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Construction Contracting in the Zero Emission Transportation Sector: Evidence from Underrepresented Businesses

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Report 24-29

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16. Abstract

This study investigates the degree to which underrepresented construction contractors face challenges in California's zero-emission transportation sector to devise a simpler and more efficient bonding structure. Using a survey dispersed over underrepresented businesses across the state, the study provides several suggestions for a statewide bonding program that caters to the needs of contractors. Both qualitative and quantitative methods are used in the study. The survey data are evaluated using econometric tools to analyze whether there are any statistically significant associations between contractors' characteristics and their industry experiences. Focus groups and focused interviews are conducted to identify those perspectives the survey does not capture, enhancing the quantitative results with firsthand accounts from contractors. This research reveals that many barriers prevent underrepresented businesses from competing effectively and having a more efficient bonding structure. The main obstacles include lack of funds, redundancies in the system such as the retention requirement, insufficient availability of necessary resources, the presence of unconscious bias, problems encountered in guaranteeing faster payments by having a payment clause that works very similarly to the federal system, and relatively high percentages required for bonding and lack of statewide consistency of funding assistance in the bonding process. These businesses exhibit a lack of information and trust regarding the efficacy and accessibility of these programs. The findings indicate the need for legislative changes that prioritize increasing these contractors' access to resources, transparency, prompt automatic payment, and mentee-mentor support. The study also recommends reorganizing the current support systems, such as by implementing an online forum to assist underrepresented contractors, enabling them to compete and cooperate more effectively and contribute to a more equitable and sustainable zero-emission transportation sector in California.

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Executive Summary

The purpose of this study is to share the results of a survey of underrepresented construction contractors in the rapidly expanding zero-emission transportation sector, to understand the challenges they face in bonding (purchasing a surety bond to insure clients from the contractor's failure to perform) and contracting, and to propose a bonding structure that works for all racial, ethnic, and cultural groups in California. The study targeted Islanders, Native Americans, Asian Americans, Caucasians, and African Americans, among other major groups. It provides an assessment to improve the equity and efficiency of their bonding experience. The survey aims to increase knowledge about the extent and nature of any disparities that might exist in our state, find out if there are any overlooked issues, and provide an assessment of the efficacy and efficiency of the process in place. A longitudinal study is conducted by surveying all contractors to determine how they might more successfully compete in the zero-emission transportation sector. Insights are gathered from minority-owned and independently-owned construction contractors on how to operate in the sector. Survey questions focus on the obstacles that these businesses must overcome and strategies for doing so. In addition, survey questions evaluate the contractors' level of awareness and readiness for the zero-emission requirements, as well as the barriers they must overcome. The study ultimately investigates elements of a statewide program that caters to the specific needs of independent construction contractors. More specifically, it evaluates rebates and tax incentives that could encourage underrepresented construction contractors to compete more effectively and explores appropriate payback structures. The research determines the range of funding needed, based on survey insights, and investigates non-monetary incentives that might help reduce operational costs for these businesses compared to larger firms. It assesses actions taken by contractors to enhance their competitiveness in the zero-emission sector, the challenges they face as minority-owned entities, and any unexpected outcomes in the bonding process. The study also examines attitudes towards the zero-emission sector amid competition from larger companies, the level of training and technical assistance required, and contractors' views on the quality of such support. Furthermore, the study identifies the perceived benefits and costs of the program and recommends a robust verification process for applicants.

1. Introduction

California has a diverse population comprised of veterans, immigrant and refugee communities, LGBT communities, women-owned businesses, and other underrepresented groups. Relative to other regions of California, some areas such as the Central Valley have significant disparities in economic development, educational attainment levels, workforce skills, health, socioeconomic status, and environmental challenges (i.e., air pollution). The Central Valley ranks among the lowest areas in terms of human capital and per capita income in the U.S. It has among the highest unemployment rates with a high ratio of unskilled to skilled labor. The distinct nature of these regions has only recently been fully recognized within state policy structures. There is a real need to attain data and knowledge about the extent of equity and inclusion of all racial and ethnic groups in our state. From this standpoint, conducting this survey helps make important contributions to the closing of existing gap in the knowledge base. It is important to investigate the degree of disparities across different cultural, ethnic, and racial groups to find out the degree of equitable outcomes when it comes to construction contracting in the zero-emission transportation sector.

The study aims to identify what measures would help in closing inequities among underrepresented groups and the degree to which bonding, experience, and competition among similar-sized contractors increases the efficiency and speed of the current structure. It also aims to assess how the association between training, collaboration among small contractors, networking, and mentoring influences the challenges and successes of underrepresented contractors in the zero-emission transportation sector.

The results of this study have implications for policymakers and stakeholders in determining the role the county and state governments can play in lowering disparities in construction contracting, and how such disparities affect different racial and ethnic groups.

2. Data and Methodology

The study focuses on the entire state of California to get a good response rate and reliable results. After sending about five hundred surveys to construction contractors in the zero-emission transportation sector, fifty-one responses were received, yielding a response rate of about ten percent, which although low, is sufficient to conduct our analysis. As indicated from these respondents, the shortest duration reported in business was one year, while the longest was 50 years, yielding an average of 15.3 years. The study survey was sent to and covered cohorts across the primary cultural, ethnic, and racial groups residing in California. Efforts were made to minimize self-selection bias which would result from collecting data from just one source. In particular, the study reached out to African Americans, Caucasians, Asian Americans, Islanders, Native Americans, and Hispanics. A raffle with prizes was conducted as a participation incentive. To further mitigate the issues arising from the low response rate, targeted interviews were held and meetings with focus groups were conducted which significantly helped clarify several gray points encountered from the survey results. The software used for the distribution of the surveys is Qualtrics (Snow & Marcilyn, 2013).

Econometric estimations are done using version 12 of the E-Views econometric software package (McCullough, 1999). Logit, probit, and least squares estimation methods were used to analyze whether there were any associations among measurable questions in the survey (Hoetker, 2007). These questions mainly asked respondents how satisfied they were with the system and whether they trusted the operation of the system in the bonding structure. Additionally, estimations were done to test for self-selection bias and other causes that may have played a role in survey findings. There were also several open-ended questions, allowing survey participants to clarify and expand on their responses to the close-ended questions.

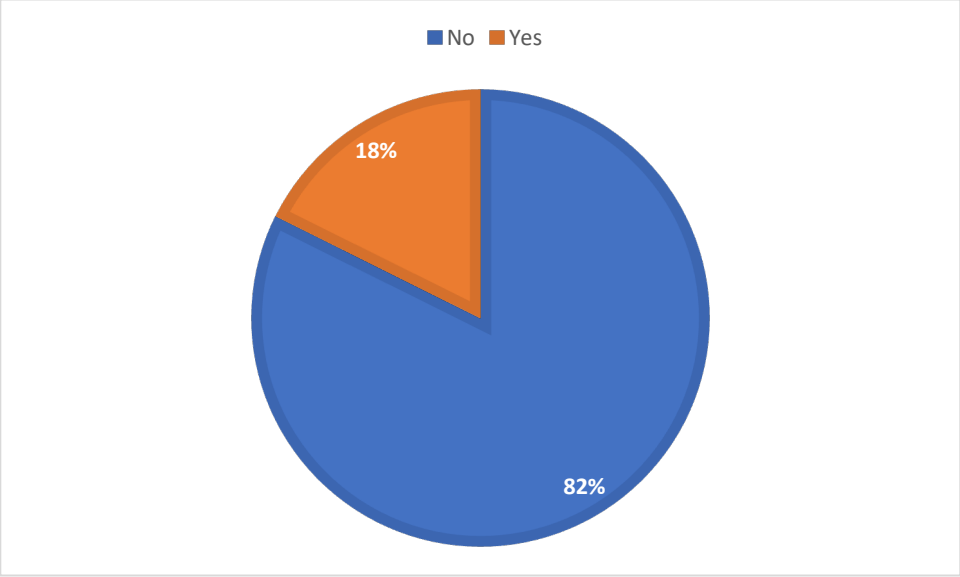
3. Survey Findings

The survey highlights that the diverse group of businesses that comprise the zero-emission transportation sector face challenges such as financial limitations, inadequate charging stations, and high costs and availability of zero-emission vehicles. These businesses experience varied levels of competition with larger firms and require more robust government support. There is a clear demand for extensive training and mentorship programs. While the financial incentives and community development benefits of state programs are acknowledged, the costs associated with compliance and equipment investment raise concerns. Additionally, there is a noticeable lack of trust in the system, with respondents highlighting ineffective government interventions and expressing biases towards larger companies. The collective responses indicate a need for policy reforms to bolster smaller and underrepresented businesses within a competitive zero-emission transportation sector.

Businesses' duration of operation varied greatly; some were quite new, while others had been active for as long as fifty years.

Of those companies that responded, 138 employees were the maximum number hired by one contractor while zero employees were the minimum, with an average employee per company of 16 employees. About 82 percent reported that they were not a prime contractor, while the remaining 18 percent reported that they were, as shown in Figure 1.

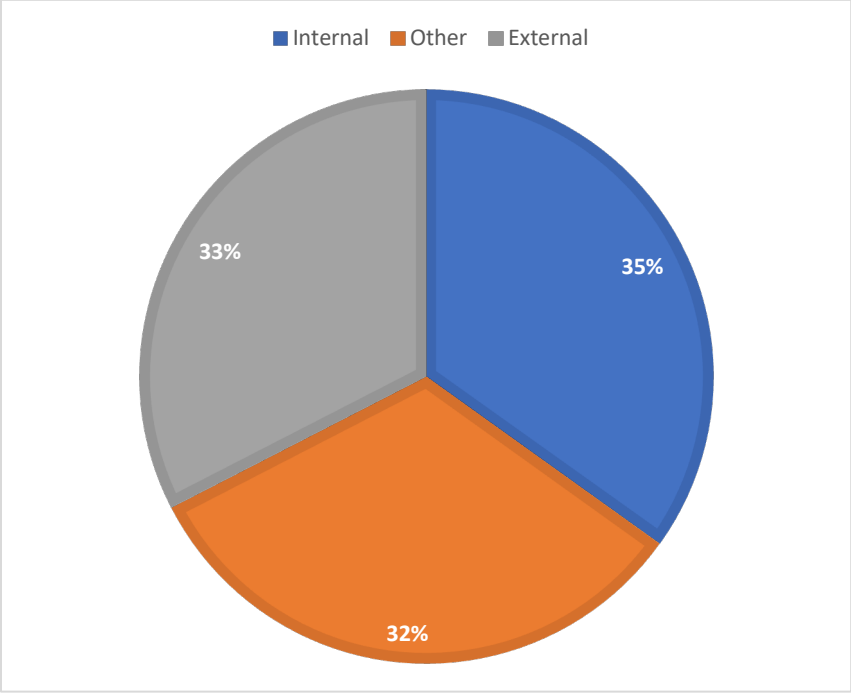
Figure 1. Are You a Prime Contractor in the Zero-Emission Transportation Sector?



In the zero-emission transportation sector, only a small percentage of businesses are prime contractors; this is due to a variety of internal and external factors. The majority work as subcontractors.

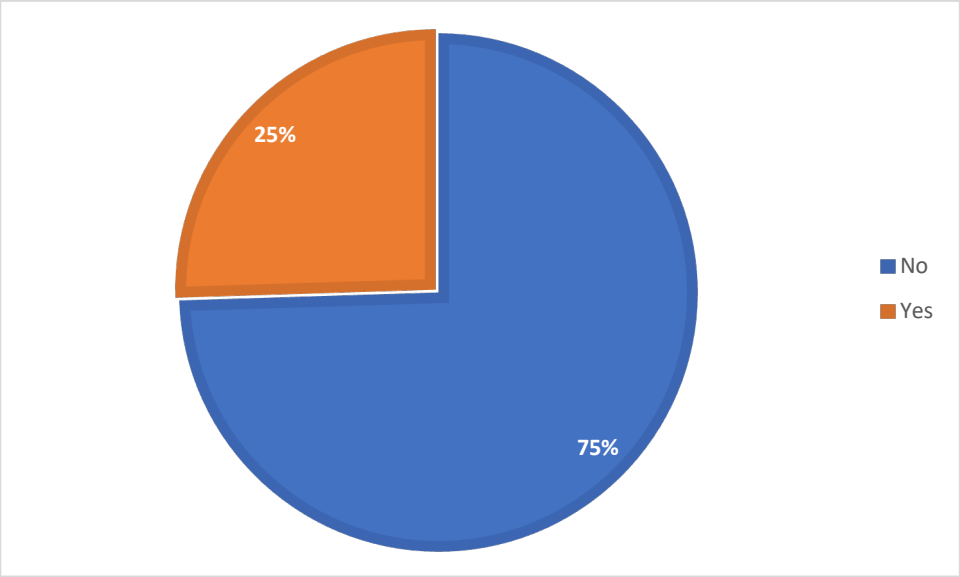
On the question "if you are not a prime contractor and wish to become one, is the reason due to internal factors (related to your company) and external factors (government related)?" 35 percent of the respondents chose internal, 33 percent chose external factors, and 32 percent chose "other" as an option, as shown in Figure 2. Those that chose "other" as an option mainly stated answers such as the new company being inexperienced, lack of bonding capacity, lack of support, resources, and capital, not having had the opportunity to bid on these types of projects, and the license type as the reasons.

Figure 2. If You Are Not a Prime Contractor and Wish to Become One, is the Reason Due to Internal Factors (Related to Your Company) or External Factors (Government Related)?



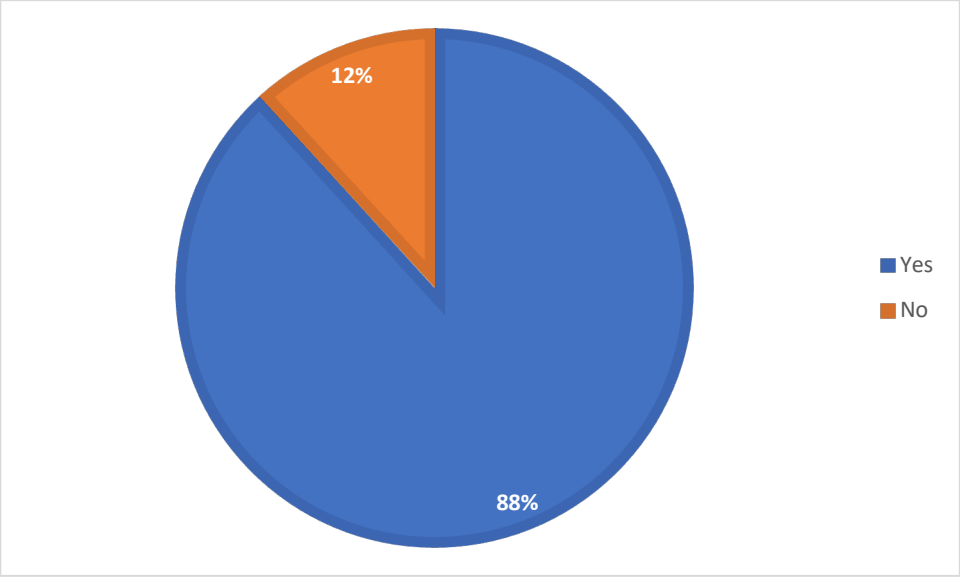
On the question "are you involved as a subcontractor in the zero-emission transportation sector?" 25 percent answered "yes," and the remaining 75 percent answered "no," as shown in Figure 3.

Figure 3. Are You Involved as a Subcontractor in the Zero-Emission Transportation Sector?



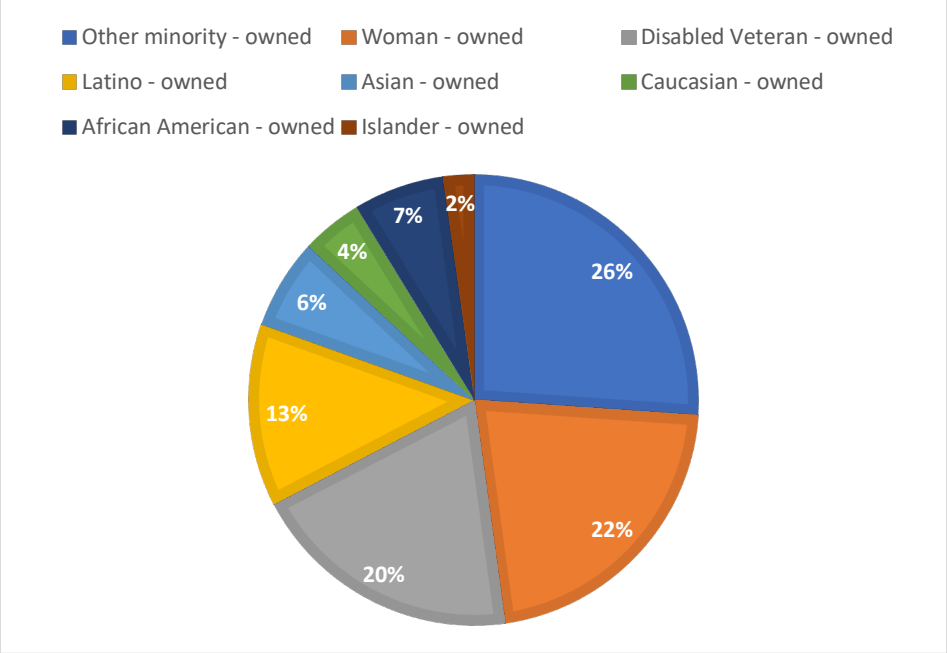
The majority of respondents identify as underrepresented businesses. Specifically, about 88 percent of them (45 out of 51 respondents) considered themselves an underrepresented business (such as women-owned, minority-owned, veteran-owned, business located in low-income areas, etc.), while the remaining 12 percent answered that they did not, as shown in Figure 4.

Figure 4. Are You Considered an Underrepresented Business (Such as Women-Owned, Minority-Owned, Veteran-Owned, Business Located in Low-Income Areas, Etc.)?



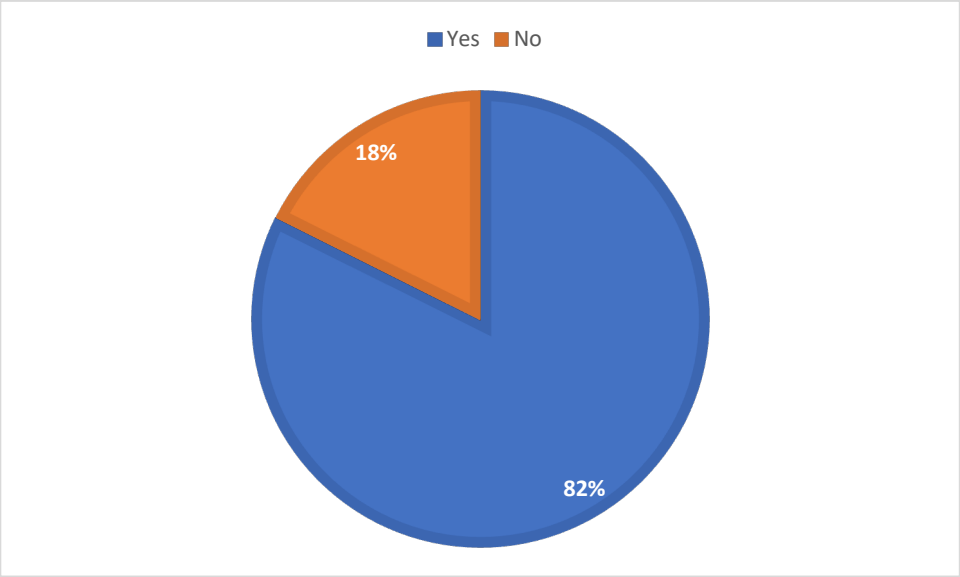
As shown in Figure 5, of these respondents, about 20 percent reported they were disabled veteran-owned; 22 percent reported being women-owned; 13 percent, Latino-owned; 6 percent, Asian owned; 2 percent, Islander owned; 4 percent, Caucasian owned; 7 percent, African American owned; and 26 percent, as "other-" owned. There were no respondents in the survey sample who were Native American-owned. The remaining 26 percent interpreted the question as Bayesian and reported being both woman and Latino-owned, woman- and Asian-owned, and small business-owned.

Figure 5. If You Answered "Yes" to the Previous Question, Please Indicate Why You Are Considered an Underrepresented Business



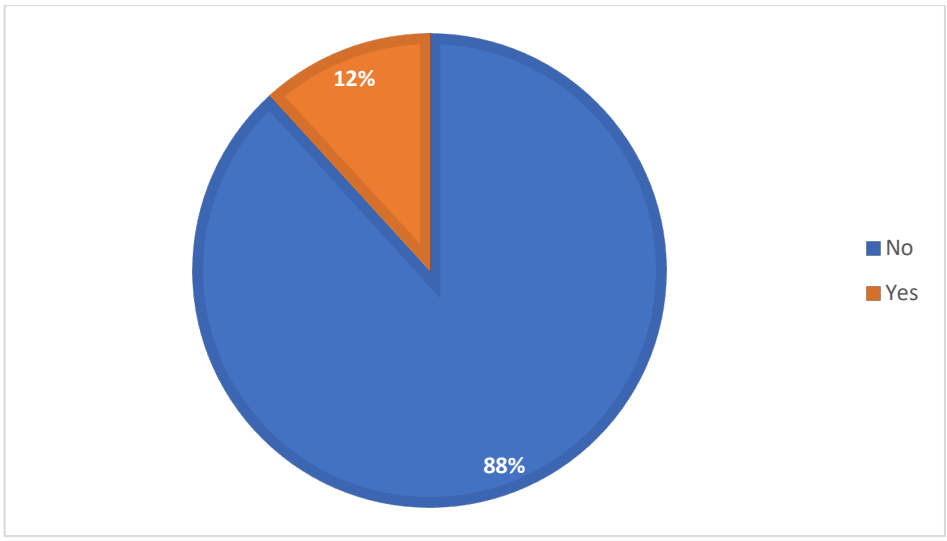
Support for state initiatives that target underrepresented businesses in the zero-emission transportation sector is strong, as shown in Figure 6, while knowledge of the state's particular incentives is lower, as shown in Figure 7. An overwhelming majority, about 82 percent, supported the implementation of a state program for underrepresented businesses in the zero-emission transportation sector, while the remaining 18 percent stated they were not supportive of such a program. Tax incentives and rebates are viewed as powerful instruments for fostering competition.

Figure 6. Do You Support the Implementation of a State Program for Underrepresented Businesses in the Zero-Emission Transportation Sector?



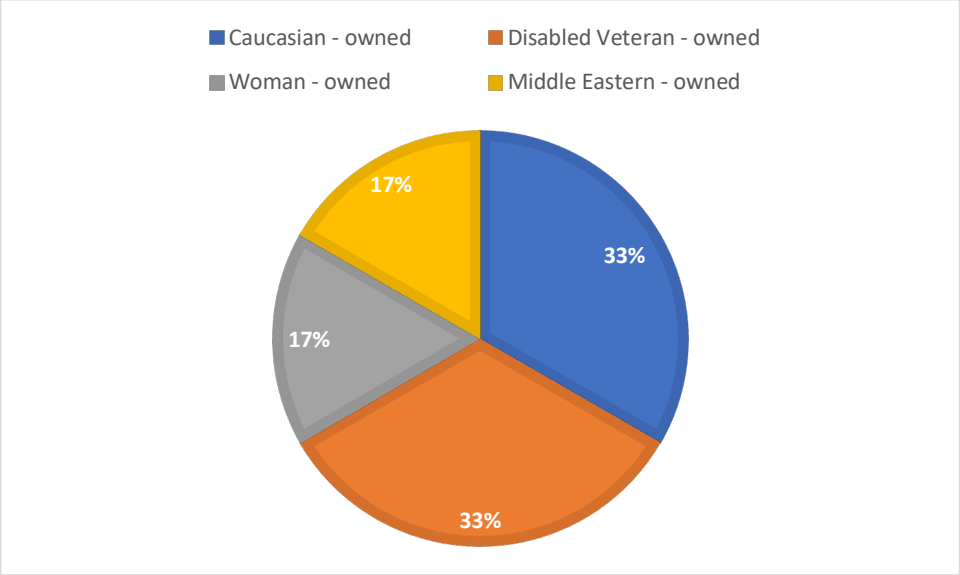
On the question "are you currently aware of any rebates or tax incentives offered by the state of California for underrepresented businesses in the zero-emission transportation sector?" 12 percent of the respondents indicated they were aware, and 88 percent indicated that they were not aware, as shown in Figure 7. The low awareness rate is consistent with the apparent lack of communication between the government and the businesses themselves. More collaboration is needed to increase the awareness rate on the part of each entity involved. Creating an online forum for such businesses to feed off each other would serve this purpose well.

Figure 7. Are You Currently Aware of Any Rebates or Tax Incentives Offered by the State of California for Underrepresented Businesses in the Zero-Emission Transportation Sector?



Participants in the focus group were able to learn from each other and act in this regard. On a scale of 0 to 5, where 0 is the least and 5 is the most effective, respondents gave an average score of 3.85 on how effective rebates and tax incentives would be in encouraging businesses to compete more effectively. The distribution of the respondents who identified as underrepresented businesses and do not believe rebates and tax incentives are effective (score 2 and below) is shown in Figure 8. Of these respondents, 33 percent reported they were disabled veteran-owned, 33 percent reported Caucasian-owned, 17 percent reported Middle Eastern-owned, and 17 percent reported women-owned.

Figure 8. Distribution of Businesses that Think Rebates and Tax Incentives Would Not Be Encouraging to Compete More Effectively

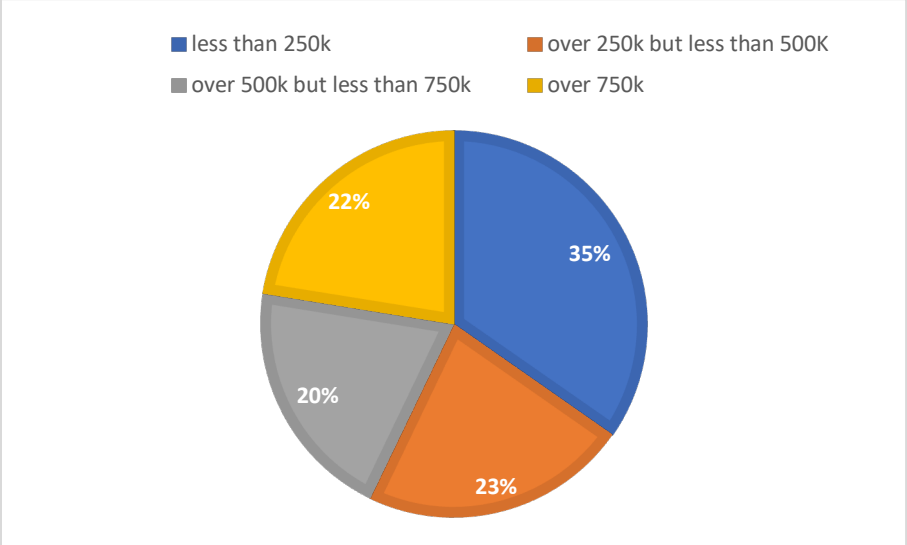


On the question "what would be the term structure for a payback scheme for the loans would be for government assistance programs, rebates, and tax incentives," respondents chose an average of 8.18 years. Respondents reported a maximum value of 27 million dollars and a minimum value of 36 thousand dollars from the contracts they received last year. Of these respondents, 60 percent reported that it was representative of the contracts they generally receive, while 40 percent reported that it was not representative of the contracts they received in prior years.

The required minimum funding for effective competition in the zero-emission transportation sector varies widely. On the question "how much minimum funding do you think your business would need to effectively compete in the zero-emission transportation sector?" the average value reported was $445K, with a minimum of $10K and a maximum of $1 million. As shown in Figure 9, 35 percent of the respondents reported that the minimum funding their business would need is less than 250 thousand U.S. dollars. 23 percent of the respondents indicated they would need over 250 thousand U.S. dollars but less than 500 thousand U.S. dollars. 20 percent of the respondents reported needing at least 500 thousand U.S. dollars but less than 750 thousand U.S. dollars. The

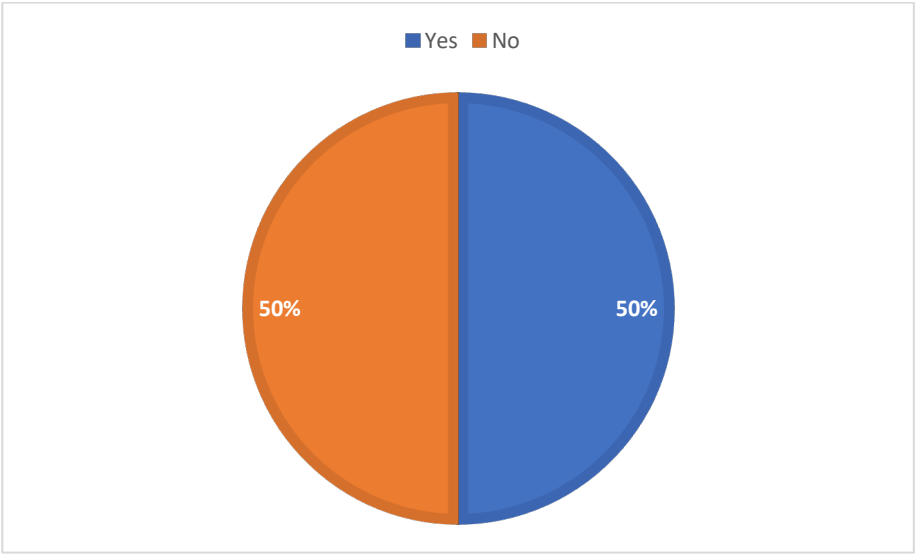
remaining 22 percent reported they would need funds over 750 thousand U.S. dollars to compete in the zero-emission transportation sector.

Figure 9. How Much Minimum Funding Do You Think Your Business Would Need to Effectively Compete in the Zero-Emission Transportation Sector? - USD (Thousands)



There is a split opinion on whether non-monetary incentives can help minimize costs. On the question "are there any non-monetary incentives that would motivate your business to minimize its higher costs compared to big companies?" 50 percent of respondents answered yes, while the other half responded no, as shown in Figure 10.

Figure 10. Are There Any Non-Monetary Incentives that Would Motivate Your Business to Minimize its Higher Costs Compared to Big Companies?



Respondents were then asked, "if you answered, 'yes' to the previous question, what non-monetary incentives would motivate your business to minimize its higher costs compared to big companies?" The respondents requested reducing bonding costs or requirements, tax breaks, low-cost loans, EV credits, the reduction of greenhouse emissions, counsel specializing in contracts, low-cost equipment rental, deferred material payments, opportunities to meet larger contractors, a clearinghouse for contractors, sub-contractors, suppliers, manufacturers, and materials wanted or sold among contractors, mentorship, learning to put in successful bids, software training, bid incentives, vehicles subsidized, bid preferences and guaranteed contracts, mentoring time and labor contracting opportunities, bonding assistance, excelled rated payment opportunities, the omission of the prevailing wage requirement, tax rebates, assistance with prevailing wage reporting, legal representation, and competitive insurances. Participants felt there was a need to lower the insurance cost requirements for small businesses that wish to participate in these types of contracts. There is also the expressed need for technical assistance, veteran-focused training programs for skilled labor, access to training for management, reimbursed training on equipment from manufacturers in the zero-emission space, workman compensation insurance, lower maintenance costs, and reliable equipment that is comparable in horsepower to regular current emission.

Respondents were asked "what difficulties do you face operating in the zero-emission transportation sector?" The responses provided were mostly about bonding, access to opportunities, funding, being able to compete as a small business, and having different categories of competition. One of these categories would be for big companies, and one would be for small ones. Each would compete in its own category, so that small businesses would not compete with big ones for the same bid. One respondent stated that these projects seem to operate in a vacuum where most contractors are "pre-ordained." Others mentioned being unable to afford new equipment, insufficient work to pay for such equipment, not knowing how to get involved or what this sector entails, high borrowing costs, a lack of understanding of the efforts/incentives to lower the barriers to entrance, vehicle availability, the cost of vehicle or specialty fuels, complex and burdensome contractual requirements for small businesses, opportunities with larger general contractors that are awarded these contracts, utility interconnection, bridge financing, permitting, switchgear, cranes being inferior to trucks,

Another respondent indicated that there is a cost problem in that the average cost of a truck is $250K while the average cost of a crane is $1 million and as such,the compliance should be different for cranes than trucks. They insisted that dealing with anything government related for construction places an onerous administration overhead on a small business and makes it almost impossible to do. The only difficulties are the funding and bonding capabilities. Another respondent said, "we are considered a small micro business enterprise and a women minority owner." Others mentioned needing resources to help with the bidding process, a lack of skilled labor, the inability to bond, and limitation in cash flows.

On the question "how do you perceive the attitudes towards the zero-emission transportation sector in relation to the competition they face from big companies?" most responded that they were positive about the sector. They felt that there are huge opportunities in the zero-emission transportation sector, but there needs to be intentionality in making sure small business enterprises get their fair share of these opportunities. Some respondents felt the competition from big companies was too aggressive for them to compete. Other respondents felt that bid wins depend on whom one knows, and small businesses must have a lot of capital to even consider bidding. The respondents felt that the big players seem to keep the opportunities to participate between themselves.

Other respondents indicated that big companies can do enough work in a year to afford this equipment, whereas a small company cannot. The big companies have easy access to new and better products/equipment. Respondents generally felt that preferences are given to larger companies that have more overhead to support larger staff and are not willing to share. According to these respondents, big companies have "big pockets" to get subsidies and cash to redo vehicles, but small contractors have to generate resources by laying off employees.

Some respondents wanted the government to provide robust training/technical assistance to small, new contractors. Respondents requested coordination with local municipalities and in-depth mentorship that supports the bidding process, equipment, staffing, and training. Some respondents wanted training in maintenance and upkeep, licensing, and certifications. Other respondents requested the pairing of subcontractors with larger prime contractors.

Others mentioned equal opportunity to assist communities in developing long-term plans to address the zero-emission infrastructure. According to them, small and local disadvantaged companies are key in providing long-term relations between the community and the infrastructure. Small companies must be given appropriate tools from the state to sustain the outlay of this infrastructure. Respondents also mentioned financial incentives provided by the government to replace vehicles and equipment. There was a request for mandatory EVITP certifications. There was also a request to provide an informational scope of work in the project infrastructure. Others mentioned OSHA training, environmental training, and electrical training with respect to safety hazards, and injury prevention. New contractors wanted someone to aid with questions during the process.

In response to the question "what are some benefits you perceive from participating in a state program for underrepresented businesses in the zero-emission transportation sector?" many stated increased bid opportunities for small and micro business contractors. Others mentioned learning about specialized trades. Coordination with specialty contractors was another benefit respondents listed along with long-term contracts allowing for planned growth. Additional responses included connections and support and the greater chance of becoming a successful small business. Several respondents stated the ability to grow to a larger contractor, the benefit of gaining traction in a new industry, and building new relationships. One responder stated that, "as a society, we would

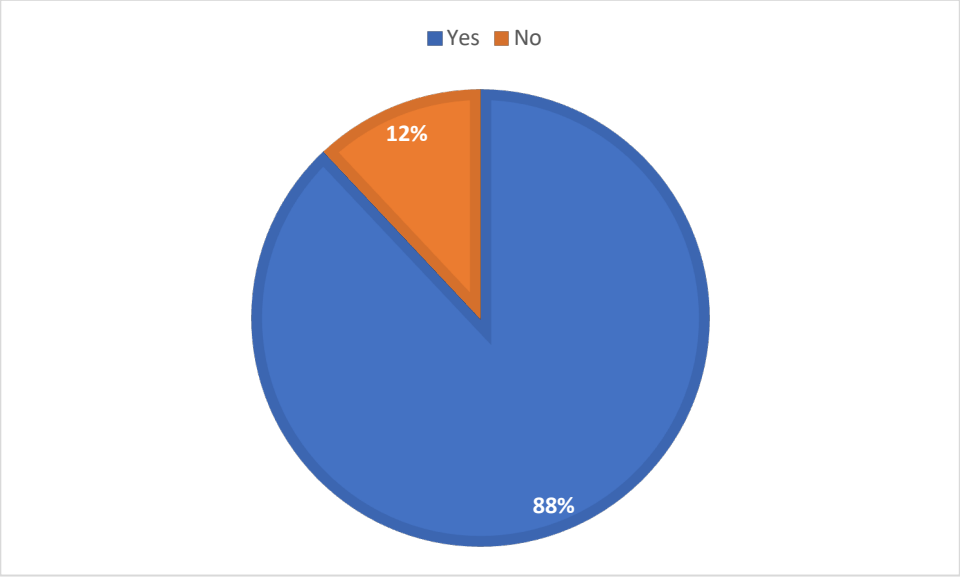
benefit from helping build a sustainable zero-emission transportation that helps combat climate change, reduce pollution, contribute to cleaner air, and be able to get the resources and company acknowledgment for our contributions." Others had similar comments in that participation would benefit the environment through cleaner transportation infrastructure and provide high-wage skilled labor jobs to underrepresented communities which would enable long-term business growth.

On the question "what are some costs you perceive from participating in a state program for underrepresented businesses in the zero-emission transportation sector?" the respondents listed high bonding costs and insurance as the main costs. Training, equipment, grant applications, utilities, high administrative costs, a percentage of the bid that needs to be held for payroll and other expenses, travel, downtime, loss of revenue waiting for vehicles to be repaired or serviced, and monitoring complex requirements were other items listed as a response to this question.

The majority of participants were prepared to submit the required paperwork for state program applications and thought the state ought to support compliance. Nearly everyone agreed that verification procedures should be made more efficient.

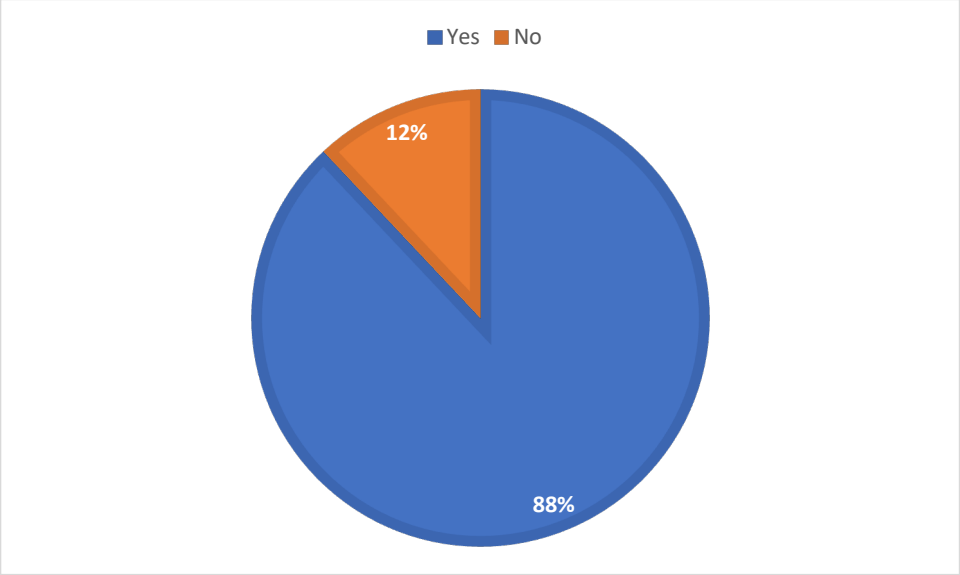
An overwhelming majority, 88 percent of the respondents, were willing to provide the necessary documentation, including state-approved identification, original utility bills, and proof of business, as shown in Figure 11.

Figure 11. Would You Be Willing to Provide the Necessary Documentation, Such as State-Approved Identification, Original Utility Bills, and Proof of Business, to Apply for the State Program?



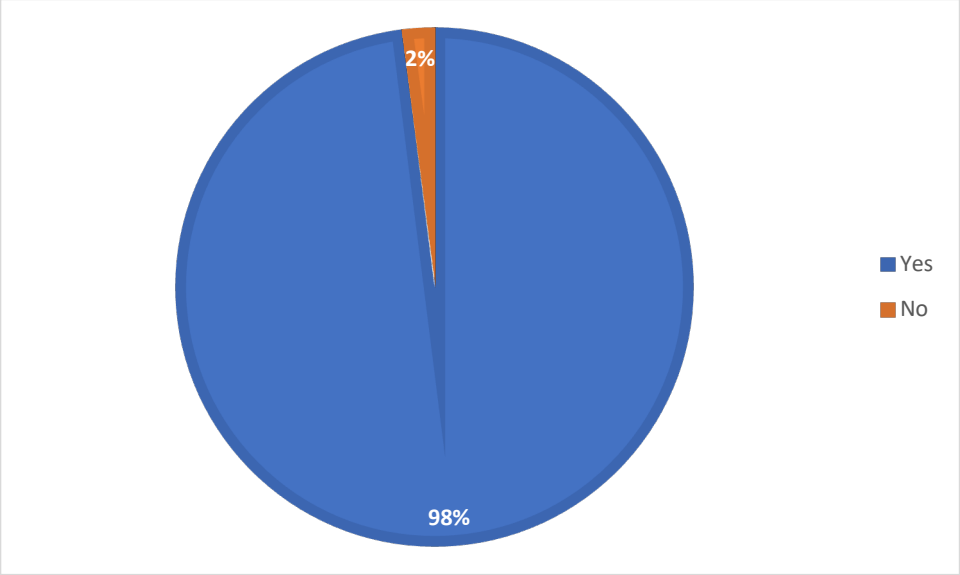
An overwhelming majority, 88 percent of the respondents, also agreed that the state program should provide additional resources or support to help businesses comply with the verification requirements, as shown in Figure 12.

Figure 12. Should the State Program Provide Additional Resources or Support to Help Businesses Comply with the Verification Requirements?



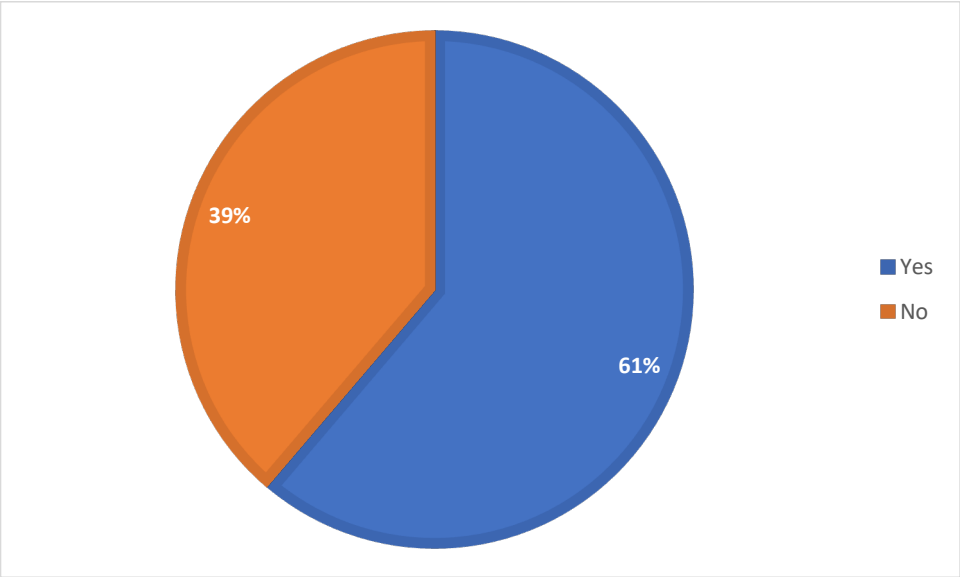
Almost all respondents, 98 percent of them, believed that the verification process should be streamlined to reduce the administrative burden on businesses while still ensuring integrity, as shown in Figure 13.

Figure 13. Do You Believe That the Verification Process Should be Streamlined to Reduce the Administrative Burden on Businesses While Still Ensuring Integrity?



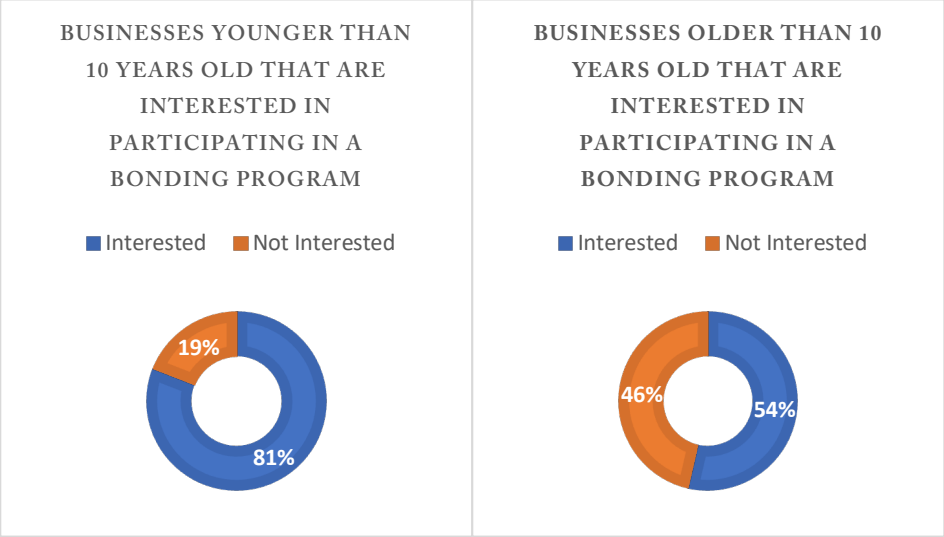
As shown in Figure 14, there was a moderate level of interest in taking part in bonding programs. About 61 percent of the respondents indicated that they were interested in participating in a bonding program while 39 percent stated that they were not interested.

Figure 14. Are You Interested in Participating in a Bonding Program?



While 81 percent of businesses younger than 10 years old were interested in a bonding program, only 54 percent of businesses older than 10 years old showed interest in such a program, as shown in Figure 15.

Figure 15. Businesses that are Interested in Participating in a Bonding Program

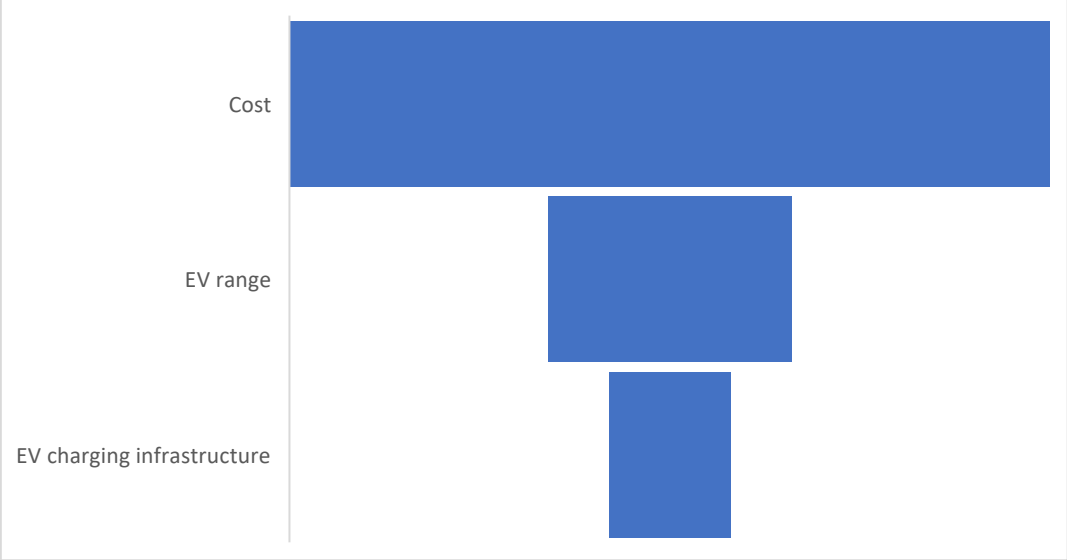


Those respondents who answered "yes" wanted to see a structure that effectively enabled participation in the bonding program. They also wanted no collateral or indemnity and a streamlined process to complete. They wanted to have a local bonding company in Los Angeles and other regions, significant reduction in bonding and insurance premiums, a streamlined application and approval process, and higher bonding limits.

On the question "what specific regulatory issue is preventing you from bonding in the zero-emission transportation construction contracting?" the responses included credit and capital, immigration status, cost, a cumbersome application and approval process, large contract amounts, being limited by bond capacity, excessive insurance requirements, requirements to put up estate, and an uneducated workforce. Others believed that small contractors were being pushed down, allowing larger business to succeed in the same space.

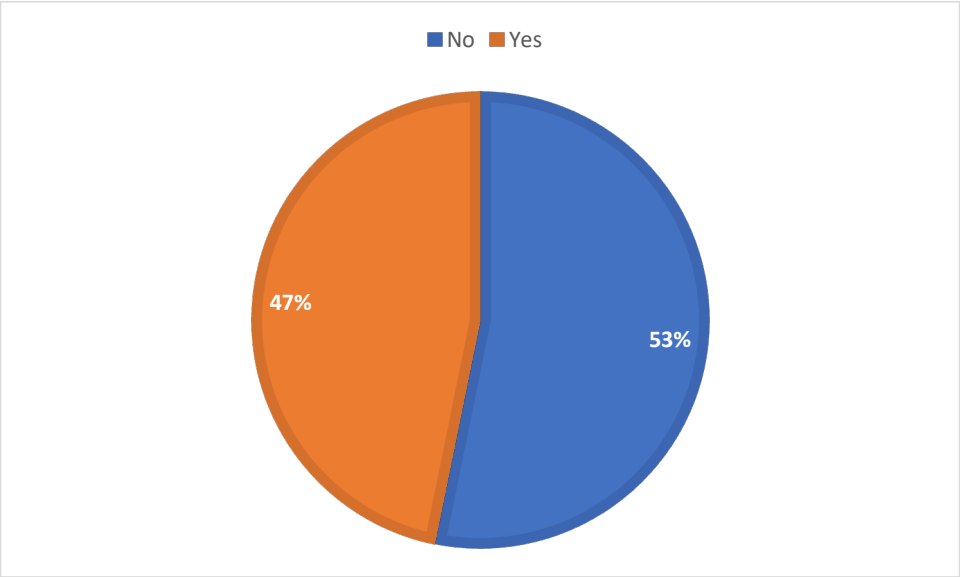
On the question "at the moment, what is mainly preventing you from switching to zero-emission EVs?" the top three responses were the cost associated with the operation of electric vehicles, the limited range of EVs, and the lack of charging infrastructure, as shown in Figure 16.

Figure 16. Top Three Reasons Preventing Participants from Switching to Zero-Emission EVs.



On the question "do you trust the working of the current system in place?" 47 percent of the respondents indicated that they trusted the system, while 53 percent responded that they do not trust the system, as shown in Figure 17.

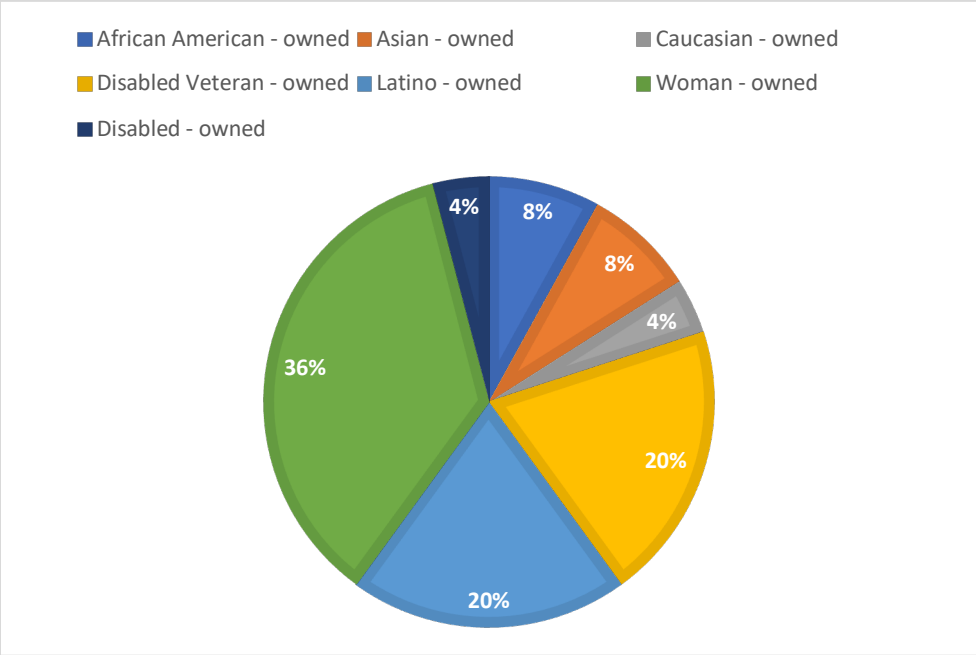
Figure 17. Do You Trust the Working of the Current System in Place?



This finding is consistent with the view that the state government has to increase efforts to improve the system. Those who answered "no" state that the entire government is controlled by "big businesses" and "greedy politicians." According to them, it does not work towards helping women-owned businesses; the learning curve without assistance is too steep and not worth the time. They felt that funds run out before they get beyond administrators and that the current system is rigged to favor big businesses and large contractors.

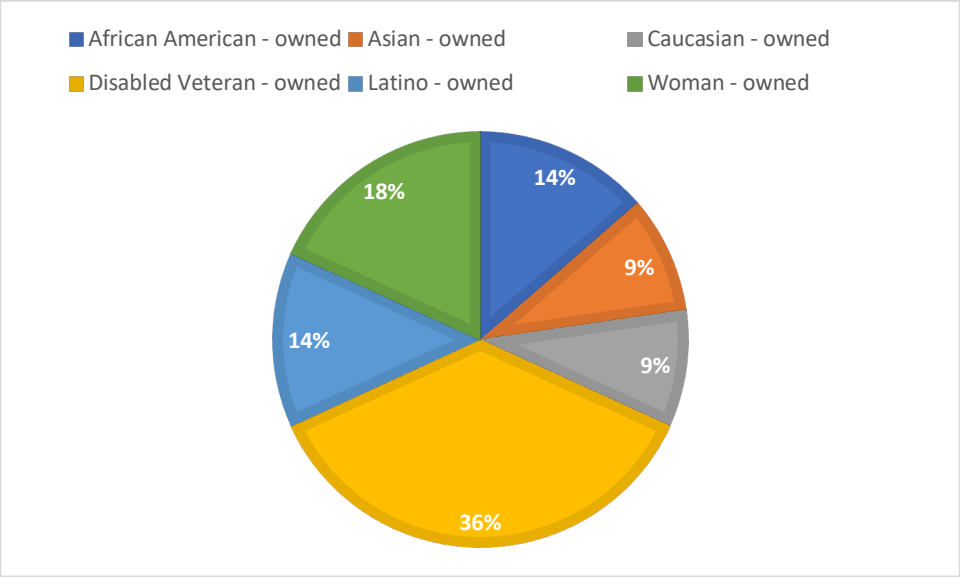
On the question "please rate how discriminatory you think the current system for tax incentives and rebates is towards underrepresented businesses from 0 to 5, 0 being not discriminatory, 5 being most discriminatory," the average score was 3.16 from 44 respondents and was skewed towards discriminatory. The distribution of the respondents who identified as underrepresented businesses and believe that the current system for tax incentives and rebates is discriminatory (score 3 and above) is shown in Figure 18. Of these respondents, 36 percent reported they were women-owned; 20 percent, African-American-owned; 20 percent, disabled-veteran-owned; 8 percent, Asian-owned; 8 percent, Latino-owned; 4 percent, Caucasian-owned; and 4 percent, disabled-owned.

Figure 18. Distribution of Businesses That Think the Current System is Discriminatory



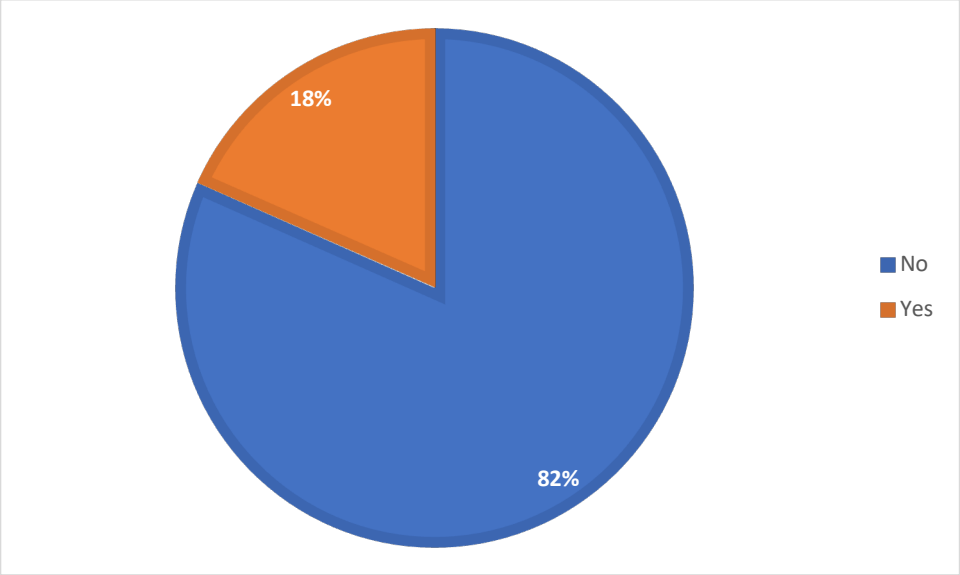
On the question "please rate how satisfied you are with the insurance options currently available for contractors in the zero-emission transportation sector from 0 to 5, 0 being not satisfied, 5 being most satisfied?" the average score was 2.08 from 36 respondents and was skewed towards dissatisfaction. The distribution of the respondents who identified as underrepresented businesses and were not satisfied with the insurance options currently available for contractors in the zero-emission transportation sector (score 2 and below) is shown in Figure 19. Of these respondents, 36 percent reported they were disabled-veteran-owned, 18 percent were women-owned, 14 percent were African-American-owned, 14 percent were Latino-owned, 9 percent were Asian-owned, and 9 percent were Caucasian-owned. Few businesses have insurance-related problems that keep them from taking part in zero-emission transportation contracting, and even fewer are familiar with the precise requirements.

Figure 19. Distribution of Businesses That Are Not Satisfied with the Insurance Options Currently Available



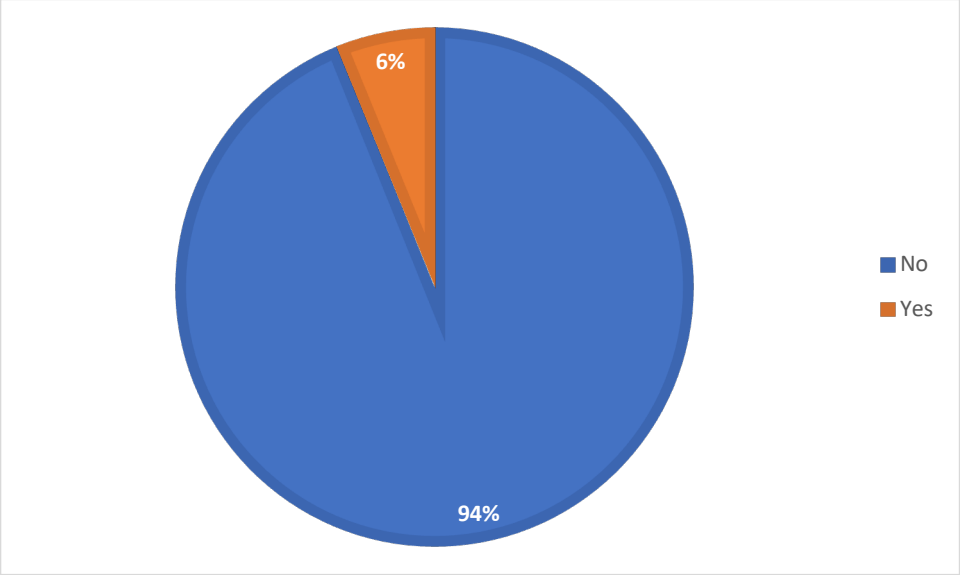
On the question "are you familiar with any specific insurance requirements for contractors involved in zero-emission transportation construction projects?" 18 percent of the respondents stated they were aware, while the remaining 82 percent indicated that they were not, as shown in Figure 20.

Figure 20. Are You Familiar with Any Specific Insurance Requirements for Contractors Involved in Zero-Emission Transportation Construction Projects?



As shown in Figure 21, about 6 percent of the respondents stated they had an insurance-related issue that prevented their business from taking part in zero-emission transportation construction contracting, while the remaining 94 percent stated that they did not.

Figure 21. Did You Have an Insurance Related Issue That Prevented Your Business from Taking Part in Zero-Emission Transportation Construction Contracting?



It appears that more education and guidance about the resources at hand are required, combined with an enhanced regulatory framework that makes it simpler for underrepresented businesses to participate in zero-emission transportation construction contracting.

4. Findings from Targeted Interviews and Focus Groups

The focus group participants had up to 40 years of experience, and teaching at UC Berkeley extension programs and at San Francisco State University. According to the input received, the bonding issue was the most important, followed by training issues and how to do the work procedurally. Most small contractors feel intimidated by the procedure at the state and federal levels. The focus group members felt that the federal government is better than the state, but the federal government pays quicker than the state. Participants stated that there is a federal law that businesses must be paid within a certain time and that there needs to be a prompt payment. They stated that after COVID, municipalities do not have the staff or any incentive to get tasks done. Participants felt that there were implications of improper filing of paperwork. Some felt that they learned the process with difficulty and that new contractors tend to do so still. Most wanted workshops, opportunities with bigger companies, and training in public schools. They communicated that there is "a different language" when talking about bonding, and the addition of insurance contract requirements can be overwhelming. Therefore, a simpler, streamlined process with prompt payment is necessary.

Participants also mentioned that Southern California is ahead because it has good mentors and better mentee relationships. For example, electric vehicle charging installations are better done by local and small shops because big companies feel it is not worth it. Members stated that the mentor can benefit from additional support. They also claimed that all government entities and locations have different rules. San Mateo and Southern California, for instance, have different procurement strategies. According to those surveyed, there should be a benefit to the mentor to incentivize. Some participants felt that small companies must make a profit every time to survive in the business, whereas big companies do not. They suggested that it is important to consider value, not just the lowest price, and it is important to factor in non-monetary benefits.

The majority of the participants felt there was an abuse of power in the process and lender discrimination, particularly against Hispanics and African Americans. This finding can be the result of self-selection, since only those who felt discriminated against participated in the survey and focus group. One participant commented that if one is Hispanic and not Caucasian, the process would be tougher. These participants felt invoices were being held up. Participants wanted greater transparency about the process of payroll to subcontractors. They also wanted to have the same procedure across California. For example, San Mateo does not pay for material received unless it is installed, a requirement which slows down the process. Participants also called for fixed guidelines across the state. They indicated that installation requirements are bad for small companies, particularly the thirty- to forty-week wait. Many participants believed the Federal Reserve has grant money that it was unwilling to share.

Participants noted that small companies need to do four to five weeks of training to understand prevailing usage. Participants unanimously wanted simpler contracts. Large companies with more

staff and resources competing against small companies make it difficult for the latter to have the same capacity in bidding. Therefore, participants felt it important for the state to help small companies achieve bonding.

Women participants in the focus group felt that there was no comradery among women and suggested an online discussion platform. Several felt they needed to have a male partner with them in their meetings and biddings. Women owners stated that they were able to get workers compensation and liability, but for performance bonds for $500K it took overlong. One participant mentioned having a state counterpart of the federal 8(a) robust nine-year Business Development Program. Another female participant expressed concern that while resources exist, she did not know how to access them.

Another participant also mentioned that the City of San Francisco, with its $5 million budget, was lending money to subcontractors. He stated he had to go through the NGO to get this money. San Francisco has a bond guarantee program with $1 billion by the city, but it is only for work in San Francisco.

Participants mentioned that the biggest barrier for small companies was bonding, particularly if they had credit issues in the past. One participant stated he was low in cash, and when he was getting assistance in bonding, not only did he have to pay the bond cost, but he had to pay the monitoring company which the insurer company brought. He was also imposed fund control, whereby the third company takes the money from the client and pays the vendors. The third party decided where the pay was fit, which created a disincentive to do such business. Third companies such as escrow companies made money from such fees and deterred small businesses. Because of this, small companies charged a five percent margin to make these fees. But big companies could charge one percent, outbidding smaller ones. The federal government guarantees payment within fifteen days because of the "Prompt Payment Clause" from the Federal Accusation Regulation. Participants felt that some municipalities are brutal in terms of payment. If the state payment is thirty days after approval, and invoices are being held up, subcontractors struggle because they do not know how to operate when payment is delayed.

One participant stated that there are a lot of state representatives in the Valley and Riverside area who are vested in improving the empowerment of the community. Another participant mentioned that minority contractors do not have equal access to capital. In general, participants desired safeguards to ensure that financial companies and surety companies are treating minorities equally.

5. Econometric Findings

Our econometric analysis revealed that there was no statistically significant association at the conventional significance levels (Hill, 2018) between (1) the question that asked respondents to rank from 0 to 5 if they felt the system was discriminatory and (2) the question that asked their race or whether they were disabled veterans. Female and Asian respondents felt most discriminated against, while disabled veterans and "other" minority-owned businesses who were not Caucasian, Latino, Islander, or African American felt the least.

Analyzing the association between respondents' trust in the current system and their race and whether they are disabled veterans revealed that there was not a statistically significant relationship between the two variables. Women-owned and other minority-owned businesses expressed the least trust of the current system, while disabled veterans trusted the most. On the question asking about satisfaction with insurance options, respondents from all races appeared to be generally satisfied. Those who self-reported as prime contractors felt the system was least discriminatory. Compared to established prime contractors, subcontractors encounter greater barriers to entry and growth. Since prime contractors have already navigated the system, they may feel less discrimination. In line with this finding, the businesses that reported themselves as being prime contractors were the ones most satisfied with the workings of the current system.

Analyzing the association between the age of a business and the perception of discrimination, the older a business is, the lower the perception of discrimination. Due to their extended operational experience and ability to adjust to potential discriminatory practices, older businesses may have become more adept at navigating the system.

Table 1 reports the results of the probit regression of the respondents' ranking of discrimination from values 0 to 5, where 0 represents no discrimination, and 5 represents the most. The respondents ranked themselves as a prime contractor (value of 1) or not a prime contractor (value of 0). The results provide statistically significant evidence of the association between the two constructs. There appears to be a negative association between the two at all conventional significance levels. The results provide evidence that being a prime contractor affects the respondents' perception of discrimination in that prime contractors are less likely to have the perception of discrimination relative to those who are not prime contractors.

Table 1. Results of Probit Regression of the Respondents' Ranking of Discrimination

Dependent Variable: PRIME

Sample: 1-51

Variable	Coefficient	Std. Error	z-Statistic	Prob.
HOWDISCR	-0.232	0.059	-3.920	0.0001
Mean dependent var	0.17	S.D. dependent var		0.385
S.E. of regression	0.41	Akaike info criterion		1.07
Sum squared resid	8.53	Schwarz criterion		1.11

Table 2 reports the results of the least squares regression of the respondents' ranking of discrimination from values 0 to 5, where 0 represents no discrimination, and 5 represents the most discrimination. For the question of whether the respondents report themselves as an underrepresented contractor, a value of 1 is "underrepresented," and a value of 0 is not an underrepresented contractor. The results provide statistically significant evidence of the association between the two constructs. There appears to be a positive association between the two at the conventional significance levels. The results provide evidence that being an underrepresented contractor affects the respondents' perception of discrimination in that underrepresented contractors are more likely to have a perception of discrimination relative to those who are not.

Table 2. Results of the Least Squares Regression of the Respondents' Ranking of Discrimination

Dependent Variable: UNDERREPYORNO

Sample: 1-51

Variable	Coefficient	Std. Error	t-Statistic	Prob.
HOWDISCR	0.224	0.020	10.862	0.0000

R-squared	-1.52	Mean dependent var	0.88
Adjusted R-squared	-1.52	S.D. dependent var	0.32
S.E. of regression	0.51	Akaike info criterion	1.53
Sum squared resid	13.39	Schwarz criterion	1.57

Table 3 reports the results of the probit regression of the respondents' ranking of satisfaction of the system from values 0 to 5, where 0 represents the least satisfied, and 5 is the most satisfied. For the question about whether the respondents report themselves as a prime contractor, the values were either 1 (prime contractor) or 0 (not a prime contractor). The results provide statistically significant evidence of the association between the two constructs. There appears to be a positive association between the two at all conventional significance levels. The results provide evidence that being a prime contractor affects the respondents' perception of satisfaction in that prime contractors are less likely to have the perception of discrimination relative to those who are not prime contractors.

Table 3. Results of the Probit Regression of the Respondents' Ranking of Satisfaction of the System

Dependent Variable: PRIME

Sample (adjusted): 1-50

Variable	Coefficient	Std. Error	t-Statistic	Prob.
HOWSATISF	0.074	0.027	2.733	0.0087

R-squared	-0.05	Mean dependent var	0.18
Adjusted R-squared	-0.05	S.D. dependent var	0.38
S.E. of regression	0.39	Akaike info criterion	1.02
Sum squared resid	7.80	Schwarz criterion	1.05

Table 4 reports the results of the least squares regression of the respondents' ranking of discrimination from values 0 to 5, where 0 represents no discrimination, and 5 represents the most discrimination in the respondents' years in business. The results do not provide statistically significant evidence of the association between the two constructs. However, there appears to be some negative association between the two based on the respondents' ranking of discrimination parameter estimate (Hayashi, 2011). The results provide evidence that being a prime contractor has little or no effect on the respondents' perception of discrimination. The longer the respondent is in business, the less is the respondent's perception of discrimination relative to those who are new in business.

Table 4. Results of the Least Squares Regression of the Respondents' Ranking of Discrimination

Dependent Variable: YRSINBUS

Sample: 1-51

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	16.166	4.060	3.980	0.0002
HOWDISCR	-0.344	1.156	-0.298	0.766

R-squared	0.001	Mean dependent var	15.07
Adjusted R-squared	-0.018	S.D. dependent var	12.59
S.E. of regression	12.70	Akaike info criterion	7.96
Sum squared resid	7911.33	Schwarz criterion	8.03

Table 5 reports the results of the least squares regression of the respondents' trust in the system, where a value of 1 represents trust, and 0 represents no trust. The results provide statistically significant evidence of the association between the two constructs. There appears to be a positive association between the conventional significance levels. The results provide evidence that the more years the respondent stays in business, the more likely that the respondents trust the system.

Table 5. Results of the Least Squares Regression of the Respondents' Trust in the System

Dependent Variable: YRSINBUS

Sample: 1-51

Variable	Coefficient	Std. Error	t-Statistic	Prob.
TRUST	12.727	3.808	3.341	0.0016

R-squared	-1.01	Mean dependent var	15.07
Adjusted R-squared	-1.01	S.D. dependent var	12.59
S.E. of regression	17.86	Akaike info criterion	8.62
Sum squared resid	15957.36	Schwarz criterion	8.66

Table 6 reports the results of the least squares regression of the respondents' ranking of discrimination from values 0 to 5, where 0 represents no discrimination, and 5 represents the most discrimination in the respondents' years in business. The results provide statistically significant evidence of the association between the two constructs. There appears to be a positive association between the conventional significance levels. The results provide evidence that the longer the respondent stays in business, the more satisfied the respondent is with the system relative to those who stay fewer years in business.

Table 6. Results of the Least Squares Regression of the Respondents' Ranking of Discrimination

Dependent Variable: YRSINBUS

Sample (adjusted): 1-50

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	8.038	3.047	2.637	0.0112
HOWSATISF	4.207	1.469	2.862	0.0062

R-squared	0.14	Mean dependent var	15.36
Adjusted R-squared	0.12	S.D. dependent var	12.55
S.E. of regression	11.72	Akaike info criterion	7.80
Sum squared resid	6597.26	Schwarz criterion	7.87

Table 7 reports the least squares regression results of the trust construct on the maximum value of contracts respondents received in the last year. The results do not provide any statistically significant evidence of the association between the two constructs. However, there appears to be some positive association between the two based on the trust parameter estimate (Hayashi, 2011), in that the higher the value of the contracts received, the greater the trust the respondents appeared to have in the system.

Table 7. Least Squares Regression Results of the Trust Construct on the Maximum Value of Contracts Respondents Received in the Last Year

Dependent Variable: CONTRCTVALUE

Sample: 1-51

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	2919172.01	1467456.49	1.989	0.052
TRUST	2421555.82	2234286.27	1.083	0.283

R-squared	0.02	Mean dependent var	3963765.25
Adjusted R-squared	0.001	S.D. dependent var	7916281.66
S.E. of regression	7902491.93	Akaike info criterion	34.64
Sum squared resid	3.06E+15	Schwarz criterion	34.71

Table 8 reports the least squares regression results of the trust construct on the maximum value of contracts respondents received in the last year. Coefficient estimates are naturally are high due to the value of contracts being high. The results do not provide any statistically significant evidence of the association between the two constructs. However, there appears to be some positive association between the two based on the trust parameter estimate (Hayashi, 2011), in that the higher the value of the contracts received, the greater the trust the respondents appear to have in the system.

Table 8. Least Squares Regression Results of the Trust Construct on the Maximum Value of Contracts Respondents Received in the Last Year

Dependent Variable: NBROFEMPL

Sample (adjusted): 1-50

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	13.450	6.063	2.218	0.0314
HOWSATISF	1.557	2.901	0.536	0.5940

R-squared	0.01	Mean dependent var	16.18
Adjusted R-squared	-0.01	S.D. dependent var	22.86
S.E. of regression	23.04	Akaike info criterion	9.15
Sum squared resid	24952.42	Schwarz criterion	9.22

Table 9 reports the least squares regression results of the trust construct on the number of employees the contractor has. The results provide statistically significant evidence of the association between the two constructs. There appears to be a positive association between the two at the conventional significance levels, in that the higher the value of the number of employees, the more trust the respondents appear to have in the system. The findings are closely in line with the number of years and trust regressions reported earlier in the study. A positive finding reflects greater experience in doing business and, therefore, trust.

Table 9. Least Squares Regression Results of the Trust Construct on the Number of Employees the Contractor Has

Dependent Variable: NBROFEMPL

Sample: 1-51

Variable	Coefficient	Std. Error	t-Statistic	Prob.
TRUST	15.272	5.480	2.786	0.0075

R-squared	-0.30	Mean dependent var	15.90
Adjusted R-squared	-0.30	S.D. dependent var	22.48
S.E. of regression	25.70	Akaike info criterion	9.35
Sum squared resid	33041.36	Schwarz criterion	9.38

Table 10 reports the logit regression results between the constructs "those who wanted to be a prime contractor and listed internal problems as an impediment" and respondents' ranking of discrimination from values 0 to 5, where 0 is the perception of no discrimination, and 5 is the perception of most discrimination. There appears to be a positive association between the two constructs at the conventional significance levels, in that the higher the perception of discrimination, the more the respondents report internal problems as an obstacle to becoming a prime contractor. This finding is critical given that the respondents were mostly underrepresented contractors. Combined with other findings, it suggests that internal problems might be perceived falsely as dissatisfaction or frustration with the system. It might also be perceived as discriminatory, although this possibility would need to consider self-selection bias.

Table 10. Logit Regression Results Between the Following Constructs: "Those Who Wanted to Be a Prime Contractor and Listed Internal Problems as an Impediment" and Respondents' Ranking of Discrimination

Dependent Variable: INTOREXT

Sample: 1-51

Variable	Coefficient	Std. Error	t-Statistic	Prob.
HOWDISCR	0.076	0.018	4.019	0.0002

R-squared	-0.07	Mean dependent var	0.29
Adjusted R-squared	-0.07	S.D. dependent var	0.46
S.E. of regression	0.47	Akaike info criterion	1.37
Sum squared resid	11.33	Schwarz criterion	1.41

Table 11 reports the logit regression results between the constructs "those who wanted to be a prime contractor and listed internal problems as an impediment" and respondents' ranking of satisfaction from values 0 to 5, where 0 represents the perception of no satisfaction in the system, and 5 represents the perception of greatest satisfaction. Similar to the results in Table 10, there appears to be a positive association between the two constructs at the conventional significance levels, in that the higher the perception of dissatisfaction, the more the respondents reported internal problems as an obstacle to becoming a prime contractor. This finding is also critical given that the respondents were mostly underrepresented contractors.

Table 11. Logit Regression Results Between the Constructs "Those Who Wanted to Be a Prime Contractor and Listed Internal Problems as an Impediment" and Respondents' Ranking of Satisfaction

Dependent Variable: INTOREXT

Sample (adjusted): 1-51

Variable	Coefficient	Std. Error	t-Statistic	Prob.
HOWSATISF	0.139	0.032	4.355	0.0001

R-squared	-0.02	Mean dependent var	0.30
Adjusted R-squared	-0.02	S.D. dependent var	0.46
S.E. of regression	0.46	Akaike info criterion	1.34
Sum squared resid	10.81	Schwarz criterion	1.38

Table 12 reports the logit regression results between the constructs "those who wanted to be a prime contractor and listed internal problems as an impediment" and respondents' reporting of trust in the system, where a value of 1 is trust, and a value of 0 is mistrust. Similar to two earlier findings, there again appears to be a statistically significant positive association between the two constructs at the conventional significance levels, in that the higher the perception of mistrust, the more the respondents reported internal problems as an obstacle to becoming a prime contractor. The respondents were mostly underrepresented contractors, lending credence once again to self-selection bias. Otherwise, the respondents would be citing external, not internal, problems as an impediment to becoming a prime contractor.

Table 12. Logit Regression Results Between the Constructs "Those Who Wanted to Be a Prime Contractor and Listed Internal Problems as an Impediment" and Respondents' Reporting of Trust in the System

Dependent Variable: INTOREXT

Sample: 1-51

Variable	Coefficient	Std. Error	t-Statistic	Prob.
TRUST	0.272	0.110	2.474	0.016

R-squared	-0.26	Mean dependent var	0.29
Adjusted R-squared	-0.26	S.D. dependent var	0.46
S.E. of regression	0.51	Akaike info criterion	1.53
Sum squared resid	13.36	Schwarz criterion	1.57

Table 13 reports the logit regression results between the constructs "those who wanted to be a prime contractor and listed internal problems as an impediment" and respondents' reporting themselves as an underrepresented contractor (value of 1) and not an underrepresented contractor (value of 0). Similar to the three earlier findings, there appears to be a statistically significant positive association between the two constructs at the conventional significance levels, in that the more respondents self-reported as underrepresented contractors, the more they reported internal problems as an obstacle to becoming a prime contractor. Notably, those who reported internal problems as an impediment to becoming a prime contractor were mostly underrepresented contractors.

Table 13. Logit Regression Results Between the Constructs "Those Who Wanted to Be a Prime Contractor and Listed Internal Problems as an Impediment" and Respondents' Reporting Themselves as an Underrepresented Contractor

Dependent Variable: INTOREXT

Sample: 1-51

Variable	Coefficient	Std. Error	t-Statistic	Prob.
UNDERREPYORNO	0.333	0.066	5.000	0.0001

R-squared	0.05	Mean dependent var	0.29
Adjusted R-squared	0.05	S.D. dependent var	0.46
S.E. of regression	0.44	Akaike info criterion	1.24
Sum squared resid	10.00	Schwarz criterion	1.28

In all, the econometrics analyses provide evidence for discrimination mostly from underrepresented contractors. However, the results also suggest that there could be self-selection bias, as reported in the last four tables. It is worth noting that those who navigate and survive are the ones who stay in business and, therefore, tend to be more satisfied.

6. New Bonding Structure

A new bonding structure should aim to cultivate trust by simplifying the process, making it at least as efficient as the federal government in terms of processing speed, efficiency, and effectiveness, while also reducing the paperwork burden. The structure needs to support mentorship initiatives that pair up underrepresented small businesses with larger corporations to help novice contractors navigate the intricacies of accounting, hiring, bidding, construction management, and bonding. Creating a membership-based online forum may allow underrepresented small businesses to interact and communicate with one another, promoting collaboration as well as competitiveness.

A simplified and more efficient bonding structure should not have the retention requirement, as many small businesses view the requirement to be redundant.

It is important for the new bonding structure to have measures in place to decrease the perception of discrimination. Suggestions include having participants fill out a survey at the end of the application process to find ways to improve the process. The survey could ask questions about the application experience, interaction with city directors, and ways to make the process more inclusive.

It is important to make prompt payments to small businesses within fifteen days, as is prescribed in the federal "Prompt Payment Clause." Federal law requires a late payment fee to be applied automatically, without the need for a request from the contractor. State prompt payment laws typically do not provide these penalties automatically.

The federal program, despite its deficiencies, is perceived to be better than the statewide bonding program because of its faster payments. According to small businesses' experiences, legislators in Irvine and in the Central Valley are approachable. The city of San Francisco received good ratings from underrepresented contractors, and suggestions were made to implement these suggestions at the statewide level.

From the responses received, there do not appear to be any significant issues related to the insurance. This was apparent from questions related to insurance in the survey. For example, on the question "did you have an insurance related issue that prevented your business from taking part in zero-emission transportation construction contracting?" 49 of the 51 respondents answered "no." When similar questions were asked in focus groups and targeted interviews, results were consistent with contractors' being able to secure insurance within a week.

If not implemented already, city directors should be required to undergo unconscious bias training at regular intervals. There were examples provided by underrepresented businesses encountering discriminatory bias in their daily interactions. For example, several women-owned businesses had their male spouses interact with other businesses to overcome this bias. There appears to be greater trust towards certain races and distrust towards others in lending credit or in the approval process.

Many city officials with good intentions appeared to be unaware that they were displaying unconscious bias when working with underrepresented contractors.

There is a clear demand for thorough training and technical support which recognizes the complexity of the industry. The new bonding structure should also call for the pairing of subcontractors with larger prime contractors who are interested in mentoring and offering opportunities to underrepresented small businesses. Preventing fraudulent applications is crucial, as is ensuring underrepresented small businesses can compete in their league. There should be a larger bonding cap of $3–$4 million and a faster streamlined process for bonding. Additionally, the new bonding structure should aim for faster payments, since the federal system currently is outpacing the state. Overall, the new bonding structure is envisioned to provide a more equitable, efficient, and supportive environment for underrepresented small businesses in California. In particular, the following improvements are suggested:

Decrease the paperwork required by avoiding questions like "do you do business with Iran?" Instead, have them in the terms of agreement.

Provide mentorship from more experienced SBEs and big companies, and provide a platform for the SBEs to communicate with each. Structure resources for bonding. Some of this is being done in Southern California and San Francisco. Increase the funds available for underrepresented construction contractors, particularly women-owned ones, which appear to suffer the most.

Have each SBE and big companies compete in their own category. Provide robust training/technical assistance to small new contractors.

Create an in-depth mentorship program that supports the bidding process, equipment, staffing, and training, ensuring pairing or encouraging the pairing of subcontractors with larger prime contractors who are genuinely interested in mentoring and providing opportunities to small businesses.

It is critical that a significant reduction is made in bonding and insurance premiums for underrepresented contractors to be able to compete. Have a streamlined application and approval process with higher bonding limits of at least $3–4 million. Since big companies are in their own category, it is important for the state to help small companies achieve bonding. Therefore, it is helpful to create conditions where big companies do not outcompete small companies by default.

Different bonding companies' agents appear to prefer non-SBA-sponsored private bonding companies that seemingly lead them to offer expensive rates and their own commissions. The current system is rigged to favor big business and large contractors with significant funding. Small and medium businesses cannot afford the cost overhead of working with the state of CA.

It is important to consider better value, not just the lowest price, and also it is important to factor in non-monetary benefits. Mandatory EVITP certifications should be in place. And there should be a space where small companies can compete with other small companies.

Bonding requires audited financial statements from the IRS. Small companies work with quick books, and this is too much work for them. Additionally, there is no internal audit team for small businesses. They need help from the government.

Many have to put up their homes for bonding. It is important to remove hurdles such as fees and costs to help small businesses and understand that escrow companies make money from the bonding process.

The new bonding structure should not look for the lowest price but consider the fact that the lowest price may damage the mentor and mentee relationship, and the benefit to the mentor should be factored in.

7. Summary & Conclusions

There are several direct and indirect implications of the longitudinal survey for policymakers. Findings show that there is generally a negative association between the image of the government and perceptions of underrepresented contractors. Significant efforts must be made to address the underlying disparities. Another implication of the findings is that it is important to have a third party to oversee the process and make regular audits.

There was a divide between Caucasian and African American races and ethnic groups such as Hispanics in the way they get contracts from the government. There was also strong empirical evidence that this could be the result of self-selection bias. There needs to be an online forum for these businesses to communicate with each other. Moreover, it is important to overcome any biases such as unconscious bias that can favor larger businesses when granting contracts. The structure also needs to be one that is much faster. More staff is needed to achieve this goal, particularly following the COVID-related shortage of staff. The federal counterpart pays faster and processes applications quicker.

To promote a fair and competitive zero-emission transportation sector, policy changes towards underrepresented contractors and greater assistance are required. Improved financial support structures, such as grants and low-interest loans, are needed, and expanded training programs and mentorship are called for. Reducing the administrative barriers and offering incentives to bring down the costs associated with compliance is recommended. Ultimately, there needs to be a systemic change along the lines suggested in this study to provide underrepresented construction contractors with equal opportunities in the zero-emission transportation sector.

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