

Contractors Walk on the Wild Side...Why?

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ABSTRACT

It has been estimated that permits are obtained for fewer than 5% of air conditioner replacements in California homes. This means that 95% of jobs never comply with nor verify the energy efficiency measures of California's energy code (not to mention the health and safety concerns with unpermitted work!).

The Western HVAC Performance Alliance—an innovative Industry-Utility alliance comprised of contractors, manufacturers, distributors, unions, code officials, utility program managers, verification providers, and researchers—has posited that there are substantial behavioral elements to the problem. They have conducted a simple survey of building contractors throughout the state to gauge over time the contractors' assessment of the risks of getting caught, and the reasons for opting to take the risk. This survey found that contractors believe that they probably would not get caught if they did not take out a permit, and that the consequences for not taking out a permit are insignificant. It also found that the main reasons for failing to take out a permit were primarily financially oriented: losing a bid, losing profits by having to lower the bid, and losing a customer who does not want to take out a permit. Based on the first round of responses to this survey, the alliance has identified some of the barriers, and is implementing several strategies to address the barriers. The Alliance has:

- designed a flyer to explain the energy code to potential customers, so that they understand why bids that include efficiency measures will be higher than those that do not comply with the law,
- designed a series of alternative forms that greatly reduce the daunting stack of paperwork required for energy code compliance,
- held discussions with the state contractors' license board to institute a continuing education credit so that more contractors will take advantage of training that is already available, and
- monitored stepped-up efforts by the license board to identify and take action against contractors who do not take out permits.

Introduction

One of the strategies that the plan set forth in California's Long-Term Energy Efficiency Strategic Plan ("CLTEESP," CPUC 2008) was for California's IOUs to engage in an unprecedented level of integration with the HVAC industry (unitary equipment). Only through such integration can the utilities' activities reach the critical mass that is required. To provide this integration, the Western HVAC Performance Alliance (WHPA) was formed in 2010. This unique alliance is now comprised of over 100 high-ranking representatives of a wide range of stakeholders. By bringing this group together, California has a unique communication pipeline between IOUs and policymakers, and the HVAC industry, defined broadly. This group has also developed an Action Plan to ensure that the CLTEESP strategies are met.

California's Building Code—Title 24

One of the very first activities of the WHPA was to set up a Compliance Committee. The bulk of those involved in the WHPA felt that compliance with the State's Building Code—Title 24—was one of the most powerful ways to improve efficiency of California buildings (current version, CEC 2008). Title 24 is one of the most progressive state energy codes in existence. The state is on a trajectory to begin requiring Zero Net Energy buildings by 2030, and each three year code cycle brings the state that much closer to this goal. Part of the uniqueness of Title 24 is its comprehensiveness and requirements for verifications and acceptance tests.

Unfortunately, although this rigor can definitely yield superior energy performance, if it is not well integrated into the industry that delivers buildings, this rigor can be a barrier from complying with the code at all. While there are clearly some cases where a contractor attempts to comply with the code and may not actually meet code requirements and not be caught, many contractors choose not to take out a building permit at all, rather than have to do everything required to comply with the code. Thus, they go underground, below the radar screen of the building officials.

Thus, there is tremendous uncertainty into what the actual compliance rates are. One study reported anecdotally on the perceived compliance rates, and estimated that permits are filed in only about half of HVAC alterations (Quantec, 2007). There are no comprehensive studies into actual compliance rates, however, and the conventional wisdom within the industry is that the compliance rate for residential HVAC alterations is actually on the order of 5%. For commercial alterations the number is expected to be similar. New construction, which is hard to imagine being done without a permit, has a much higher compliance rate. Regardless of the rates that are assumed, it is clear that failure to comply with the building code leads to a huge missed opportunity to improve the performance of California buildings. The CLTEESP laid out a goal of achieving a compliance rate of 50% by 2015 and 90+% by 2020, and this is the goal that the WHPA Compliance Committee is targeting.

Survey of Contractors

The WHPA Compliance Committee conducted a survey in order to better understand what the thinking of contractors is related to non-compliance (not taking out a permit). The intent of the survey was to answer three questions: 1) What is the perceived probability of getting caught? 2) What are the perceived consequences of getting caught? and 3) Why would contractors take this risk?

The results of this survey have informed the actions of the WHPA Compliance Committee, and the intention is that the survey will be conducted again over time, to see if any of these factors is changing. This survey was developed, implemented, and analyzed by a Committee staffer, a draft survey was developed and reviewed by the Committee, and various members of the committee helped to disseminate the survey. The survey was available in two formats: on-line and postcard-sized response forms which could be folded in half and mailed postage paid. Both formats included the logos of several union and non-union contractor associations, the California building official's organization, and the distributor trade group. This helped to ensure that the respondents would know that the industry as a whole was behind this survey. These groups disseminated the survey to their members, hence, the survey was not a random sample of California contractors, and likely has a "joiner" bias. 268 responses were

received: 64 with postcards and 204 online. The survey was focused on residential HVAC replacements, which represent on the order of 80% of the residential HVAC jobs (the balance are in new construction). The results of the survey were not a surprise, but they were valid evidence of a serious problem in the industry, and suggested ways to target activities to improve compliance rates.

Results of Survey

Probability of Being Caught

One of the biggest barriers to compliance is that there is little perceived (or real) chance of being “caught.” In this case, being “caught” means that the contractor would be identified by the code official or other authority and given some sort of consequences. The question that aimed to gauge this perception was phrased as follows, along with the multiple choices available:

Many of your competitors are able to bid lower on residential HVAC replacements by not taking out a building permit.
The industry members indicated on the back of this form are interested in your honest view of the risks associated with not taking out permits. Please take a moment to answer these three simple questions.

Do you think your competitor would be “caught” if he¹ didn’t obtain a building permit for replacing a residential air conditioner?

- Yes – He would almost certainly get caught.
- Probably – It’s possible he could get lucky and NOT get caught, but probably not.
- Don’t know – He might get caught, and might not.
- Maybe – It’s possible he could get unlucky and get caught, but probably not.
- No – He would almost certainly NOT get caught.

Note that the question does not ask “Will YOU be caught?” but “Will your competitor?” It was felt that this less invasive question would receive a more open response. As seen in Figure 1, there were a few respondents who felt that there was a risk of getting caught (2% Yes, 4% Probably). 13% didn’t know, and the vast majority felt that there was probably or certainly not a chance of getting caught (45% and 36% respectively). There is a clear perception that one is not likely to be caught.

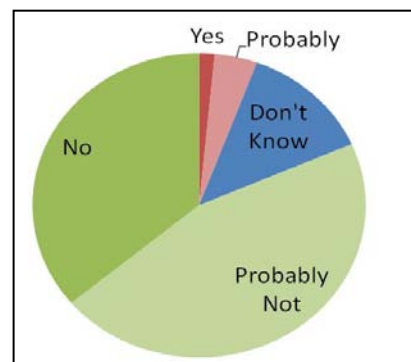


Figure 1: Would your Competitor get “Caught”?

¹ Note that the masculine pronoun was used. This reflects the male-domination of the contractor profession, and is regrettable, but it was felt that it was most appropriate for this audience. The authors look forward to the day when dual pronouns can be used!

Consequences of Being Caught

The second question aimed to gauge the contractors' assessment of what the consequences would be if they were caught without taking out a permit. The question that probed this and the possible answer were:

If he were to get "caught," what do you think would happen to him?
(Check all that you think apply).

- He would get a warning.
- He would have to go back and get a permit for that project.
- He would have to pay a minor fine (about double the permit cost for that project).
- He would receive a citation and pay a major fine (up to \$5000)
- He would lose his C20 license.
- It would put him out of business.
- He might go to jail.
- He could face a lawsuit, with triple damages.
- Other (please specify:)

As seen in Figure 2, most of the responses were for consequences that were fairly minor (18% Get a Warning, 42% Have to Go Back and Get a Permit, 26% Minor Fine). The other, more serious consequences were much less likely to be reported (7% Major Fine, 3% Lose License, 1% Out of Business, 1% Go to Jail). Clearly, the perceived risk of getting caught is negligible, and the perceived consequences of getting caught are insignificant, so it is not surprising that compliance rates are low.

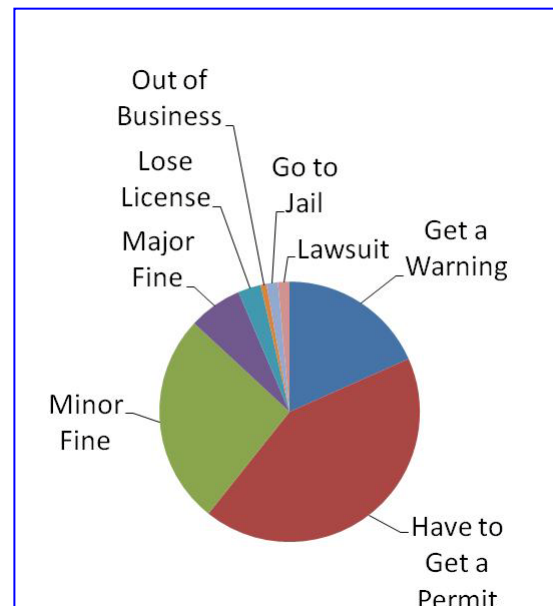


Figure 2: What would be the Consequences?

Reasons for Taking Risk

If there is any risk involved in failing to take out a permit, why would a contractor take this risk? The third questions attempted to find out what the reasons are for not taking out a permit. The question was worded as follows:

What are the three most important reasons why he would take this risk and not take out a permit?
(1=Most Important, 2=Second Most Important, 3=Third Most Important.)

- It would drive up the price of the job and cut into his profits.
- It would drive up the price of the job and make him lose the bid.
- Filling out the forms is too complicated.
- Going to the Codes counter takes too much time.
- It's too hard to do duct testing and sealing.
- Customer doesn't want a permit.
- Risk? What risk?
- Other (please specify:)

As seen in Figure 3, the three of the most commonly cited reasons for not taking out a permit were financial in nature (the leftmost blue bars). The largest response was that the contractor would lose the bid (37% cited this as the most important reason), since the extra work and the cost of the permit can add thousands of dollars to the price of a bid. This extra cost also eats into profits (13%), and there is a risk of losing customers who do not want a permit to be taken out (8%). The remaining answers were: Code Counter Inconvenient (11%), Measures too Hard (10%), Forms are Too Hard (4%), and "Risk? What Risk?" received 17% of the votes.

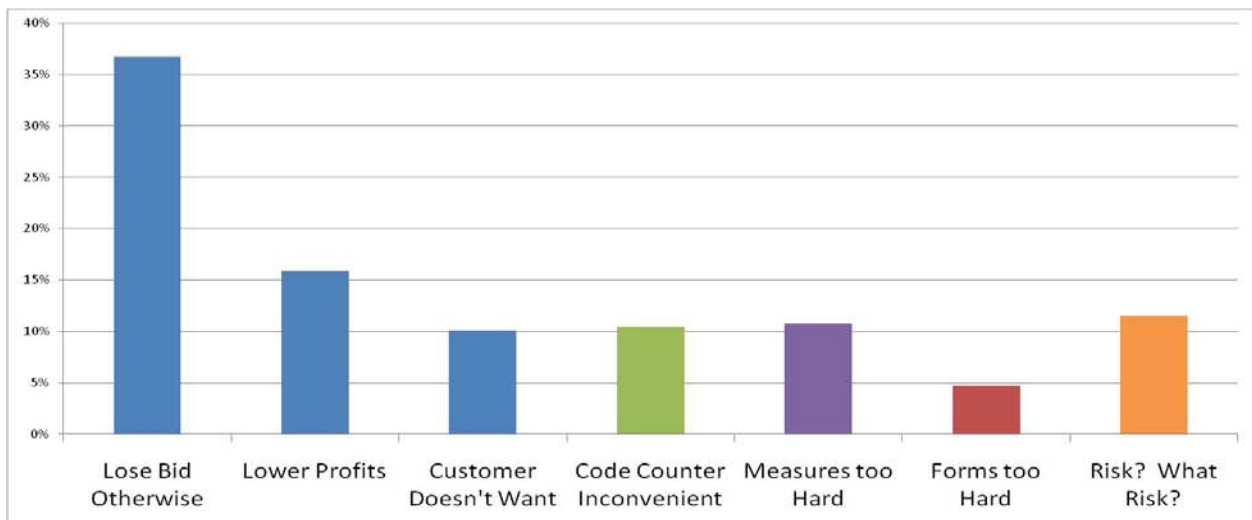


Figure 3: Why Would He Take this Risk?

Activities to Address Barriers

After evaluating the results of the survey, the WHPA Compliance Committee took a variety of actions to address the factors that are causing contractors to choose not to take out permits and comply with Title 24. Each of the activities discussed below relates to one of the

barriers identified in the third question above. Most of the activities were designed to address simple prescriptive HVAC replacements.

Economic: Lose the Bid, Lose Profits, Customer Doesn't Want Permit

When a contractor takes out a permit for a residential HVAC replacement, the cost of doing the job increases significantly. In addition to the cost of the building permit itself, the contractor must do additional testing, and in many cases there must be a third-party verification of the installation. This can add thousands of dollars to what should be a fairly simple job. This either drives up the bid to the point where it is quite difficult to compete with someone who is not taking out a permit and incurring these extra costs, or it cuts into the contractor's profit, if he is forced to lower his bid to remain competitive. The solution to this is to level the playing field. To do this, customers must be willing to pay the higher costs (and reap the energy-efficiency benefits) of a permitted job. How, though, can a contractor convince the homeowner to accept these higher costs?

One of the first activities of the Compliance Committee was to develop a brochure for contractors to give to homeowners (see Figure 4). The intention of this form is that it is something that the contractor can show to potential customers when they are sitting around the customer's kitchen table, going over the bid that the contractor is providing. The brochure attempts to do the following:

- describe Title 24,
- alert the homeowner to the fact that it is, in fact, illegal for the contractor to do a job without a permit,
- provide some information about the benefits of energy efficiency and the importance of a good installation,
- describe the inspection process and allay the homeowners concerns that the building inspector will be looking for all kinds of other code violations,
- provide a place for the contractor to convey the final inspection appointment time (keeping in mind that it is one thing for the contractor to take out a permit, but it is equally important that the contractor complies with the entire process and final the job by obtaining a final inspection), and
- demonstrate that the industry is united, through the use of the logos of all the contractor and code official associations and the Contractor State Licensing Board (CSLB), along with the following statement that was approved by all the sponsoring organizations:

The HVAC industry is united as never before in its commitment to reducing the energy used by heating, ventilation, and air conditioning systems, through measures such as those required by California's Title 24.

This brochure was drafted and reviewed by the WHPA Compliance Committee, and the final version was disseminated by all the sponsoring organizations. It is also available on the WHPA website.

California Building Standards—HVAC Changeout Requirements

According to the California Mechanical Code (Title 24, Part 4), a building permit is required for most Heating, Ventilation, and Air Conditioning (HVAC) modifications, including (but not limited to):

- New HVAC installation
- HVAC changeout/remodel/replacement including the air-handler, coil, furnace, or condenser
- Relocation of an existing HVAC unit
- Removal of an HVAC unit or system
- Adding ducting

The California energy code also requires the following:

- Minimum efficiencies for heating equipment, central air conditioners, and heat pumps
- Duct insulation
- A set-back type thermostat
- Analysis to ensure that the equipment capacity will be appropriate (in some cases)
- Sealing and testing of any ducts that leak 15 percent or more
- Independent verification of HVAC work by a Home Energy Rating System (HERS) rater (in some cases, only a one-in-thirty random sample needs to be tested).

After the work is completed, tested, and independently verified, it must be inspected by the building official.

Not getting a permit is illegal and exposes you to additional costs and liability. If your contractor does not get a permit, he or she can be disciplined under Business and Professions Code, section 7110, potentially resulting in a substantial fine and loss of license.

Did you know.....the average California home uses almost 30% less energy than the average US home? This is due in large part to the types of measures required by this code. Proper installation and verification are the keys to making this work!

Your final inspection will take approximately 15 to 30 minutes to complete. Someone over the age of 18 will need to be there to let the inspector in, and the inspector will need access to your HVAC equipment (typically, in a closet and back or side yard). Your contractor does not need to be present.

The final inspection is an important part of the HVAC installation process. The goals of the inspection are to ensure that the installation was done properly, and that your new system meets the safety and efficiency requirements of the codes. You will enjoy the comfort and efficiency of your new system for years to come.

Homeowners are often concerned that the inspector will be looking for unrelated code violations. The inspector is there to identify HVAC installation issues such as improper wiring and ducting. If the inspector happens to see any problems that are a threat to safety, he or she will bring them to your attention and ask you to address them. Otherwise, you can be confident that the inspector will be focusing on the HVAC system.

The following is your appointment for a final HVAC inspection:

_____ (am / pm)

Phone # _____

Please call this phone number anytime after 8am on the day of inspection if you would like to obtain a more specific time.

If this time is not convenient for you, please call this phone number to reschedule.

California Building Officials

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The HVAC industry is united as never before in its commitment to reducing the energy used by heating, ventilation, and air conditioning systems, through measures such as those required by California's Title 24.

Figure 4: Homeowner Brochure for Contractors

The Code Counter is Inconvenient

To address the fact that going to the code counter is inconvenient for contractors, the WHPA Compliance Committee is conducting a pilot test of an online permitting system. The contractors and code officials on the committee reported that it is very common for a contractor to meet with the customer, obtain the permit, install the job, have it verified, and have a final inspection all within two to three days. When a customer's air conditioner is not functioning, replacing it quickly is critical. This group acknowledged that there are times when a contractor does not have time to go to the code counter to get the permit.

Online-permitting is expected to give the contractor the flexibility to apply for a permit as early as possible, without cutting into the day's billable work. The contractor sends a request for a permit through an online portal, and the code counter staff reviews it and then issues a permit number. All of this can be done without visiting the counter. One of the things that makes this difficult to do is processing the permit fee. Many jurisdictions have sophisticated financial systems in place to accomplish financial transactions with city residents and businesses. All cities have a different system, and it would be difficult to develop an online permitting system that interfaced with all possible financial back-ends. Some commercially available solutions are quite costly to the city.

The solution that was chosen for the pilot test was a commercially available application that allows the contractor to register with the website, and process the payment. The website issues a permit number as it contacts the jurisdiction to indicate that a permit is pending. A credit-card type transaction is issued. This is a simple thing to coordinate with a city, and the small payment is made for the service is paid by the contractor, not the city.

The pilot test is beginning with Fairfield, CA, and will eventually be extended to about four or five other cities. The pilot is just beginning, and the Compliance Committee is eagerly awaiting the results.

The Measures are Too Hard

Ten percent of survey respondents felt that the measures required by Title 24 were too difficult. Most of the measures—such as sizing the equipment correctly, sealing ducts, checking airflow and fan power, adjusting charge, and carrying out acceptance tests—are not difficult, but they do require training to implement correctly. The key to this barrier was determined to be training.

The WHPA Compliance Committee is attempting to address this barrier by coordinating some of the training resources in the state. The Committee held a forum at which several training providers shared stories on how they approach the training, what skills they train for, and lessons learned from years of providing this training. One of the findings were that there is a need for training to be provided to code officials and contractors together, so that both sides can see what the other is learning. This fosters a joint sense of purpose and accountability. Although the state's IOUs all have excellent free training programs, which teach the necessary skills, they are reaching only a small fraction of the contractor community.

Right now, obtaining a license to be an HVAC contractor does not require training. One must pass a test, but the types of measures required for Title 24 are not emphasized in this test. It has been stated that it is easier to get an HVAC contractor license than a license to open a beauty parlor! There is also no continuing education requirement to maintain the license. The

Compliance Committee is working with the Contractors State License Board (CSLB) to evaluate license and continuing education requirements.

While the measures themselves are doable by most contractors, the fact that there are so many measures, and they change every three years makes Title 24 difficult to comply with. One way the Compliance Committee addressed this concern has been to review the new requirements that are proposed to go into the 2013 version of Title 24. Some of the issues that have been addressed are protocols for charging air conditioners during the winter time, and the use of fan-driven flow measurement devices for measuring return airflow. Some more general concerns, which were submitted formally during Title 24 proceedings, are shown in Table 1.

Table 1: Recommendations Made by Compliance Committee for 2013 Title 24

1. We all recognize that simplification of all processes will lead to greater compliance with the new standards. The primary goal should be to make the process as simple as possible while still meeting the energy goals of the State of California. **The CEC should continue to actively work with all parties who will be implementing the standards down to the end user level to find ways to simplify compliance. For example, developing a simplified method for some common compliance scenarios.**
2. Most of the failure to take out permits comes from alterations rather than new construction. For simple HVAC replacements, which are a large fraction of these projects, the current required paperwork is overkill. Our committee has worked with the CEC to develop two simplified and combined forms (CF1R-ALT-HVAC and MECH-1C). **We recommend that simplified forms be developed to replace ALL of the required forms, for the special case of simple HVAC replacements, and that proposed forms be reviewed carefully by code officials and contractors (the WHPA would be happy to serve in this role).**
3. The world of the contractor is slowly entering the computer age. For those who are already there, there is a need for simpler ways to fill out forms, rather than requiring repetitive writing on printed out forms. **We recommend a “Turbo-Tax” type application be developed to facilitate collecting and reporting information that goes on the forms, at least for simple HVAC replacements. At a minimum, forms should be PDF forms rather than flat documents.**
4. If data can be collected electronically, it can be mined for valuable information about compliance related activities. **We recommend that key information collected on the forms be stored in a searchable database, and that the database be made available to the public for job-related purposes and for compliance research.**
5. Enough is not known about compliance rates. The statistics gathered by the CEC from compliance documents will not capture the presumably large number of projects for which no permit was ever taken out and there is no paper trail whatsoever. **We recommend that the CEC work with the CPUC to conduct a thorough study focused on failures to take out permits, and that that study be conducted over several years (with early interim deliverables) to capture a true sample over the full term of an adopted standard cycle. The study should also evaluate what factors affect compliance rates.**

The Forms are Too Hard²

Another complication, for which Title 24 is notorious, is the number and total length of compliance forms. Table 2 shows the number of available forms. Note that not all forms are required for any given job, but contractors must wade through all this paperwork to comply. Keep in mind again that simple prescriptive residential HVAC replacements are about 80% of

² This barrier received only 4% of the votes. It was noted by one Committee member, however, that this may be because people are NOT USING the forms currently! If they were using the forms, perhaps this barrier would be more significant.

the residential HVAC jobs, and you can see that this amount and variety of paperwork is a big barrier.

Table 2: Required Forms for Title 24

| Residential Forms | |
|--|----------|
| Certificates of Compliance | 3 forms |
| HVAC Alterations Certificates of Compliance | 5 forms |
| Mandatory Measures | 1 form |
| Installation Certificates | 5 forms |
| Installation Certificates – HERS | 7 forms |
| Commercial Forms | |
| Certificates of Compliance | 18 forms |
| Installation Certificates | 6 forms |
| Certificates of Acceptance | 17 forms |
| Certificate of Field Verification and Diagnostic Testing | 1 form |

The WHPA Compliance Committee was particularly concerned about the Certificate of Compliance forms, which are the very first forms that must be filled out at the time of pulling the permit. For a simple residential HVAC replacement this form is 5 pages long, and includes questions about roofing, fenestration, and mass-walls. Clearly, a simplified form would be much easier to fill out. The Compliance Committee proceeded to work directly with the California Energy Commission (CEC) and developed an improved form—The HVAC Alterations Certificate of Compliance. Because it was simply an excerpt of the existing Certificate of Compliance form, it did not require approvals at the highest levels, but the CEC has adopted the form and it is now available on their website, alongside all the other forms. This form is actually a series of 5 different forms, one for each climate zone requirement. Since any one contractor usually works in only one or two climate zones, it was felt that this complication was preferable to the complication of attempting to address all possible climate zones, with different requirements, on one form. There are some types of jobs for which the form is not applicable, such as multi-zone systems, but the vast majority of jobs can use this form. A similar form was developed for the Commercial HVAC Alteration Certificate of Compliance.

Another attempt to simplify the paperwork, with a much longer lead time, is development of an automated forms generator. Similar in look and feel to online income tax programs, by simply asking simple questions about the job, the correct forms can be generated for compliance. Or perhaps the idea of forms is altogether unnecessary, and information can be conveyed electronically. The Compliance Committee is pursuing these ideas with the CEC and the IOUs.

Risk? What Risk?

Of course, if there is no perceived chance of getting caught, and the consequences of getting caught are insignificant, then noncompliance is not seen as any kind of risk. The solution to this is to improve the (perception of) the chances of getting caught, and inflate the (perception of the) consequences of getting caught. The WHPA Compliance Committee is working with the CSLB to make progress on both of these fronts.

The CSLB is currently conducting a series of high profile “sting” operations, wherein they pretend to be homeowners looking for an HVAC contractor. They invite contractors to

provide a bid, and in the course of so doing they ask if a permit is required. If the contractor says that no permit is required, then they are found to be in violation of the law. The violating contractors are issued a citation, and upon receiving two citations, they will receive a significant fine (up to \$5000 per violation, which could be a significant fine for a contractor who makes a habit of violating).

These sting operations have been successful. The CSLB reports that over 50% of contractors who responded have been cited. This number would undoubtedly be larger if they kept up the guise and allowed the contractor to actually do a job. It is likely that when push comes to shove, in order to minimize the cost of the job, the contractor will volunteer to not take out a permit.

The goal of these stings is not to nab a large number of violating contractors, but to raise the awareness of the requirement of compliance, and to increase the perception of the consequences of getting caught. By working with the trade press and getting the word out through WHPA member organizations, this word is starting to spread, although there is no evidence that this is changing compliance rates in any significant way. By reimplementing the survey, we will be able to see if the perceptions are changing.

Other efforts to step up enforcement could include tracking serial numbers of all HVAC equipment sold, through the distributors, to match with permits; working with manufacturers to see that warranties are tied to correct installation, requiring permits; and using IOU upstream efficiency programs to further the message about the importance of complying, by requiring a valid permit before an incentive can be paid.

Summary

It has been estimated as many as 95% of HVAC replacement jobs never comply with nor verify the energy efficiency measures required by California's energy code, Title 24. If they do not go through the compliance process, which starts with taking out a permit, they are not likely to install the energy efficiency measures included in the code. Increasing compliance significantly can be an effective way of improving the performance of California buildings.

The Western HVAC Performance Alliance—an innovative Industry-Utility alliance comprised of contractors, manufacturers, distributors, unions, code officials, utility program managers, verification providers, and researchers—believes that there are substantial behavioral elements to the problem. They have conducted a simple survey of building contractors throughout the state to gauge over time the contractors' assessment of the risks of getting caught, and the reasons for opting to take the risk.

The findings of the survey were that contractors for the most part do not believe that there is a credible threat that they will be caught if they do not take out a permit. Over eighty percent of contractors believe that they would definitely or probably not be caught. They also believe the consequences of being caught without a permit are not substantial. 86% felt that the consequences would be a small fine, requirement to go back and take out a permit, or other such slap on the wrist. The reasons why one would take this risk are primarily financial: half of respondents felt that they would either lose a bid to someone who was not including the expense of taking out a permit, or would be forced to lower their own bid to be competitive.

Based on the first round of responses to this survey, the alliance has identified some of the barriers, and has implemented several strategies to address the barriers. These strategies include:

- designing a flyer to explain the energy code to potential customers, so that they understand why bids that include efficiency measures will be higher than those that do not comply with the law,
- designing a series of alternative forms that greatly reduce the daunting stack of paperwork required for energy code compliance,
- holding discussions with the state contractors' license board to institute a continuing education credit so that more contractors will take advantage of training that is already available, and
- monitoring stepped-up efforts by the license board to identify and take action against contractors who do not take out permits.

It is likely that a combination of different efforts will be required to improve compliance rates in California. There is no silver bullet. The success of the WHPA Compliance Committee in identifying and addressing the barriers is attributable to the fact that it includes a wide range of stakeholders, all working with a similar vision to remove barriers to compliance. This type of innovative organization can prove to be a model for other regions of the country in improving compliance rates with state energy codes.

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