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**Strategies to Achieve High Compliance with HERS and Commissioning Requirements**

*Additional submitted attachment is included below.*

# Strategies to Achieve High Compliance with HERS and Commissioning Requirements

Comments Submitted by Mitsubishi Electric US – April 10, 2019 – CEC Docket #17-EPB-01  
**With the approaching introduction of A2L-class refrigerants and higher installed efficiency targets, 100% permit and HERS compliance are more necessary than ever.**

Although most HVAC contractors strive to provide high quality installations, average installed efficiency of new replacement equipment is approximately 58% of the rated efficiency\*<sub>1</sub> primarily due to improper system sizing, undersized or leaky ducts, and refrigerant leaks. Simultaneously, a range of environmental advocates and manufacturers have agreed to a phase down of high GWP refrigerants, and the rapidly evolving field of technology requires both widespread participation in advanced product training. While permit compliance levels are as low as 4.7% in some California counties\*<sub>2</sub> compliance rates of 95% to 100% are now imperative. A range of new codes and standards which define new A2L system installation and safety protocols as well as high compliance rates must quickly evolve.

There are three principal proposals to enforce widespread compliance:

- 1) **Statistical Analysis of Permitting and Licensing Data:** A single statewide online permitting portal can also be the one-stop shop for obtaining business licenses for the jurisdiction in which a contract is to be performed. If as part of the permit application, contractors are also required to obtain or reference a business license for which they are asked to declare under penalty of perjury that they have workman's comp, the number of installers on their staff, and whether they perform both residential and commercial work and the ratio of each. From this information, the software can fairly accurately predict the average contract size and number of contracts per year their crew would need to complete to support the company. Contractors with an obviously low annual number of permits would be flagged for auditing.
- 2) **Time of Sale Inspections and The Davis Model:** The City of Davis has achieved 95% permit and HERS compliance by requiring every home to have a permit review and inspection at time of sale. The estimated cost of the HVAC portion of the inspection is \$125 per home and requires only an hour's worth of the inspector's time. A review of over 560 homes inspected in 2018 found only 29 had HVAC change outs without permits, a 95% compliance rate. However, a building official from Davis emphasizes the program took many years to reach high compliance levels since first instituted in the 1970's, and it is also supported by an administrative ordinance that imposes escalating fines for non-compliance that may also be a factor in high rates of compliance. He also notes that the inspection requests are sometimes hard to accommodate given multiple demands on staffing during the peak real estate season.
- 3) **Boots on the Ground Enforcement:** Any effective method to identify offending contractors will do nothing to stem permit violations without improved enforcement. Statistical methods to identify patterns of non-compliance, escalating fines and time of sale inspections are only effective if combined with mandates to empower inspectors to cite violating contractors including unlicensed contractors. Licensed contractors deserve a level playing field and should not be asked to continue competing against unlicensed and untrained competition who has no liability or workman's comp insurance and who does not invest in advanced installation training. A level playing field for honest contractors who abide by testing requirements is paramount to motivating 98% or more of the field to comply. Without boots on the ground, and violator

identification, all the other compliance strategies such as mandatory training, will inevitably fall short. We need better funded enforcement. Enforcement is critical to achieving proper system testing and commissioning, but the quality and safety of the install cannot be assured without 100% participation in advanced training on a range of topics which must include quality installation, ACCA sizing protocols, system design, WrightSoft or Elite or other load calculation programs, system optimization, combustion safety, RCV, ESP, air flow, balancing, fan-Watt draw and eventually A2L system design and protocols. Without a doubt, HVAC systems have evolved quickly with huge increases in reliability, efficiency and lower environmental impact, but with these changes has come increased complexity and significantly more design and technical complexity. Never before have there been such good cause to require continuing education units (CEUs) as there have been for architects and electrical technicians. The technological complexity of product across the HVAC industry calls for an end to the era wherein a contractor may obtain a license and maintain it without cracking a technical manual for years.

Many have proposed various equipment registration schemes such as serial number tracking from manufacturer to install, but all of these tracking system proposals have unanticipated cost impacts and inherently dependent on thousands of staff people along the supply chain making inaccuracies in the data obtained inevitable. Identification of one piece of equipment that may be the subject of an unpermitted installation offers no insight into patterns of violation by contractors as the statistical methods proposed above do. For this reason, enforcement dependent on serial tracking system would tend to unfairly punish marginally complying contractors, but not identify the worst offending contractors who would circumvent the system entirely by buying product from other sales channels, with very negative and unfair impacts on distributors. Because serial number tracking does not expose *patterns of violation* -as other enforcement methods do, there are higher risks associated with the likely ineffectiveness of the system and significant risk of adverse effects on the market and distribution networks. See An Analysis of the Cost-Effectiveness of Serial Number Tracking and Enforcement Alternatives, submitted to CEC Docket#17-EPB-01 by Bruce Severance, Compliance Engineer, Mitsubishi Electric US, November 15, 2018.

In closing, Mitsubishi Electric calls upon the regulatory agencies who have a mandate in SB1414 to do what is necessary to achieve high levels of compliance and it is imperative that this be done in the most cost effective way possible, namely by using automated statistical tools to identify patterns of violation and identifying the worst offenders.

Also, if the highest installation quality is to be achieved and system efficiency optimized on residential equipment replacement, HVAC contractors need to be authorized to hire any subcontractor whose work in attics and crawl spaces directly affects the heat load calculations and therefore the HVAC equipment sizing for the home. To affect this change the CSLB, working with the CEC's endorsement, should formally define all "load reduction work" in attic or crawl space to be "incidental" to the HVAC contractors primary task of system optimization, thereby avoiding a legislative mandate directing CSLB to change, and thereby granting HVAC contractors the authority to act as primary contractors in these areas of the building. A new class of energy efficiency (EE) contractor could be created to provide "wrap-around" attic upgrade work under the HVAC's primary contract.

**Footnotes:** \*1 Data supported by numerous studies conducted and supported by NCI, ACEEE, NIST, ACCA and others: Sensitivity Analysis of Installation Faults on Heat Pump Performance, NIST, U.S. Dept. of Commerce Sept. 2014, <http://dx.doi.org/10.6028/NIST.TN.1848>, NCI: HVAC Equipment Replacement Disasters You Can Learn From, August 2017.  
\*2 Research by DNV-GL, conducted for CPUC: 2014-16 HVAC Market and Code Compliance Assessment, 9-22-17