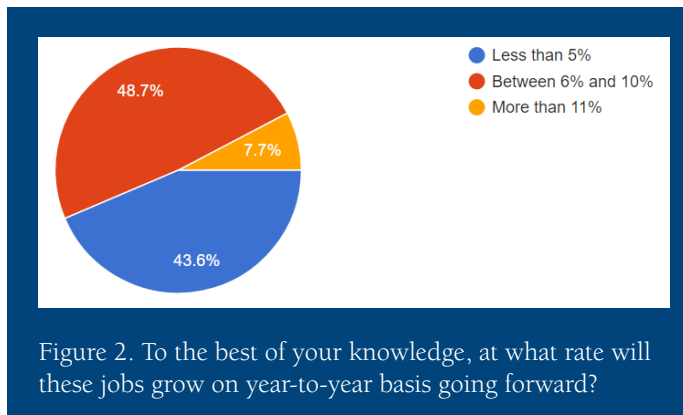
CBECS Categories	Number of Buildings			Square Footage			
Type	Small	Med	Large	Small	Med	Large	Total
Office	97,897	28,904	7,049	411,124,699	608,178,595	918,334,809	1,937,638,103
Non-refrigerated warehouse	78,923	42,502	7,075	419,022,566	910,278,882	792,409,749	2,121,711,197
Education	52,294	14,624	3,121	198,076,655	339,556,984	257,955,200	795,588,839
Service	51,274	5,647	955	244,015,517	88,276,937	99,502,936	431,795,390
Public assembly	30,707	14,458	617	119,150,588	288,161,854	113,419,679	520,732,121
Retail other than mall	33,020	9,125	3,179	137,740,194	223,653,956	407,316,028	768,710,178
Food Service	40,333	3,572	49	146,802,908	60,516,982	3,609,654	64,126,636
Religious worship	27,569	10,975	364	134,107,660	225,856,961	21,482,752	381,447,373
Vacant	20,908	2,896	1,286	88,978,370	71,578,514	134,745,416	295,302,300
Strip shopping mall	8,364	12,349	1,738	54,063,757	328,246,831	271,469,466	653,780,054
Food Sales	13,400	3,847	801	28,180,949	94,286,331	104,482,580	226,949,860
Other	16,496	847	677	92,298,874	34,532,769	54,810,826	181,642,469
Lodging	7,285	7,146	1,942	39,622,968	192,239,112	367,285,179	599,147,259
Outpatient health care	9,031	3,812	420	35,068,186	63,735,461	36,929,882	135,733,529
Public order and safety	6,902	1,765	334	45,137,994	36,020,125	51,059,668	132,217,787
Nursing	662	2,179	508	5,895,818	53,824,331	44,379,650	104,099,799
Laboratory	1,236	346	513	7,907,799	8,136,052	60,284,419	76,328,270
Inpatient health care	-	-	1,062	-	-	236,399,902	236,399,902
Refrigerated warehouse	-	-	279	-	-	73,852,336	73,852,336
Enclosed Mall	-	-	157	-	-	156,753,505	156,753,505

Table 1. Estimates of California building stock.

Building Size	Number of Buildings	% Number of Buildings	Total ft ²	% Total ft ²
Less than 10,001 ft ²	496,301.35	71.6%	2,207,195,502	22.0%
10,001-50,000 ft ²	164,992.38	23.8%	3,627,080,678	36.1%
ESCO targeted buildings	32,125.81	4.6%	4,206,483,636	41.9%
TOTAL	693,419.54		10,040,759,816	

Table 2. California commercial building size breakdown.

In addition, interview subjects cautiously put demand for building auditing at 5% of the market per year within the commercial building stock. Even if expectations are dampened to 3%, that still represents 300,000 square feet that will require auditing or over 20,000 buildings. The researchers' interview results align with those found through the survey (see Figure 2).



■ THE POTENTIAL FOR STRATIFYING THE ROLE OF A BUILDING AUDITOR—THE CURIOUS CASE OF THE "ENERGY CORPS" MODEL

The California Conservation Corps (CCC) provides vital services to the state through the deployment of young adults who serve and work on various projects for a short period of time, similar to the AmeriCorps program or the Civilian Conservation Corps of the depression-era. Through funding provided via Proposition 39 the CCC created the Energy Corps to provide building energy audits to K-14 schools across the state in order for schools to request funding for energy conservation measures.

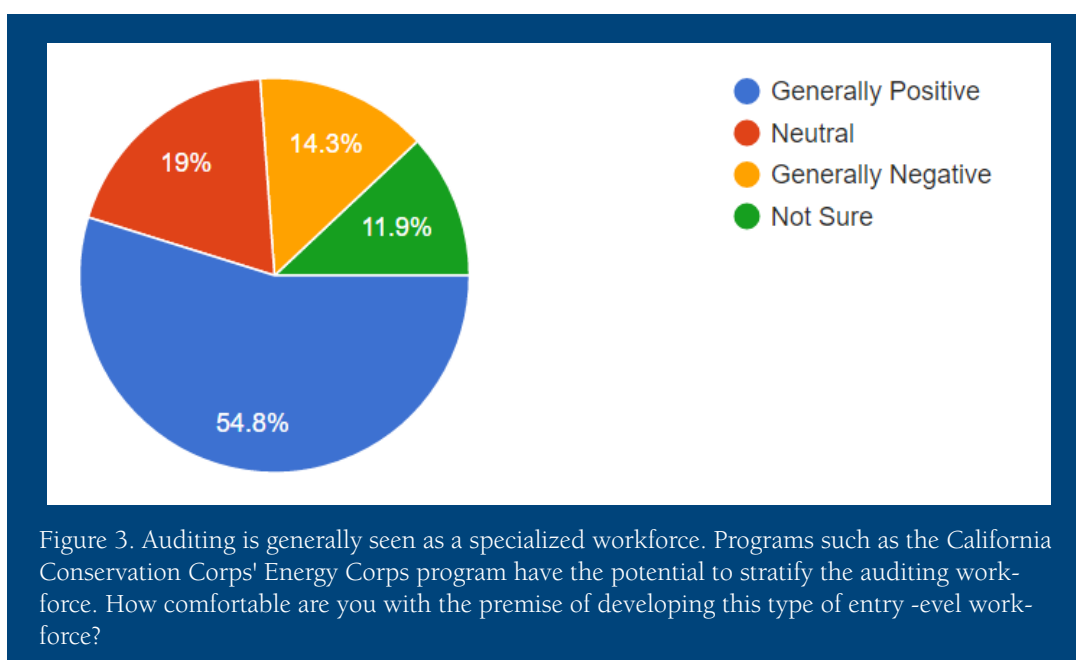
The Energy Corps presents a unique yet informative case of increased stratification within a workforce that is typically limited to highly skilled, highly educated individuals. Corps members are provided a significant amount of hands-on training, and are paired with more senior members to ensure the quality of the data collected. Furthermore, each corps member becomes an expert in one particular area of building energy data collection so that s/he has an extreme depth of knowledge in a narrow field as opposed to having a broad understanding of many different areas of energy. This stratification method has allowed the Energy Corps to provide the equivalent of ASHRAE Level 1+

energy audits to schools across the state that would have otherwise not been able to undertake such an audit.

With regard to mimicking this type of stratification for the proposed community-college trained ELEA workforce, some interviewees were fairly skeptical of its successes. One consultant interviewed feared that reducing the cost of an audit too much would decrease the value the building owner or manager placed on its results and stressed the importance of a commitment to act on the recommendations generated from the audit. Another interviewee stated:

My gut reaction is that this would be hard to do. I think it has to do with the fact that there is more pressure on the implementers to have their contract on pay for performance. Some of the highest cost stuff is getting someone on site. If you are going to send someone on site, the collection of data is path critical. My fear is that you'd have to send the more detailed guy in anyway, that you might as well do it in the first place.

In contrast, survey respondents were much more optimistic about the potential of a stratified auditing workforce – over 50% had a generally positive view of stratifying the auditing workforce in a manner similar to the California Conservation Corps (see Figure 3).



The audits performed on schools by the Energy Corps are similar to those that would be of the greatest use to other small and medium commercial buildings in the state. These buildings are often simpler in nature than their larger counterparts, and would not require the level of detail that corresponds to an ASHRAE Level 2 or Level 3 audit. It is therefore easily conceivable that the training and experience provided for the Corpsmembers would mirror that which would be required for an entry-level auditing workforce specifically targeting additional small and medium buildings in the state.

Perspective of Industry Experts on the Business Case

The following section represents the bulk of the work conducted as part of Phase 3 of this study. The list of interview questions and the survey instrument used can be found in the Appendix. Over the course of this study, researchers administered a survey to 40 participants and conducted a total of 20 interviews with industry experts that represent a wide range of stakeholder groups, including representation from:

- Utilities
- Third Party Programs
- Government
- Training Programs
- Data Analytics Firms/Utility Program Deployment
- Energy Consultants
- Engineering Firms
- ESCOs
- Workforce

The interview questions were broken down into three broad sections, representing the most important factors in determining the feasibility of a community college-trained entry-level auditing workforce.

- Section 1: Researchers first asked interviewees about their perspectives on the current auditing landscape. This section allowed for development of a solid baseline and ensured that there was a common language used to talk about the tasks of an auditor. This section also provided a sense of the current availability of auditing work and major employers in the industry.
- Section 2: Researchers asked a group of questions regarding the market needs for energy auditors and potential areas of growth. They asked interviewees to consider their time in the industry and to think about other times in which there was a significant increase in the need for energy services and under what circumstances those characteristics might be replicated. Researchers also asked interviewees to hypothesize as to the main drivers of increased demand.
- Section 3: Researchers asked interviewees about their views specifically on the idea of an entry-level energy auditor trained by the California Community Colleges. Researchers gained insights into the knowledge, skills, and abilities interviewees felt would be necessary for an auditor to be successful and asked if they agreed with the hypothesis that lowering the cost of building audits through the deployment of entry-level energy auditors would lead to a reduction in the state's energy needs.

Understanding the Current Auditing Landscape	Future Trends in Auditing Needs	Opportunities for Entry-Level Energy Auditors
<ul style="list-style-type: none"> • Half of respondents defined an auditor as one who collected data only. The other half included analysis and report writing in their definition. • No consensus among interviewees as to the current saturation of the auditing market. Some believed there was a great need for additional audits while others saw no evidence of this in their professional experiences. • The word 'auditor' has a negative connotation that can turn off potential customers. The word 'assessor' or 'analyst' was seen as a better fit. 	<ul style="list-style-type: none"> • Almost all interviewees believe that the need for building energy auditors will grow in the next 5-10 years. • There will specifically be a need for auditors in small and medium buildings as ESCOs and other large companies typically do not serve these customers. • Efficiency in older buildings is much less well-understood than efficiency in new construction. Auditors have an important role to play in increasing efficiency in the older building stock. 	<ul style="list-style-type: none"> • In order for entry-level auditors to positively affect efficiency in the state, the workforce needs to be well versed in methods to turn audits into action. Reports need to be straightforward and the benefits to the customer need to be clearly communicated. • In addition to having the requisite technical skills and building knowledge, the entry-level workforce must have excellent soft skills that allow them to provide timely and accurate customer service.

Figure 4. Summary of the key themes that emerged from the interviews.

■ EXPERT PERSPECTIVES ON UNDERSTANDING THE CURRENT AUDITING LANDSCAPE

In order to establish a common language to facilitate the discussion, researchers first asked interviewees for their definition of an auditor. Secondary research, including an analysis of current job postings for audit-related work, indicated a vast spectrum of duties that fall into the category of auditing. It was therefore extremely important to begin the conversation with interviewees by understanding what they meant when they talked about auditors and the roles and responsibilities they believed fell under the job category.

Interestingly, about half of interviewees limited their definition of an auditor to an individual who collects data only, as opposed to the other half who also tasked auditors with the responsibility for analyzing the data they collected and using it to produce actionable reports that could be used by the building owner or manager to make efficiency improvements. Within the survey results, 100% of respondents indicated that data collection was a required activity for an auditor (see Figure 5). In contrast to the interview results, 90% of survey respondents also listed data analysis as a required activity.

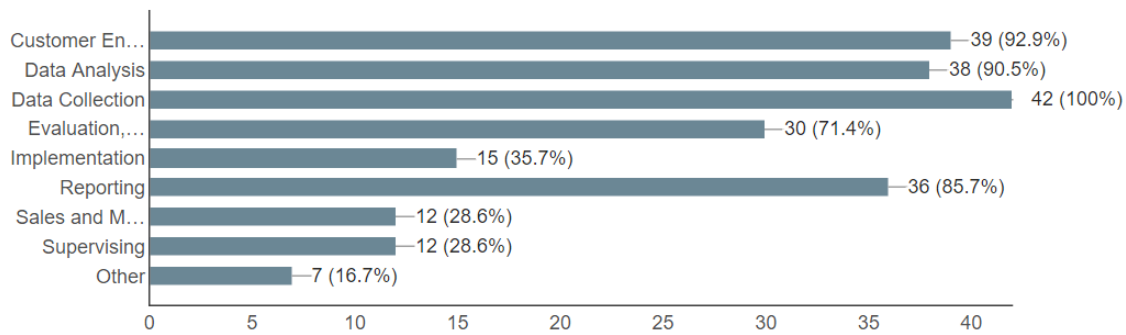


Figure 5. Please check all activities you think are required of an auditor.

Almost all interview respondents mentioned that an auditor, in their mind, is someone that physically goes into a building to assess its energy use - a few indicated that they did not consider an individual who assessed a building remotely or otherwise performed a no-touch audit as a true auditor. As one interviewee stated, an auditor is the “*first eyes on the ground when it comes to understanding opportunities for retrofits or upgrades. There is a lot that can be done without a human in the field - bill analysis, no-touch audits, etc. - but to me an auditor is someone on the site.*” In addition, one respondent from a Third Party Program made clear that he did not like the use of the term ‘auditor.’ He pointed to recent market analysis that customers had a negative association with the word ‘auditor’ and recommended using ‘assessor’ or ‘analyst’ as an alternative.

As for those employing auditors, ESCOs and Third Party Programs were cited in equal measures and by about two-thirds of interviewees. A few respondents mentioned that utilities were not significant employers of auditors, though they do play an important role in driving demand for auditors. Instead, it is the ESCOs and Third Party Programs that are charged with implementing the programs put in place by the utilities. One respondent, who spoke from a utility program deployment perspective, indicated that there is a spectrum for audit employers - ESCOs hire more skilled auditors who are familiar with commercial buildings. In contrast, auditors as energy engineers are hired more by mechanical, electrical, or plumbing consulting firms who act as program implementers working for utilities’ commercial or residential programs. In addition, he mentioned also seeing contractors hire auditors as an adjunct option to their services. 85% of survey respondents worked for, or had previously worked for, a company or organization that employed building energy auditors. Respondents overwhelmingly indicated that the firm where they worked employed fewer than 50 auditors (See Figure 6).

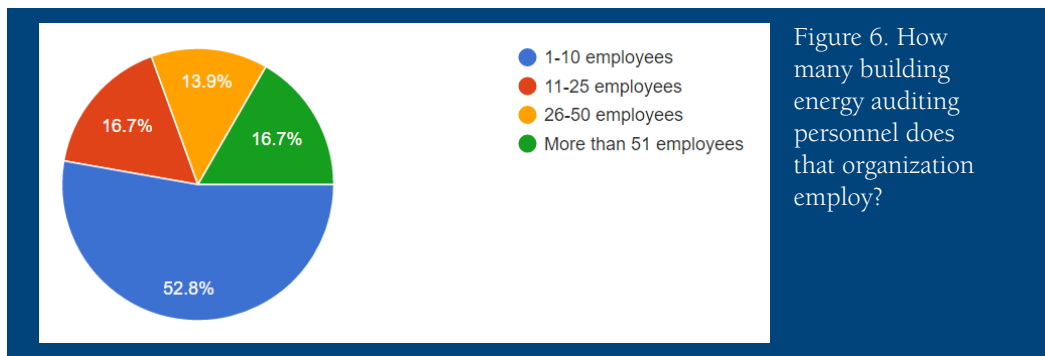
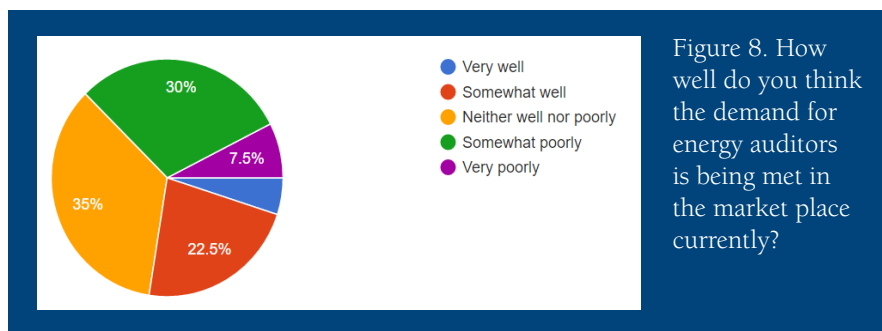
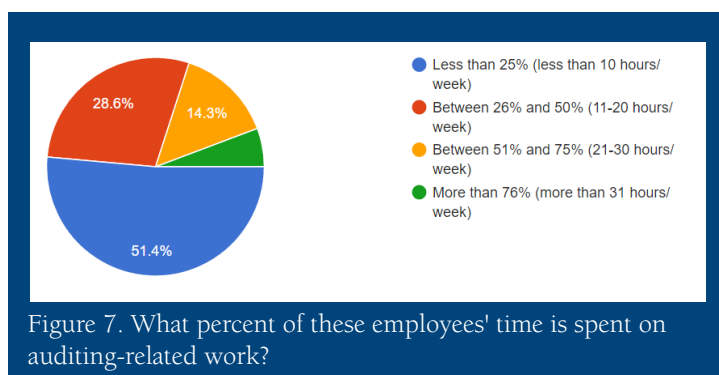


Figure 6. How many building energy auditing personnel does that organization employ?

Furthermore, a majority of survey respondents indicated that less than 25% of employee time at their firm was spent directly conducting building audits (see Figure 7).

When discussing the current market saturation for auditors, there was little consensus on the topic. While some interviewees believed that we are very far from market saturation, others, one consultant in particular, had not heard talk of a distinct need for additional auditors. Researchers believe that some of this ambiguity in responses may stem from the variety of ways interview subjects interpreted the question. Some individuals understood this question to be about the need employers had for auditors based on their own business needs while others interpreted this question more generally and were thinking about number of buildings that should be audited and the number of auditors required to address those buildings. Of survey respondents, only 5.5% felt that the demand for energy auditors is being met “very well” currently. Below is a pie chart showing the range of responses to this question – 30% of the individuals who responded believe that the need is being addressed “somewhat poorly” while 22.5% believe it is “somewhat well” addressed (see Figure 8).



One interview subject indicated that “I don't know if saturated is the right word; but between Title 24, net zero goals, that keeps ratcheting the bar up. But projects are harder to find because low-hanging fruit has been taken care of.” In a seamless

transition to the next section on future trends and auditing needs, another interviewee stated:

“...We’re very very far from market saturation. To a certain extent that is going to depend on overall demand for audits in general. We’re very far, there is a lot of work to be done in terms of addressing building efficiency and upgrades, benchmarking. When we start getting to the scale that we need to be at, then there will be a huge need for auditors. The whole field-side of this equation is definitely lacking right now...”

■ EXPERT PERSPECTIVES ON FUTURE TRENDS IN AUDITING NEEDS

The most important question asked when discussing future trends and auditing needs with interviewees was whether they saw the need for auditors growing, and to what extent over the next five to ten years. This broad question was followed by more specific questions on historic moments when the need for auditing increased significantly, or instances where an increase was expected but did not manifest.

A vast majority of interviewees agreed that there is a growing need for auditors, and this growth would continue for the foreseeable future. Many cited local and statewide regulations as a primary driver of this growth. As one respondent from the training field indicated, *“the goals of various local and statewide regulations are unprecedented and*

therefore, even if it is currently unclear how certain regulations, AB 758 in particular, will be implemented, it is hard to see it not having a tremendous impact on the need for auditors.” Survey respondents corroborated this response – 50% believe there will be an annual growth rate of 6-10% in auditing-related jobs (see Figure 9).

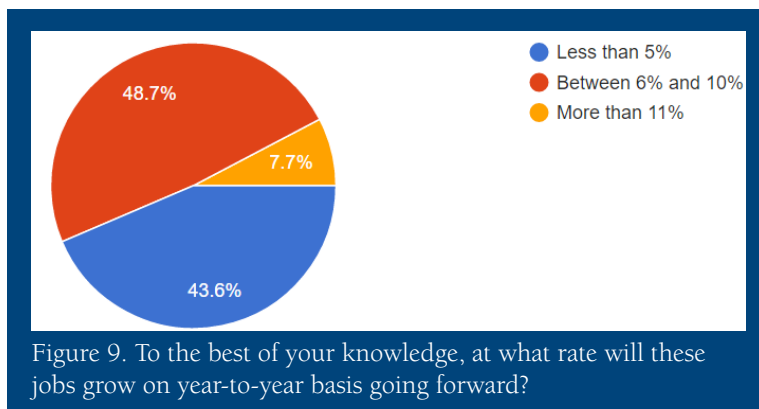


Figure 9. To the best of your knowledge, at what rate will these jobs grow on year-to-year basis going forward?

In contrast, however, a few interviewees pointed to new technologies and the rise of no-touch audits as potentially dampening the rise in demand. *“It is plausible,”* one interviewee said, *“that the opportunities for auditors may be overtaken by a data screening or data analysis role. While remote review would not replace an on-site audit, it may be able to replace the initial site visit and come up with priorities for a more in-depth visit that would possibly shrink the overall need for auditors.”* Another interviewee indicated that if data companies were successful, as they are claiming they will be, in a close understanding of energy based on meter data, there could be less demand for the technical aspects of an auditor job. Yet another interviewee explained these opposing viewpoints this way:

“...As much as there are new technological offerings and services available that are trying to automate this process, and these are useful, I do not think there is a real replacement for a qualified individual showing up to a site and doing an actual audit. They’re almost certainly going to find something detailed that automated solution would not be able to decipher in that way...”

According to one interviewee, working as a consultant, industry has done a good job of understanding how efficiency works in new construction, but it hasn’t worked as hard on existing buildings. It is much easier to do efficiency in new construction; the existing building market is a harder question. If the state is serious about energy reduction, it needs to look at the existing building market. In the next couple of decades the political

environment and repercussions of climate change will force California to look into the existing building market more closely. As that happens, the focus will pivot to older buildings. The role of big data analytics, no-touch audits, building end-use simulations, and audits will all help advance efforts related to existing buildings.

■ EXPERT PERSPECTIVES ON OPPORTUNITIES FOR ENTRY-LEVEL AUDITORS

The final group of questions researchers asked interviewees about was the potential success of an entry-level auditing workforce. Researchers started by explaining the initial hypothesis - that by lowering the cost of building energy audits, specifically in the small and medium commercial market, through the use of a lower cost work force, the state of California would reduce its overall energy usage. They then defined an entry-level energy auditor as an individual with no more than an Associate's degree, no work experience in the energy field, and no more than one year of general work experience. This definition was followed by questions aimed at determining if interview subjects saw, or anticipated, a specific need for individuals with this level of experience in the marketplace, and whether they thought the California Community Colleges would be a successful conduit for preparing a workforce with this type of training and experience.

While a vast majority of interviewees agreed that additional, lower-cost building audits were an important step towards increasing the state's overall energy efficiency, a majority of the respondents cautioned against depending too much on audits themselves leading to reduced energy usage. A phrase that arose multiple times in conversations was the need to figure out more concrete ways to ensure that "audits lead to action." One respondent succinctly stated the views of most of the interviewees in saying that:

"...a lot of building owners or managers do audits because they want to know what the opportunity is and understand what their return on investment is for a retrofit, but they may not like the answer and therefore won't act on it. An audit isn't always going to lead to more action..."

Another respondent added the importance in delivering savings specifically when it comes to Third Party Programs:

"...If we use ratepayer money to fund these things I want/need to see an actual reduction in energy use..."

In addition, a few interviewees spoke of the importance of having building owners and managers place a higher value on the audits themselves, and cautioned against having the cost diminish too much. The customer (building owner or manager) should feel as though s/he has some 'skin in the game.' If the cost of audits becomes too low, you may waste valuable resources doing an audit that the customer has no intention of ever doing anything about. It is important to see initial commitment from the building owner or manager to act on the recommendations that come out of the audit.

With regard to the specific knowledge, skills, and abilities of a successful entry-level energy auditor, in the context of the training that the community colleges could

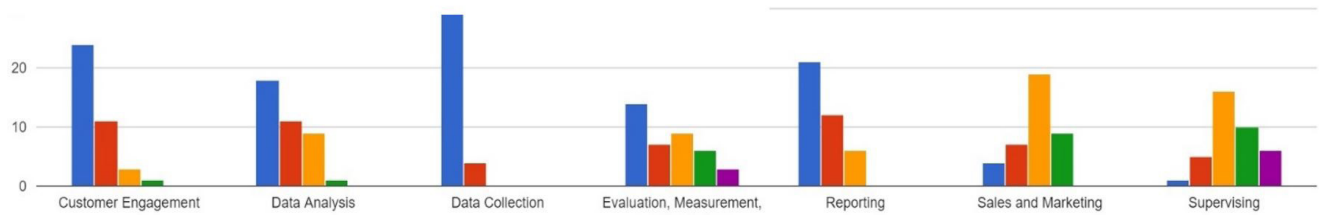


Figure 10. Please indicate how important you think each of these attributes is specifically for an entry-level auditor.?

provide, a few themes emerged. First, and most frequent, was the need for soft-skills within this workforce (see Figure 10). It was generally agreed that entry-level auditors would be required to interact with their customers fairly regularly and it was therefore important that they possess adequate interpersonal skills that would allow the individual to communicate effectively with their customer and explain, beyond the technical specifications, the benefits of performing the recommended energy upgrades. With regard to the current auditing workforce, one utility interviewee indicated that the lowest level auditor they currently employ is an account representative, and stressed the need for these individuals to have strong interpersonal skills that allow them to communicate effectively with their clients.

At the same time, a majority of interview subjects felt that it would be overly ambitious to expect an entry-level individual to have an in-depth understanding of all the various systems found in the modern building. Instead, interviewees recommended training individuals in specific areas affecting a building energy management, such as lighting or heating and cooling. One interviewee indicated that:

“...entry-level is someone I would trust to know depth within a small technical area. I don’t think it is possible to have an entry-level individual who knows something about everything having to do with a building...”

Also of note, a few interview subjects encouraged the research team to consider the potential for incumbent workers to join this entry-level auditing workforce, which would obviously fall outside of the initial definition. One of these individuals provided energy training, while another took a class in the energy field at his local community college. In both instances, the interviewees pointed out that careers in energy seem to be appealing to individuals looking to change paths, and that perhaps there is room in this space for individuals with a greater level of general work experience than we allowed for in our original definition.

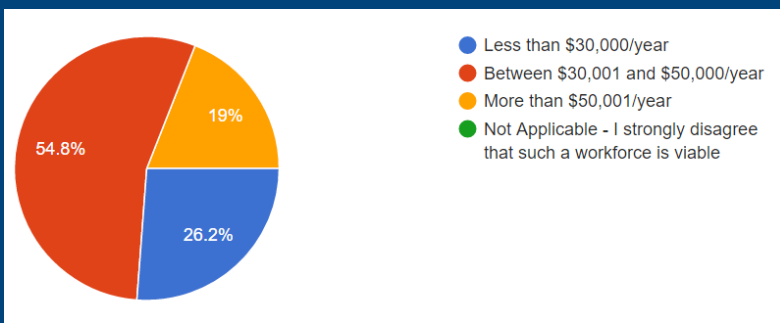


Figure 11. What do you think the lowest salary range for entry-level energy auditors might be?

Interview subjects and survey respondents agreed that a career in building energy auditing could be a steady and well-paying profession for community college students (see Figure 11). Interviewees and survey respondents estimated the starting salary for well-trained audit professionals was between \$30,000 and \$50,000.

Recommendations for Community Colleges

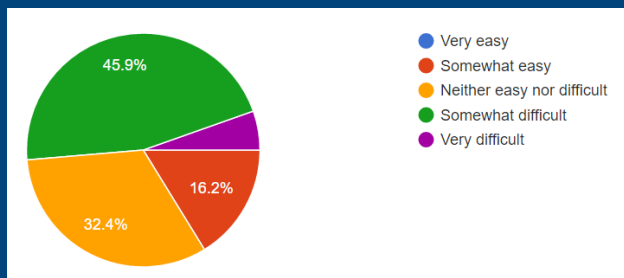


Figure 12. How difficult is it for your team/organization to find qualified energy auditors?

Industry experts unanimously agreed that finding capable energy auditors is challenging and there is a dearth of skilled auditing professionals in the marketplace. 50% of survey respondents stated that it was “somewhat difficult” or “very difficult” to find qualified energy auditors (see Figure 12). The interviewees were also unanimous in the perspective that California Community Colleges are primed and probably best positioned to address this need in the marketplace.

■ POTENTIAL OPPORTUNITIES FOR COMMUNITY COLLEGE ENGAGEMENT

Apart from the expert perspectives, this research pointed to some key gaps in developing an entry-level workforce in the building assessment space. Some of the key limitations of existing programs in terms of catering to an entry-level audience, while meeting the preferred expectations of the experts stated earlier are:

- The majority of existing training programs that carry credibility in the market are geared toward incumbent professionals, often with advanced degrees. Due to this fact, many of these well-regarded programs are not appropriate for community college students.
- Of the training programs that are accessible to entry-level professions, almost none incorporate soft-skills training. Experts emphasized “soft-skills” as a high priority. As one expert put it, *“a lot of the hiring supervisors have two requirements: do you have a driver's license? Do you have soft skills? A lot are saying, if they have those 2 they are trainable and we will invest in them.”*
- Almost none of the programs incorporate field audit experience, expect for other workforce training programs such as the “Energy Corps.”
- Most programs are light on training time and do not meet a critical student engagement period required to internalize core concepts.
- Since many of the existing programs are on-line based and/or have short engagement periods, entry-level professionals do not gain the necessary network and the needed support to pursue job opportunities.

Based on the abovementioned key takeaways from the interviews, surveys, and secondary research, the team concludes that there is a critical role for community colleges to play in workforce development geared toward building assessments. While there is obvious need, no data is available on the specific number of auditing jobs. In the absence of this data, the team recommends two actionable pathways for developing pilot training programs. These two recommendations stem primarily from interview conversations; the researchers believe that these recommendations are tangible ways for the community colleges to address the above gaps. Furthermore, a vast majority of interview subjects indicated that they believed the California Community Colleges were uniquely suited to help solve the state's workforce needs with regard to meeting its energy efficiency goals.

Recommendation 1: Infuse auditing curriculum into existing trade programs. Building in-depth and hands-on curriculum on specific areas of building systems into existing programs will prepare students to become specialists in lighting, HVAC, etc. so they are well prepared to join either existing auditing teams or use their knowledge and training as a general technician, installer, or building operator.

Recommendation 2: Create a new, market-aligned Commercial buildings assessor program. In lieu of the depth of knowledge the trade-specific students above would receive, students enrolled in this program will have a greater focus on soft skills and customer engagement. This will allow them to serve as the customer-facing employee on an audit team, act as an account representative, or produce effective audit reports.

Table 3 provides a summary of the key elements of the recommended pilot programs for the community colleges.

Program Type		Develop a new training program	Infusion into existing trade specific programs
Goal(s)	Programmatic Opportunity	Train a workforce that represents "skilled generalist" aimed at serving small and medium commercial market segment	Develop "specialists" through a well-rounded trade specific workforce programs (HVAC, Lighting etc.) with basic knowledge in building science and trade specific energy opportunity assessment skills.
	Branding opportunity	<p>Aspire to develop a synonymous brand with the DOE's Industrial Assessment Centers (IACs) administered by universities across the country with a focus on commercial buildings where graduates of the program carry the legitimacy of quality. In the words of an expert;</p> <p><i>"...started to recruit from IACs. Hired interns out of IACs and always had 1 or 2 new grads. IACs were good places to recruit because you knew they were familiar with audits..."</i></p>	
Minimum Preferred KSAs	Knowledge in Sales & customer service	Medium to High Proficiency	Basic to Medium Proficiency
	Knowledge in Energy efficiency & Building science	Medium to High Proficiency	Basic to Medium Proficiency
	Knowledge in critical building systems & management systems & ECM	Medium to High Proficiency	Medium to High Proficiency
	Knowledge in trade specific systems	Low to Medium Proficiency	High Proficiency
	Skilled in Professionalism	High Proficiency	High Proficiency
	Critical thinking and analytical skills	Medium to High	Medium to High Proficiency
	Data analysis and reporting skills	Mid-Level Proficiency	Basic Proficiency
In-Field auditing experience	Site audits conducted during the program	Be involved in all aspects, customer acquisition, auditing and communication of value proposition on a minimum of 5 small and medium commercial buildings under the supervision of an expert	Minimum of 5 large commercial building site with complex systems and controls under the supervision of a field expert
	Internship partnerships	Develop partnerships with specific local, utility and state programs. Third Party Program implementers represent potential for successful partnerships. Work with Utilities to potentially become a preferred vendor for auditing work in partnership with 3Ps.	Develop trade specific partnerships with the likes of Sheet Metal Workers Union, IBEW, etc. to offer trade specific audit programs for engineering firms, consultants and ESCOs.

Table 3. Summary of the key elements of the recommended pilot program for the community colleges.

Appendix

■ City Ordinances

City of San Francisco

San Francisco's Existing Commercial Buildings Energy Performance Ordinance (2011) requires annual benchmarking, periodic energy audits, and transparency of benchmarking information for existing non-residential buildings 10,000 square feet and larger.¹ Comprehensive energy efficiency audits from a qualified energy auditor are required at least once every five years for non-residential buildings over 10,000 square feet.² Audits must meet or exceed ASHRAE procedures for commercial buildings, and larger facilities are required to receive a more rigorous evaluation than smaller facilities. Additionally, larger buildings are encouraged to consider retro-commissioning as an alternative way to meet the audit requirements. The city of San Francisco illustrates the successful implementation of city ordinances mandating periodic energy auditing for non-residential buildings.

Individuals with specific, approved qualifications must perform the audits conducted to adhere to San Francisco's energy ordinance. Table 2 illustrates the profiles of four approved sets of qualifications.³

The level of detail required for building audits depends on the size of the building. Buildings that are 10,000 to 49,999 square feet must undergo a basic energy analysis consistent with an ASHRAE Level 1 audit. Buildings that are 50,000 square feet or above must undergo an "intermediate" survey and energy analysis consistent with an ASHRAE Level 2 audit.

City of Berkeley

The Berkeley Energy Savings Ordinance (BESO) was adopted into law in 2015 and requires building owners to complete energy efficiency assessments and publicly report the information with the goal of saving energy through whole-building efficiency programs. Energy efficiency assessments are required at the time of sale and will be phased-in for all buildings, with the exception of single-family homes, by size and year (see Table 5). The timing, frequency, and specific type of energy assessment required depends on the type and size of the building. Building assessments will result in a report detailing customized energy efficiency recommendations.

To conduct BESO audits, an individual must meet certain qualifications, which vary by building type. For commercial (including mixed use) buildings, assessors must have one of the following:

¹See https://leginfo.legislature.ca.gov/faces/billNavClient.xhtml?bill_id=201520160AB802 for more information.

²See <http://sfenvironment.org/article/energy-efficiency-audits/overview> for more information.

³Table found at <http://sfenvironment.org/article/energy-efficiency-audits/minimum-qualifications-for-energy-auditors>

- ASHRAE Building Energy Assessment Professional Certification;
- Association of Energy Engineers' Certified Energy Manager or Certified Energy Auditor; or
- California Professional Engineer licensed through the National Society of Professional Engineers.

In addition, energy service providers must be registered with the city as a BESO Energy Assessor to perform audits for a specific building type.

Table 5 illustrates how audit requirements will be phased in over time. It varies in

	Certification or License	AND	Minimum Experience
(1)	Licensed Engineer (PE) OR PhD in Mechanical Engineering*	AND	At least 2 years of experience performing energy efficiency audits or commissioning of existing buildings; OR Any certification listed in #2 below.
(2)	<ul style="list-style-type: none"> • ASHRAE Building Energy Assessment Professional (BEAP); • ASHRAE Commissioning Process Management Professional (CPMP); • Association of Energy Engineers Certified Energy Manager (CEM); • Association of Energy Engineers Existing Building Commissioning Professional (EBCP); • Association of Energy Engineers Certified Building Commissioning Professional (CBCP)* OR • Northwest Energy Education Institute Energy Management Certification (EMC) 	AND	At least 2 years of experience performing energy efficiency audits or commissioning of existing buildings
(3)	<ul style="list-style-type: none"> • BOC International Building Operator Certification Level II; OR • (B) International Union of Operating Engineers Certified Energy Specialist 	AND	At least 10 years of experience as a building operating engineer; OR At least 5 years of experience as a chief operating engineer
(4)	Equivalent professional qualifications to manage, maintain, or evaluate building systems, as well as specialized training in energy efficiency audits and maintenance of building systems, as determined by the Director of the Department of Environment		
	*Qualifications approved by Department of Environment as equivalent		

Table 4. Approved set of auditor qualifications for SF city ordinance.

frequency by building size, with larger buildings requiring more frequent audits.⁴

Building Size (sq ft)	Due Date	Reporting Cycle
Large buildings: 50,000 or more	7/1/2018	Energy Assessment every 5 years AND ENERGY STAR Performance Report annually
Large buildings: 25,000- 49,999	7/1/2019	
Medium/Small buildings: 15,000-24,999	7/1/2020	Energy Assessment every 10 years
Medium/Small buildings: 5,000-14,999	7/1/2021	
Small buildings: Less than 5,000 (excluding 1-4 unit homes)	7/1/2022	

Table 5. Audit requirement according to size.

City of Los Angeles

Los Angeles' Green Building ordinance ("Green LA") requires energy efficiency retrofits of public buildings to achieve LEED silver status. The ordinance applies to buildings that are greater than 7,500 square feet or were built prior to 1978. In addition to these mandatory measures for city-owned buildings, there are voluntary initiatives including the Better Buildings challenge and the Sustainable City plan which outline goals for future policy development, including mandatory audits and retro-commissioning to improve energy efficiency in public and private buildings. The market for energy efficiency audits is expected to grow as the statewide policies begin to be implemented and as the city implements its Sustainable City plan.⁵

City of San Diego

Currently, privately funded commercial and residential buildings are not subject to any audit requirements. However, the auditing market is expected to expand in the next few years as the mandatory energy efficiency targets for utilities from statewide policies start to be implemented and enforced.

■ Interview Questions

Landscape

What is an auditor?

What are they called in the marketplace?

Who currently employs energy auditors?

Can you characterize these auditors into a handful of key categories?

Does your firm (or one you work with) currently employ energy auditors for commercial buildings?

If so, what is the lowest-level position you employ?

What sort of skills, trainings, and experience do they have?

How easy or difficult is it to find employees with the requisite background and skillset required?

How saturated is the auditing market today?

How many people do you think are currently employed as energy auditors?

⁴Table sourced from <http://www.cityofberkeley.info/BESOSchedule/>

⁵See <http://www.lamayor.org/about-plan> for more information.

Market Needs/Growth

Do you think, moving forward, there is a growing need for energy auditors?

If yes, what do you think the main drivers of increasing market saturation will be going forward?

By how much (percent)?

Have there been other instances in which specific drivers (such as regulation or technology improvements) increased this demand?

Or, have there been instances where you anticipated a growth and it did not happen?

Entry-Level Auditor Opportunities

Do you agree with above hypothesis that lowering the cost of energy audits through the deployment of entry-level energy auditors will help the state to reach its energy efficiency and energy reduction goals?

Have you heard of the CCC Energy Corps?

If yes, what are your perceptions of the program?

Based on the two points above, our definition of an ELEA is an individual with no

Have you heard of the CCC Energy Corps?

If yes, what are your perceptions of the program?

Based on the two points above, our definition of an ELEA is an individual with no more than an Associate's Degree, no experience in the energy sector, and no more than one year of general work experience. Do you see a need for such an auditor in the marketplace?

What do you think the minimum skillset/training/background these ELEAs should have is?

Are you familiar with any training programs that are already serving this sort of need?

Do you see a role for the community colleges to develop this workforce?

■ Survey Questions

About You

1. Please check the option that best represents the sector of the energy industry in which you currently work. [Advocacy; Consulting Firm; Data Analytics Firm; Energy Services Company (ESCO); Engineering Firm, Local, State, or Federal Government; Third-Party Programs; Training Programs for Building Assessments; Utility Company; Workforce Development/Trade Programs; Other]
-Please check the box(es) that best represent other energy industries in which you've been employed - check all that apply. [Advocacy; Consulting Firm; Data Analytics Firm; Energy Services Company (ESCO); Engineering Firm, Local, State, or Federal Government; Third-Party Programs; Training Programs for Building Assessments; Utility Company; Workforce Development/Trade Programs; Other]
2. How many years of energy-related work experience do you have? [0-5 years; 6-10 years; 11-15 years; 16-20 years; more than 21 years]
3. Which building sector(s) do you have experience working with? Check all that apply. [Agricultural; Commercial; Industrial; Residential; Other]
4. Do you have experience conducting building audits (directly or in a management role)? [Yes; No]

Current Auditing Market

5. Does your firm/organization (or a previous organization you worked with) employ personnel in roles that require them to perform building energy audits? [Yes; No]
-How many building energy auditing personnel does that organization employ? [1-10 employees; 11-25 employees; 26-50 employees; More than 51 employees]
-What percent of these employees' time is spent on auditing-related work? [Less than 25% (less than 10 hours/week); Between 26% and 50% (11-20 hours/week); Between 51% and 75% (21-30 hours/week); More than 76% (more than 31 hours/week)]
6. Please check all activities you think are required of an auditor. [Customer Engagement; Data Analysis; Data Collection; Evaluation, Measurement and Verification; Implementation; Reporting; Sales and Marketing; Supervising; Other]

Market Needs and Growth

7. How well do you think the demand for energy auditors is being met in the market place currently? [Very well; Somewhat well; Neither well nor poorly; Somewhat poorly; Very poorly]
8. How difficult is it for your team/organization to find qualified energy auditors? [Very easy; Somewhat easy; Neither easy nor difficult; Somewhat difficult; Very difficult]
9. To the best of your knowledge, how many auditing related jobs currently exist in California? Guesses are acceptable. [Less than 1,000; Between 1,001 and 2,000; Between 2,001 and 5,000; More than 5,000]
-How comfortable are you with your above answer? [Factual; Believe it is a good estimate; Educated guess; Wild guess]
10. To the best of your knowledge, at what rate will these jobs grow on year-to-year basis going forward? Guesses are acceptable. [Less than 5%; Between 6% and 10%; More than 11%]
-How comfortable are you with your above answer? [Factual; Believe it is a good estimate; Educated guess; Wild guess]

Entry-Level Auditor Opportunity

11. Auditing is generally seen as a specialized workforce. Programs such as the California Conservation Corps' Energy Corps program have the potential to stratify the auditing workforce. How comfortable are you with the premise of developing this type of entry level workforce? [Generally positive; Neutral, Generally negative; Not sure]
12. What do you think the lowest salary range for entry-level energy auditors might be? [Less than \$30,000/year; Between \$30,001 and \$50,000/year; More than \$50,001/year; Not Applicable – I strongly disagree that such a workforce is viable]
13. Please indicate how important [Very important; Somewhat important; Neutral; Not important; Not at all important] you think each of these attributes is specifically for an entry-level auditor. [Customer Engagement; Data Analysis; Data Collection; Evaluation, Measurement and Verification; Implementation; Reporting; Sales and Marketing; Supervising; Other]

