

April 5, 2005

Rachel Schmeltz  
Energy Star Product Manager

Dear Mrs. Schmeltz:

My name is Gary Heederik of Energy Doctor, Inc. in Lodi, CA. I have responded in the past to your request for stakeholder input on HVAC issues. I am now responding to your request for stakeholder suggestions on "how to verify HVAC sizing in a practical manner". I believe our options are limited, but here are some of my thoughts and current direction on the subject.

I have been involved with the City of Lodi Electric Utility since 1999 assisting them in designing and implementing energy saving programs for their residential customer base. As you are probably aware, we were the first utility/municipality in California to implement a program around the Honeywell Enalaysis diagnostic equipment called "The Lodi House As A System Home Inspection Program." It was developed by Energy Doctor under the direction of Rob Lechner, Manager of Customer Programs, for the Lodi Electric Utility. Our program, for the past 2 years, has revolved around air flow in an effort to get our contractors up to speed with offering a better product to our customers. As we ramp up our program starting in June, we hope to implement a program around the HVAC system as a whole. That means that they need to be looking not only at air flow, but also charge and proper design. Proper design takes into consideration both room by room air flow and proper size (tonnage).

Attached you will find protocols written by Energy Doctor for the Lodi program. These protocols were written based on a practical, basic approach to HVAC design and installation as I saw it. I have been open to comments and suggestions from our contractors on anything they thought was unreasonable or not correct. I have yet to get any feedback short of don't test any new homes because of defect litigation issues.

Therefore, I have to assume that the protocols are on target for what needs to happen to guarantee system performance and customer satisfaction. Following are some of the problems that I see, and therefore possibly leading us to a practical solution.

Problem 1:

1 ) In the past, we have had contractors telling customers that the reason their systems don't work is that they are too small. So the contractor sells a larger system (3 tons to 4 tons).

Question:

- 1 ) How many of these upgraded systems do we have out there?
- 2 ) How do we know what houses have been affected?
- 3 ) What method was used for the contractor to determine the system was too small?
- 4 ) This may be the reason for catastrophic air flow problems when tested with Enalaysis

Problem 2:

1 ) We have had systems designed based on loads for tonnage, but rule of thumb for room by room air distribution. This is probably the main reason the customer is not satisfied with the system performance.

Question:

- 1 ) Wasn't the duct work originally designed for 3 tons not 4 tons of air delivery?
- 2 ) Will the duct work be able to handle the additional air flow?

- 3 ) Which system is really correct 3 or 4 tons for this home?
- 4 ) What design method was used to base their findings on?

Your request for suggestions for a practical way to verify sizing is a good one. First of all, we must advocate and promote proper design practices and educate the consumers so they can ask the right questions of their contractor. And from a rebate stand point the Electric Utility can and will encourage total system design practices in order to get rebate funding. The second thing we need to do is be able to verify the design which is the bigger issue.

There are two approaches that are currently being used or would it be more accurate to say that are available.

- 1 ) Contractor self design using an approved software program such as Right J
- 2 ) Hire a third party - Mechanical Engineer

Lets look at each of these approaches..

Self Design: One of the problems that I see of contractor self design is that the programs can be manipulated based on data entry's to get the results one is looking for. The trick is how do we as utilities, municipalities, or consumers for that matter verify the accuracy of the design? As I see it, the only way we can verify the accuracy of a contractors own work is to have a "Plan Check" process. This would significantly increase the cost and reduce the cost effectiveness of any program we might fund.

Engineer: On the other hand a third party Mechanical Engineer can increase the cost of the job from \$300 to \$500 on an average, however the accuracy will tend to be more reliable.

Either way we go, their is going to be an increase in cost to the consumer and different direction for our rebate program. We do know that we can not in good conscience continue to rebate for items that we know don't work as well as we thought they did. We can on the other hand reward performance verified work and educate our customer base on the deficiencies of current contractor practices.

Raising the bar...

The Lodi Electric Utility is going to attempt to address this issue in our next program. Like you, we are also interested in any and all suggestions and support we can get from neighboring utilities, California Energy Commission, or other interested parties as we move into this area. Energy Doctor has a program concept that we will be working on with Mr. Lechner over the next 4 to 5 weeks in an effort to establish a rebate program that will guarantee the entire HVAC system works and performs to its maximum efficiency levels by addressing the system as a hole. Taking into consideration Design tonnage, air flow (total system), coolant charge and proper air distribution (room by room). Our goal is to have full and verifiable accountability at the lowest possible cost. How we get there and at what cost is the issue. We do, however, wish to share our success/failures with any interested parties in the hopes that together we can develop a working plan that can be shared across the country.

Sincerely

Gary Heederik  
President  
Energy Doctor, Inc.