

DOCKETED

Docket Number:	17-EBP-01
Project Title:	Improving Energy Compliance of Central Air-Conditioning and Heat Pump Systems
TN #:	224548
Document Title:	Comments on Improving Energy Compliance of Central Air-Conditioning and Heat Pump Systems
Description:	N/A
Filer:	System
Organization:	Nathan Walker/Goodman
Submitter Role:	Public
Submission Date:	8/20/2018 4:41:34 PM
Docketed Date:	8/21/2018

Comment Received From: Nathan Walker
Submitted On: 8/20/2018
Docket Number: 17-EBP-01

Comments on Improving Energy Compliance of Central Air-Conditioning and Heat Pump Systems

Additional submitted attachment is included below.



August 20, 2018

California Energy Commission
Docket Unit, MS-4
Docket No. 2017-EBP-01
1516 Ninth Street
Sacramento, CA 95814-5512

Re: Comments on Improving Energy Compliance of Central Air-Conditioning and Heat Pump Systems

Dear California Energy Commission Staff:

Goodman Manufacturing Company, L.P. ("Goodman"), submits the following comments in response to the California Energy Commission's ("CEC") efforts on improving energy compliance of central air-conditioning and heat pump systems.

Goodman is a member of Daikin Group, one of the largest heating, ventilation and air-conditioning manufacturers in the world. Goodman is headquartered in Houston, Texas, and employs thousands of workers across the United States. The company manufactures residential and light commercial heating and cooling equipment, and its products are sold and installed by contractors in every state.

Goodman has organized our comments into six major sections. After an initial overview, we have four sections addressing various issues raised during the CEC Lead Commissioner workshop on August 3, 2018. Goodman very much appreciates the opportunity to submit comments.

I. Overview

CEC staff should identify the potential energy savings associated with every measure considered in the draft action plan. The action plan should specify the overall energy savings being lost today and propose a plan to increase energy savings while ensuring that the proposed measures are cost effective. A digital tracking system of HVAC equipment at the manufacturer, distributor, and installer levels would be costly for all stakeholders in the HVAC supply chain and the state of California, and would be ineffective in helping the state achieve its Title 24 compliance goals. The current permitting processes across jurisdictions in the state are expensive, cumbersome and inefficient. Efforts to simplify the permitting processes, improving contractor outreach and homeowner education, and stronger enforcement of existing rules will help make the Title 24 compliance requirements attainable.

II. Proposed Compliance Measures Must Quantify Energy Savings Potential While Addressing Cost Effectiveness

Since energy savings is the ultimate end goal of an increased regulatory compliance in the installation of central air conditioning and heat pumps, CEC should quantify the estimated energy savings of each proposed measure raised in this docket. In addition, CEC staff should quantify the estimated costs of each proposed measure, so that cost effectiveness of the recommended installation compliance pathways is optimal for the California consumer.

A final report on a study, funded by the California Public Utilities Commission, associated with HVAC permits and code compliance was published in 2017¹ and concluded the following:

1. A significant difference between the efficiency of permitted and non-permitted installations was anticipated, but the results revealed very few statistically significant differences. Permitted installations were expected to meet or exceed all requirements. This was not the case, especially for the Inland region (climate zones 2, 4, and 8-16) where the HVAC installation efficacy (“HIE”) was about 70% for electric and gas. Non-permitted cases had a wider range of performance, but still the average HIE was greater than 60%.
2. Based on interviews conducted with a sample of home energy rating system (“HERS”) raters, the study generally confirmed the existence of barriers, including lack of knowledge on the part of contractors and homeowners, and inconsistent enforcement by building officials and departments. The study also found gaps and some discrepancies in the documentation for some of the permitted sites visited.

We urge CEC to consider the issues raised above in addition to findings of any similar field studies performed in California.

During a CEC staff workshop on October 5, 2017, a HERS provider stated a majority of the furnace installations are struggling to meet the 0.58 w/CFM fan efficacy requirement per the current edition of Title 24, including condensing furnaces with ECMs.² This is primarily due to the fact that the fan efficacy as an efficiency metric is also dependent on duct design and filter, and if ACCA Manual D is not followed properly, the fan efficacy numbers linked to higher efficiency furnaces end up getting penalized. This is a prime example of how in many cases, HERS raters may have the required skill set, but are unable to help realize the full energy savings potential of the installed system. In this particular case, the high efficiency furnaces simply helped overcome other system losses within the buildings to achieve the 0.58 w/CFM fan efficacy target. The establishment of a digital tracking database will not solve this field related issue in building alterations. Instead, an uncertainty analysis should be performed on all field measurements, and compliance should be based on being within the field measurement +/- uncertainty. (Due to inaccuracy of field measurements as opposed to laboratory measurements.) This will help achieve maximum

¹http://www.calmac.org/publications/HVAC_WO6_FINAL_REPORT_Volumel_22Sept2017.pdf, page 87

²Comments from Mr. Hodgson on pages 55 and 56 of the following meeting transcript: http://docketpublic.energy.ca.gov/PublicDocuments/17-BSTD-01/TN221835_20171120T105843_Transcript_of_the_1052017_Staff_Workshop_on_the_Draft_2019_Buil.pdf

compliance while accounting for any constraints posed to HERS raters by existing buildings. We also recommend that the payment process for HERS field verification be decoupled from a homeowner or contractor so that the HERS rater can solely focus on compliance to the Title 24 requirements while performing the verification process.

III. Problems with Current Permitting Process and Barriers to Permit Compliance

California's Long Term Energy Efficiency Strategic Plan issued in 2008 states that "less than 10 percent of HVAC systems obtain legally required pre-installation local building permits." The Strategic Plan also aims to increase the percentage of permitted installations from the assumed rate of 10 percent to 90 percent by 2020. Before attempting to create any program to increase energy code compliance and permit pulling, legislative changes should be made to allow California building inspectors to inspect non-permitted work sites. Under current law, an inspector may only enter the property of a permitted job site. Without this change, inspectors will continue to be marginalized in their mission to ensure the health and safety of the end user. Digital tracking of equipment will not give inspectors any more authority to enter the property of a non-permitted job. Allowing inspectors to review unpermitted job sites will give the California Contractors State License Board a more accurate accounting of what percentage of jobs are properly permitted. CEC needs to identify all the current pitfalls associated with the issuance of building permits, and identify simplification mechanisms, such that more installers are encouraged to go in that direction, and the percentage of permits issued is increased.

In 2014, the Center for Sustainable Energy ("CSE") surveyed local building departments and found that only 30% use a checklist or a reference tool to ensure that appropriate compliance documentation is provided with the permit application.³ The CSE survey also found that for 50% of the cases, permit applications are either unaccepted by local building departments or returned due to incompleteness associated with the Title 24 requirements.⁴

The CSE survey determined the following as the biggest barriers to permit compliance in residential alterations:

1. 86% of contractors and HERS raters attributed it to the cost to homeowners and contractors.⁵
2. 39% attributed it to the lack of knowledge/understanding of the permit process.
3. 63% attributed it to the lack of knowledge/understanding of the energy code.
4. 36% attributed it to the determination of applicable requirements.
5. 74% attributed it to the compliance forms/paperwork.

³https://energycenter.org/sites/default/files/docs/nav/buildings/contractors/cool-comfort/Survey%20Data%20Results_%20CSE%20Site_Nov.%202014.pdf, slide 41

⁴Op. cit., slide 44

⁵Op. cit., slide 72



Section 10-103 of Title 24 currently specifies the following administrative requirements for compliance:

1. Form CF1R (Certificate of Compliance) – 9 pages long.
2. Form CF2R (Certificate of Installation) – currently involves the following forms for HVAC systems installed in existing buildings depending on the compliance pathway selected within Title 24:
 - a. CF2R-MCH-01a – 13 pages long.
 - b. CF2R-MCH-01b – 11 pages long.
 - c. CF2R-MCH-01d – 15 pages long.
 - d. CF2R-MCH-20d – 5 pages long. Title 24 requires duct sealing for altered space-conditioning systems.
 - e. CF2R-MCH-20c – 5 pages long. Links low leakage air-handling unit requirements with forms CF1R as well as line item B.09 of CF2R-MCH-01a.
 - f. CF2R-MCH-23a, CF2R-MCH-23b, CF2R-MCH-23c, or CF2R-MCH-23d to verify the 300 CFM per ton airflow rate requirement in Title 24 – up to 5 pages long.
 - g. CF2R-MCH-25a (superheat method) and CF2R-MCH-25b (subcooling method) on refrigerant charge verification– 14 pages long combined.
 - i. CF2R-MCH-25c – addresses the alternate weigh-in charge procedure and is 8 pages long.
 - ii. CF2R-MCH-25e – addresses charging procedure at 55°F or less in winter, and is 9 pages long.
 - h. CF2R-MCH-25f – addresses package units with factory charge and is 5 pages long.
 - i. CF2R-MCH-26 – 4 pages long, and gets invoked when a performance compliance credit is sought for a high SEER and/or EER.
3. Form CF3R (Certificate of Verification) – HERS raters performing the testing would need to certify/register a CF3R. Forms appear to mirror several of the forms addressed in bullet 2 above.

There is a very high level of burden, illustrated by the above, for the contractor and HERS rater to determine full compliance with the Title 24 requirements. This burden is one reason that compliance rates are not at desired levels.

IV. Proposed Improvements to Permitting / Enforcement

As outlined in section III, forms associated with the permitting process are currently cumbersome to manage. They need to be consolidated, access to the documents need to be streamlined, and online permitting/compliance tools should be made readily available such that both installers and HERS raters can populate the necessary fields within a short time period. The process should be almost instantaneous (taking minutes to complete rather than hours). Additionally, any permitting



solutions being considered should be significantly lower in costs as compared to the current costs (varying across jurisdictions) to secure permits.

CEC should also consider revisions to Title 24 such that like for like replacements of pieces of equipment are as cost-effective as possible for the consumer. Further, increased education on Title 24 requirements coupled with a simplified and standardized permitting process across jurisdictions will help facilitate compliance.

Finally, efforts should be made to help foster continuing contractor education associated with regulatory requirements in the state of California for installed central air conditioners and heat pumps.

V. Why Serial Number Tracking Is Not a Viable Solution

At the federal level, it is true manufacturers, distributors and contractors are already mandated to comply with several requirements pertaining to maintaining data, including model number and serial number, of central air conditioners.⁶ The records can then be made available upon request from DOE, and are not required to be in an electronic format. It should be noted, however, that the federal requirement applies only to air conditioners and no recordkeeping requirements exist today for heat pumps or furnaces. Goodman notes while the title of this rulemaking only includes “air-conditioner and heat pump” that for the furnace is an integral part of an air-conditioner system, including aspects regulated by Title 24 such as fan efficacy. Any implementation of serial number tracking to address Title 24 compliance will go far above and beyond what is currently mandated by federal law.

Further, the potential for possible disclosure of confidential business information via a proposed HVAC registry database is a major concern for HVAC industry equipment manufacturers. Even more fundamental, though, is the fact that manufacturers do not have the ability to track serial numbers to the installed address. Manufacturers distribute equipment through independent and company owned distribution locations, and products are eventually sold through these locations to contractors, who eventually sell and install products in residential or high-rise residential buildings. As a manufacturer, we are effectively twice-removed from the final location of the installed product, and have no legal standing to demand it from our customers or their customers.

Adding a complex layer such as a digital tracking program complicates what is already a highly involved and detailed process. While serial number tracking may help enforcement, it would only exacerbate the current problem of inadequate manpower and resources, as reported by the California Building Officials representative during the August 3, 2018 workshop.

⁶On July 14, 2016, the U.S. Department of Energy (“DOE”) issued a final rule on the enforcement of regional standards, which led to certain mandatory requirements for central air conditioners, including those installed in the state of California.

The Air-Conditioning, Heating, and Refrigeration Institute Directory of Certified Product Performance lists more than 2.5 million individual residential air conditioner and heat pump rating combinations. Additionally, there are unknown numbers of distributors, dealers and contractors conducting business in the state of California. Several key questions need to be considered, such as the following:

- Who will be responsible for the tracking serial number correctness across the chain and the maintaining a program with such comprehensive data?
- Which entity will fund the program, and will funding be guaranteed for the development and maintenance of a comprehensive database across several years or decades?
- How will the state of California assess the cost effectiveness of setting up and maintaining such a database? Systems for tracking product inventory vary from manufacturer to manufacturer.
- Which entity will be responsible for ensuring that confidential business information is not publicly divulged, or susceptible to security breaches?
- What security precautions will be taken to protect the database?
- Would the entity responsible for this database be subject to a public information request?
- Who will have access to the database?
- Will liability emergency funds be made available to this entity in case a party believes that its confidential business data has been compromised and files a lawsuit against the entity managing the data?
- An entire HVAC system is comprised of multiple pieces of equipment, each having its own, unique serial number, and each critical to the performance rating. In many cases, the multiple pieces of equipment forming a single HVAC system in a residence can be manufactured by different manufacturers, and in a replacement scenario, installed by varying contractors purchasing equipment from varying distributors. Which equipment serial numbers will be tracked?
- Why is a digital tracking database needed if publicly available shipment data already exists?⁷ CEC issued a draft staff report on commercial and industrial fans and blowers (“CIFB”) on June 11, 2018.⁸ The report estimated the CIFB California-population-weighted shipments by using the national shipment numbers and the California population figures issued by the U.S. Census. While there is room for improvement on this calculation methodology, an approach along these lines could help CEC estimate the permitting compliance shortfall without investing significant resources into the development of a digital tracking database. (Shortfall methodology would involve a comparison of the calculated shipment numbers for California with the data in the current home energy rating system registries.) Additionally, the regulatory and added cost burden imposed on all stakeholders within the supply chain can be avoided.

⁷<http://www.ahrinet.org/Resources/Statistics/Historical-Data/Central-Air-Conditioners-and-Air-Source-Heat-Pumps>

⁸<https://efiling.energy.ca.gov/GetDocument.aspx?tn=223774>, page 46



- Alternative to this proposed methodology, CEC should consider reviewing DOE's shipment analysis for the residential central air conditioner and heat pump rulemaking.⁹

VI. Concluding Remarks

Goodman appreciates the opportunity to provide these comments. If you have any questions regarding this submission, please do not hesitate to contact myself or Rusty Tharp, Director of Regulatory Affairs at either 713/263-5906 or rusty.tharp@goodmanmfg.com.

Sincerely,

Nathan Walker
Senior Vice President
Tel: 713/263-5338
Email: nathan.walker@goodmanmfg.com

⁹<https://www.regulations.gov/document?D=EERE-2014-BT-STD-0048-0098>, Technical Support Document, Chapter 9