DOCKETED	
Docket Number:	17-EBP-01
Project Title:	Improving Energy Compliance of Central Air-Conditioning and Heat Pump Systems
TN #:	224312
Document Title:	Bruce Severance, Mitsubishi, July 26 comments
Description:	N/A
Filer:	Judy Roberson
Organization:	California Energy Commission
Submitter Role:	Commission Staff
Submission Date:	7/27/2018 9:06:22 AM
Docketed Date:	7/27/2018

From:	Severance, Bruce
To:	Roberson, Judy@Energy
Cc:	Moore, Sara@Energy
Subject:	MEUS Comments Addendum
Date:	Thursday, July 26, 2018 3:01:04 PM
Attachments:	image003.png HVAC Safety-Enforcement Policy-MEUSaddendum7-18.docx

Dear Judy Roberson,

In light of the extremely constructive workshop discussion and public comment on July 20, I had several off-line conversations with stakeholders following the conference and the resulting brainstorm produced the following additional addendum to our previous comments.

Mitsubishi Electric US (MEUS) continues to see proper system sizing, duct design and improved installation as key variables that can double or even triple "installed system efficiency" on a statewide basis. Under average contractor practices today, the installed system efficiency falls far short of the rated equipment efficiency, and the client is short-changed primarily due to the failure to perform proper system commissioning and the failure to address existing duct leakage issues.

Mitsubishi Electric US has had numerous internal discussions on how we may facilitate a change in compliance standards that has benefits for contractors, and their clients by increasing comfort, efficiency, indoor air-quality and customer satisfaction. We welcome the opportunity to participate in these discussions.

Sincerely,

Bruce Severance
Regulatory Compliance Engineer
Industry and Government Relations

Mitsubishi Electric US, Cooling and Heating
P.O. Box 1000, Grover Beach, CA 93483
Mobile: 805-574-3207
Email: bseverance@hvac.mea.com

http://www.mehvac.com/

Mitsubishi Electric US:

Additional Comments Submitted to CEC Regarding July 20 Compliance Workshop

(Consider these comments an addendum to MEUS Comments Uploaded to Docket on 7-17-18)

HERS Fraud and Conflict of Interest:

1) Anecdotal evidence from the field indicates that falsification of HERS documents is occurring at a rate of 15% in some counties and as much as 70% in Southern California. HERS raters widely report that if they fail HVAC contractors consistently, they are not called back to do testing on the next project. The current system wherein HVAC contractors control who they hire has implicit conflicts of interest. Honest HERS raters are put at a competitive disadvantage and can be driven out of business *for being honest*.
2) Greg Mahoney, a building official from Davis, and representing CalBO, (California Association of Building Officials), argues strongly against building departments assigning or hiring HERS raters. This is especially onerous for small, understaffed departments and the burden of coordination should not fall on them.
3) One solution is to give CalCerts (or other HERS providers) control over assigning HERS raters to HVAC projects. To be sure this system eliminates preferential treatment, HVAC contractors who have obtained permits would make the first contact to CalCerts, and their software system would automatically assign a HERS rater to the job on a rotational basis (not random). The HERS rater would have 24-hours to confirm to both the contractor and CalCerts that they accept the job. Russell King of CalCerts seemed to think this approach would be viable and could be done by an automated email service that would not be difficult to establish and would not increase overheads or burden on staff.
4) HERS Sampling: Anecdotal evidence suggests that sampling can result in duct systems with up to 20% leakage with indoor air-quality impacts on occupants. Such poor quality resulting from the current sampling system indicates that the quality of the homes tested is intentionally higher than the quality of other homes that are not tested in the sampling. This brings the entire sampling protocol into question and indicates dishonesty is taking advantage of this system.

Permit and HERS Simplification and Honoring Contractor and Enforcement Overheads:

1) The HERS forms are unnecessarily complicated. There are so many unnecessary pages and building officials are not reading the details of them because they are cumbersome. If an HVAC contractor is providing software generated room by room load calculations and system diagrams including equipment specification and duct design, there should be nothing more needed than a one-page simplified permit application form to start the job. This form should be standardized statewide by the CEC and uploadable online to both the building department. Once approved and stamped, the proposed drawings and calculations can be submitted by the contractor to CalCerts.
2) The CF1R and CF2R forms should be eliminated. If system design revisions are made after the initial application, corrected drawings can be submitted online with a one-page revision form.

3) The CF3R verifying HERS testing should be the only document required to verify compliance other than the stamped drawings.
4) Many HVAC contractors complain about lost time due to current permitting and HERS protocols and cite this as a reason to perform work without permits –even those that are dedicated to high quality work circumvent the rules. It takes hours to complete load calculations, and hours to commission systems. It is time consuming and frustrating to make the contractor stand in line at a building department half way across the county to file a permit that could easily be done online. This would also reduce a building department's burdens and overheads.
5) Similarly, building departments could require their inspectors to schedule arrival at a site within a one-hour window and further require courtesy calls to the contractor when they are a half-hour away.
6) Courtesies and conveniences that save the contractor many hours of down time and unforeseeable and unpredictable loss of profit need to be institutionalized statewide.
7) Quality control checklists that are filled out by installers or certified crew foremen during system commissioning would be a far more useful and clearer indication of measured performance and compliance than the current CF1R or CF2R forms. Such checklists would confirm measured airflow, static pressure, duct leakage, fan watt-draw and refrigerant verification.
8) Such checklists could be voluntary but incentivized by the state in the following manner: Self-commissioned systems that result in consistent HERS tests passes on five or seven consecutive jobs could result in "preferred status" entitling a contractor to have HERS raters exam systems without the presence of the contractor and freeing them from that overhead.
9) Contractors who consistently meet system design requirements and pre-test their systems to consistently pass HERS should be given "streamlined" HERS status. They would not be required to be present for HERS testing and could contract with the HERS rater to meet building department inspectors on their behalf, sparing them the inconvenience and cost of having staff on site for these inspections.

Unlicensed HVAC Contractors:

1) Unlicensed HVAC work is widespread and puts the licensed contractor at an enormous disadvantage: Licensed contractors are required to maintain bonds, liability insurance and workman's compensation insurance that can increase their burdened labor rates by 30% to 50%. There is no way for them to compete with unlicensed contractors and their attempt to do so forces installation quality to the lowest levels industrywide.
2) Unlicensed work in excess of state allowed contract value limits is a form of fraud. The unlicensed contractor inevitably makes assertions about their knowledge and expertise to perform quality work without knowing anything about how to deliver quality HVAC work or even having the tools to do so. These systems are too complex to allow any repairs to be performed by unlicensed contractors or by the homeowner. There are serious health and safety risks with allowing unlicensed repairs to electrical or gas feeds as well. Unlicensed work needs to be criminalized, categorized as "fraud" (in the same sense that impersonating a doctor is a crime) severely punished and policed.
3) On this note, it should be incumbent upon all HVAC supply stores, big box stores and online HVAC equipment distribution sites to require presentation of contractor license numbers. In the

event that a homeowner is purchasing equipment from an online distributor, a copy of the signed contract including the contractor's license number should be uploaded to prove that the purchase is being made after contract is signed. There is no other simple way to prevent system installation by unlicensed or untrained staff.

4) Supply houses should be admonished not to sell to unlicensed contractors and be required to post signs advising all customers that proof of current license is required, and that use of another contractor's number without being their employee is fraud. Appropriate penalties need to be in place to deter unlicensed contractors.
5) CSLB needs to establish clearer guidelines and textbooks for what must be known to pass the HVAC contractors licensing exam. Currently, the CSLB endorses no textbooks and offers no clear outline of the design, install and efficiency topics that must be understood in order to pass the exam. HVAC is by far the most complicated system in a building and candidates taking the exam deserve to have critical exam topics clarified in detail. There has been resistance to this in the past because of fear that the CSLB should not "give away the answers". The bottom line is that there should be clear criteria for the breadth of knowledge required so that people are not passing the test haphazardly, and unlicensed contractors who have the work experience and who want to get a license and operate in a legitimate fashion (with insurance and training) have a path for being brought into the fold. They should also be encouraged to attend CEC/IOU training centers, etc.
6) It is already a CSLB rule that unlicensed contractors cannot "borrow" or work under another contractor's license unless they are proven to be an employee of the company. But this rule is frequently abused and many jobs are performed under "borrowed" license numbers. This type of work is similarly a misrepresentation of the contractors' qualifications and should be more severely punished to discourage such "friendly arrangements" between licensed and unlicensed contractors. It is in fact a form of fraud that results in the delivery of a substandard product, and the client is cheated out of value and subject to other liabilities that they are not made aware of.
7) Proper HVAC system installation requires a field of expertise much broader than the average consumer ever imagines: The client who endorses contracts with unlicensed repairmen not only assures a low quality install that will perform poorly and expose them to health risks. They also expose themselves to significant legal liabilities in the event of fire, loss of property or personal injury. Public education campaigns should be directed toward consumers to discourage hiring unlicensed contractors and to make them aware of quality and liability compromises that are made by doing so.
8) According to Greg Mahoney, Davis Building Official, the city of Davis has enjoyed relatively high compliance with permit requirements for all remodel work because the city instituted mandatory inspections of all properties during escrow. This was instituted because of two students killed in a house fire when an unpermitted garage conversion performed by the homeowner caught fire. Forty years later everyone knows that unpermitted and unlicensed work will only cost them more to repair if anything is found not to comply later. This seems to be a very effective strategy that catches all or most non-conforming or unpermitted work. Because it instills respect for code compliance and permit requirements, it is probably far more effective than an attempt to institute serial number tracking that would only yield a data base that would still have to be scoured by investigators looking for clues and patterns of non-compliance. It also discourages realtors or "home flippers" from hiring unlicensed and uninsured contractors, thereby offering broader protections to residents.

Public Service Announcement Opportunities:

1) There is an abundance of public service announcement airtime on television stations statewide, albeit during off-peak hours. Given the significant indoor air quality and CO hazards associated with poor duct design and low install quality, the state could produce a series of PSAs that feature the importance of proper system design, health and mold related issues, "red-tag" fraud schemes and the potential energy savings benefits of proper installation. All of these ads could include an underlying theme of avoiding unlicensed contractors.
2) Other paid ad campaigns could feature the importance of highly trained HVAC crews and refer audiences to websites for companies that have higher certifications for both contractors and their crew foremen.

Contractor Training:

1) There is little doubt that contractors need continuing education requirements. Duct systems in existing structures that pre-date 2005 have an average of 30% duct leakage. Contractors don't seem to appreciate the health implications of the depressurization and bio-toxin infiltration that results from this condition. Homes with crawl spaces draw 40% of the make-up air from the crawl space. Half of the existing housing stock has rodent or other animal infestation issues. Duct leakage poses a public health crisis, yet most contractors do not test existing ducts or even own the equipment to do so. Little or no attention is paid to critical building safety and performance issues with health impacts such as depressurization of buildings, back-drafting of combustion vents, combustion vent draft pressures, system external static pressure, and combustion ventilation requirements. Few contractors are versed on the product and safety advantages of upgrading to sealed combustion equipment (condensing type). Few understand the impacts of such upgrades on elimination of CVA vents, and duct design. The current generation of contractors are asked to pass a contractors licensing exam that does not currently encompass "new school" and latest generation technologies. Because technology is now evolving quickly, no one-time licensing exam is sufficient. The consumer deserves quality and healthy conditions. Continuing education requirements are the only practical solution.
2) There are currently several industry training programs that teach most of these principles fairly thoroughly: NATE, NCI and online education like "It's About Q" offer formats and curriculum that meets most of the above topics.
3) Rick Chitwood who has done much of the ground-breaking efficiency work for the CEC, authored: Measuring HVAC Performance. If his methods of designing systems were widely adopted, system efficiency could be doubled again, but most HVAC contractors assert that the Chitwood school of thought is "wrong" because it contradicts the "old school" methods they were taught, and they lack the technical training to embrace the "new school" thinking.
4) A phone survey of HVAC contractors could be easily conducted with three or four simple questions to benchmark the current ratio of old school and new-school contractors. This benchmarking is important because we need to be able to assess the statewide improvement in five years and whether attitudes and HVAC contractor behavior changes. Questions on the survey could include: 1) Do you pull permits on every furnace or heat pump replacement? 2) Do

you test leakage of existing ducts on every job? 3) Do you ever design systems with shorter ducts with registers throwing air toward the outside of the building? 4) Do you own duct leakage testing equipment and is it used on every duct job? 5) Do you perform refrigerant charge verification on every job? 6) Are any of your crew foremen NATE or NCI certified?

Broadening Scope of "Incidental" HVAC Work to Include Attic Sealing and Insulation:

1) One of the key measures in Chitwood's methodology is dropping ducts to the floor of the attic and deeply burying them in blown insulation. This type of work has traditionally been performed by a BPI or home performance general contractor who air-seals the attic plane and make the attic rodent-proof before blowing new insulation. There is no reason why HVAC contractors could not be allowed through a new CSLB ruling to act as the primary contractor to have an insulation company do this work. It would simplify their duct installation to work in an insulation-free attic and greatly improve system efficiencies. CSLB rules allow "incidental work" to be added to a scope. For example, an electrician is allowed to make minor drywall repairs that are necessary to complete an electrical repair. These attic improvements could be similarly categorized.
2) These types of measures have been central to home upgrades performed under the Energy Upgrade California Program. But this program has had to spend a disproportionate amount of program dollars on marketing because: 1) The program has required that a BPI-certified general contractor act as the primary contractor for all of the work. This is disadvantageous because there is no incentive for HVAC contractors to call in a GC to perform attic work when they replace the furnace and there is no incentive for them to do so. It only slows their work schedule without benefits; 2) General contractors have had to cold call on clients and educate each one of them about the retrofit measures and why they are advantageous when clients have no urgent reason to upgrade their HVAC systems. Typically, they are not reaching the clients who need the work done the most: those whose HVAC systems need replacement.
3) The Energy Upgrade California Program is also failing to gain traction due to cumbersome paperwork and contractor participation requirements that are onerous and not cost-effective. The requirement to perform BPI testing both before and after improvements is expensive and unnecessary. However well intended, IOUs have not done a very good job of designing a program that was simple and cost effective, and their numerous rules were design to protect themselves from liability, but exposed contractors to unreasonable unforeseen expenses, rule ambiguity and frequent program updates that made the bureaucracy more rather than less complicated and costly. Bureaucracy is killing the program. At the current rate of home upgrades being performed, it will take 800 to 900 years to upgrade all of the existing housing stock. With the Governor's stated goal of completing this work by 2030, radical change is required.
4) If HVAC contractors are allowed to act as primaries contractors in hiring insulation contractors to remove old insulation, seal attics, rodent proof and then deeply bury ducts, these attic improvements would be far more widespread than under the current rebate program structure. A streamlined energy upgrade program could be built around this set of upgrades performed under the HVAC contractor's primary contract with program incentives paid to both the HVAC contractor and the client. One reason this synergy would be so advantageous is that consumers

always contact HVAC contractors when HVAC systems fail. There is no similar trigger that makes them call a BPI-certified home performance general contractor. These upgrades are inherently easier for the HVAC contractor to add onto the work scope of the contracts they are already landing than for GCs to sell with a cold call. Such a program would see much higher market penetration than the current program structure, and could result in a tripling of total home efficiency of the existing housing stock over the next twenty years.

5) Of course, HVAC contractors should be certified in building science principles. In the past Building Performance Institute has provided the national standard for this expertise, but utilities in California have contractor training programs that are highly technical, and the state could develop its own certification program based on BPI principles. This is not a substitute for NCI or NATE certification that is more focused on HVAC system design and commissioning specifically.
6) HVAC contractors should own their own test equipment. Why wouldn't it be in their own best interest to have the tools to allow their own crews to verify their own work prior to HERS testing? This would consistently improve quality and performance and lower the cost of repairs made while the HERS rater is onsite with the associated additional overhead.
7) Contractors should be required to use load calculation software either in-house or contracted design services. The CEC could incentivize such software training for HVAC contractors in the coming code cycle by making training free for early adopters and offering discounts on software packages. Software developers such as WrightSoft, would certainly offer bulk purchase discounts on software licenses sold in quantities of 100-250 at a time. The CEC could pass on those discounts to early-adopter contractors.
8) Field reps report a high degree of refrigerant contamination due to unskilled and improperly trained contractors performing refrigerant charge operations. Recyclers are refusing to accept as much as 20% to 25% of the recaptured refrigerant due to impurities which poses significant GWP hazards and threatens to undo the progress being made working toward adoption of less harmful refrigerants. There is little doubt, given the relevance of all these high-impact variables, contractors must be both licensed and highly trained.

Indoor Air-Quality and Balanced Ventilators:

1) Balanced ventilation systems such as ERVs and HRVs are clearly superior to intake or exhaust systems for meeting ASHRAE 62.2 fresh air requirements. Exhaust only systems depressurize building envelopes which introduces particulates with negative health impacts. Intake-only systems tend to drive vapor into wall assemblies and can lead to condensation and mold.
2) HVAC contractors need to be trained to identify indoor air quality conditions that call for balanced ventilation in residential applications. For the record, Mitsubishi Electric US does not manufacturer or distribute residential ERVs for the US market, but we believe balanced ventilators should be the only option allowed under the code to meet ASHRAE 62.2 in order to protect public health.
3) Cal EPA and CARB warnings against the use of UV-scrubbers that release ozone and harmful free radical compounds into the conditioned space should be prohibited by law. Testing for these by-products and compounds should be mandatory for this category of product.
4) CEC should make clear policy statements regarding removal of asbestos wrapped ducts all of which use old-types of duct tapes that are known to leak, and encourage legislation to develop asbestos abatement incentives for low-income families and landlords.

Creating the Next Generation of Energy "Home Performance" Contractors:

1) It would be advantageous for the CEC and the CSLB to create a new contractor category for home performance contractors. Currently, home performance contractors are general contractors that have additional certifications in building science and energy analysis. However, general contractors are often not sufficiently motivated to enter the home performance field. In good times they are focused on high-profit new construction and remodel work that is more glamorous and less humble than the attic and crawlspace work that energy upgrades involve. In bad times, when they tend to fall back on home performance work, the clients who would normally want this work done don't have the cash flows or credit to afford it. Many general contractors and some subs refuse to do attic work because it is physically challenging and requires the agility, strength and fortitude of a younger man. Many find the sacrifice thankless and far less profitable than the alternatives.
2) One of the reasons that the Energy Upgrade California Program has not achieved widespread popularity is that it is difficult to enlist successful general contractors in the program, as well as bureaucratic obstacles and overheads proving to be too challenging.
3) A new license classification focused on energy upgrades should be created that allows a training program pathway to license qualification rather than the usual years of apprenticeship. This would create a greater pool of younger contractors willing to do this challenging work for the opportunity to work for themselves. It would foster competition and create the army of performance contractors required to retrofit the existing housing stock in the state. Such a classification would give home performance contractors energy testing and analytics skills, as well as basic skills to frame access hatches, build insulation dams and attic catwalks, make drywall repairs, effective air-sealing attics and crawlspaces, adding attic ventilation and perform minor HVAC ducting repairs. All electrical could be performed by licensed electricians that home performance contractors would have authority to subcontract. Without this new license classification, there will never be sufficient incentive to lure general contractors away from the work they inherently prefer to do, and there will never be sufficient contractors available to accelerate the volume of work performed in a given year.
4) Given the cost of BPI-certification training, the state needs to subsidize the cost of this training and require that all class attendees read the test in its entirety before classes begin to increase the rate of successful completions on the exam. The subject matter is complex, and there has traditionally been about a 50% fail rate due to candidates underestimating the subject complexity and expecting to digest a month's worth of research during a one-week course.

Other CO2 and GWP Gas Environmental Impacts and Externalities:

1) High incidences of refrigerant contamination create costly disposal problems for the recycling infrastructure. There would be a temptation to release these gases to the environment rather than processing them and the solution lies in addressing the problem at the source: I have already suggested training contractors to avoid these contamination issues. But it is also imperative that refrigerants not be sold or distributed to unlicensed contractors or homeowners. These gases have a

Global Warming Potential (GWP) many times greater than that of CO2 and must not be cross-contaminated through misuse by untrained staff.

2) Although recycling centers cannot be expected to bear the cost of disposing of contaminated gases, the State needs to develop a program that offers them safe disposal options. Without this, there will inevitably be inappropriate dumping or releases of the GWP gases.
3) Investigating which licensed or unlicensed contractors may have caused the refrigerant contamination would prove to be difficult if not impossible to trace. For this reason, the threat of fines and penalties against contractors responsible for contaminating gases should be high. Also, the homeowner should be required to pay some fee for contaminated gases captured at their home so they are motivated to hire only licensed and 608-certified contractors.
4) EPA 608 certification should not be a cursory on-line class and the curriculum should emphasize high mandatory penalties to act as a deterrent to intentional contamination. Protocols should include labeling and separating gauges and tanks used to recapture different types of gases.
5) HVAC contractors must be required to own several sets of RCV gauges, at least one set for each type of refrigerant on the market to avoid cross contamination. This represents a significant investment for the small contracting company, but it is a necessary requirement.
6) Although manufacturers are still evaluating the next generation of refrigerants and there is no clear consensus at this time on narrowing the field of refrigerant options, it is important for stakeholder working groups at AHRI to try to narrow this field of competing refrigerants to a few over the next three years so that the likelihood of cross-contamination by contractors in the field is lessoned, not increased. It is also not reasonable to expect contractors to keep multiple sets of refrigerant charge gauges and tanks on all their service vehicles. This adds additional equipment and management overheads which are an undue burden on the average contractor.