DOCKETED	
Docket Number:	19-BSTD-01
Project Title:	2019 Alternative Calculation Method Reference Manuals and Compliance Software Tools
TN #:	234380
Document Title:	California Energy Commission Comments - NAPHN Comment Letter
Description:	N/A
Filer:	System
Organization:	California Energy Commission
Submitter Role:	Public
Submission Date:	8/19/2020 10:33:32 PM
Docketed Date:	8/20/2020

Comment Received From: California Energy Commission
Submitted On: 8/19/2020
Docket Number: 19-BSTD-01

NAPHN Comment Letter

Additional submitted attachment is included below.

August 17, 2020

Re: “HRV White Paper on Revisions to HRV Standard Designs and Modeling: CBECC-Com and CBECC-Res 2019.2.0” A proposal to derate the credits assigned to HRV’s.

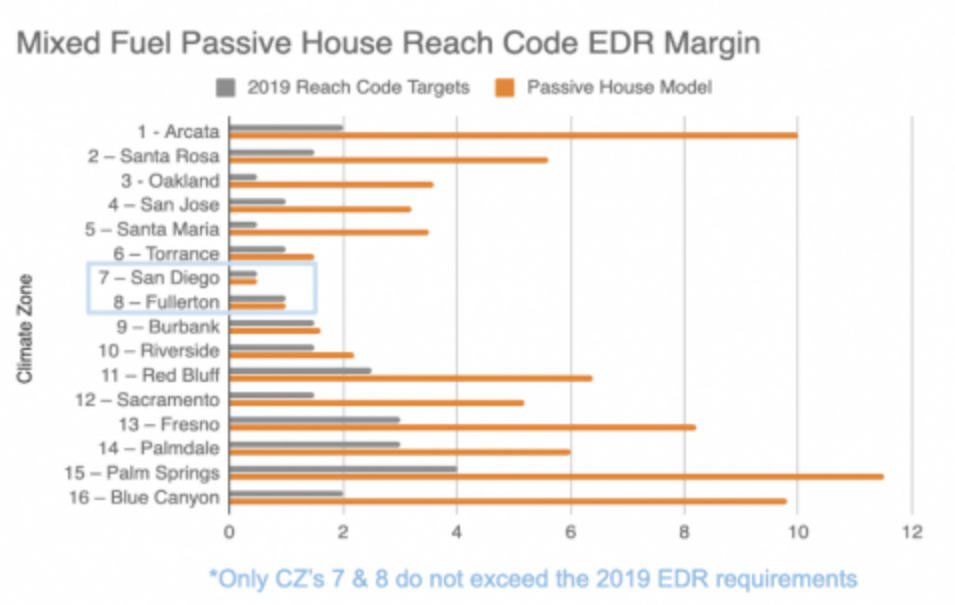
Dear Commissioner McAllister and CEC staff,

On behalf of the extended Passive House community we represent in California and across North America, we respectfully submit the following comments in conjunction with the above proposal to derate heat recovery ventilators. Our role is to represent the front-runners in the high performance building industry - those already building well beyond the current baseline energy code targets. Given this role, our purpose here is to urge the CEC to consider the following:

1. Retain the existing credits currently provided for HRV’s in CBECC-Res 2019
2. Consider including bonus points for units with higher recovery efficiencies
3. To recognize alternate ventilation unit testing protocols beyond HVI.

Why retain the HRV credits?

As part to the 2019 Low-Rise Multifamily Reach Code proposal reviewed and vetted by Codes and Standards earlier this year, Passive House California (PHCA) confirmed that low-rise multifamily buildings designed and built with HRV’s with measured efficiency capture above 75% would far exceed the EDR margins currently required for 2019 Reach Code targets. We found that while not all climates in California require the heating/cooling energy recovery, they all benefit from their use. *This offers surprising cost-effectiveness opportunities to developers once they discover that heating equipment may be eliminated in particular climates.*



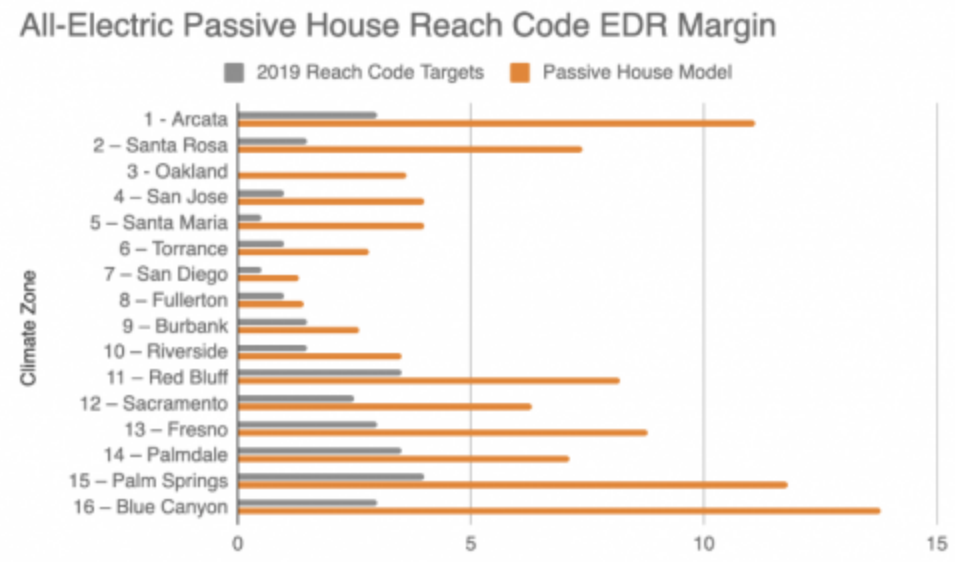


Image source: PHCA's website article - CASE Passive House Low-rise Multifamily Reach Code Delivers Results!
https://passivehousecal.org/news/case-passive-house-low-rise-multifamily-reach-code-delivers-results

Furthermore, what PHCA discovered in this study[1] is that for low-rise, multifamily buildings, is that insulation measures currently required in the baseline code are already sufficient to meet

[1] https://passivehousecal.org/sites/default/files/media/PHCA%202019%20Reach%20Code%20Report_POSTSCRIPT.pdf

Passive House standards in half of the sixteen California climate zones. (Which points out an interesting anomaly in the energy codes' allocation of wall insulation requirements across our various climate zones - a digression from our topic here, but one that we think you may find as curious as we do..?)

By retaining the current HRV credits, we believe that developers and contractors alike will finally gain experience and confidence with the ventilation equipment vital to providing great indoor air quality (IAQ) while not compromising energy efficiency. We believe the current credit points the industry in the right direction, and provides the confidence that will be needed to move towards including envelope efficiency upgrades required for future code cycles. As Title 24, Part 6 code continues to roll out, airtightness below 3 ACH will be needed. As 3ACH air tightness is achieved, exhaust only ventilation negates the airtightness benefit. Adding an HRV with effectiveness above 80%, with consumption less than 0.4watts per CFM, allows us to bring all the benefits of envelope and airtightness together - another point clearly demonstrated in the results of PHCA's study.

Product Supply Chain ramifications:
By retaining the HRV credits in the current CBECC-Res model, the supply chain for higher performance ventilation, with heat recovery, should start to significantly improve the product supply chain here in California. Currently there is *only one Passive House Institute Certified product on the California market.* This state of affairs reflects poorly the California's energy code's reputation for leadership. Lack of high performance product competition in this market ensures that cost-effectiveness will remain challenging for our entire building community, not only those of us aiming for much higher performance beyond baseline code. If HRV's are derated, the CEC will be sending a confusing signal to manufacturers who supply our market - one that we believe will be detrimental to the efficiency of our buildings and the State's ability to meet the carbon emissions targets that our legislature has mandated.

Bonus points for better performance:
Rather than considering the removal of the current credits granted to HRV's we suggest the CEC consider adding bonus points for units that deliver effective recovery efficiencies above 80%. This would send a much better signal to both the construction and manufacturer markets for obvious reasons. NAPHN has already been in communication with the CEC about the lack of available equipment here in California, specifically those that combine one or more functions currently delivered via separate components common to all buildings, for example: heat pump hot water heaters that are also able to provide heating and cooling. I was able to share details of the energy recovery ventilation units combined with conditioning that are now available on the Chinese market, and encourage the CEC to find ways to allow similar products to be developed or distributed here in California. Removing or derating the HRV credit in CBECC-Res will further delay and deter manufacturers from exploring these combined product efficiencies and leave California's building industry ever further behind.

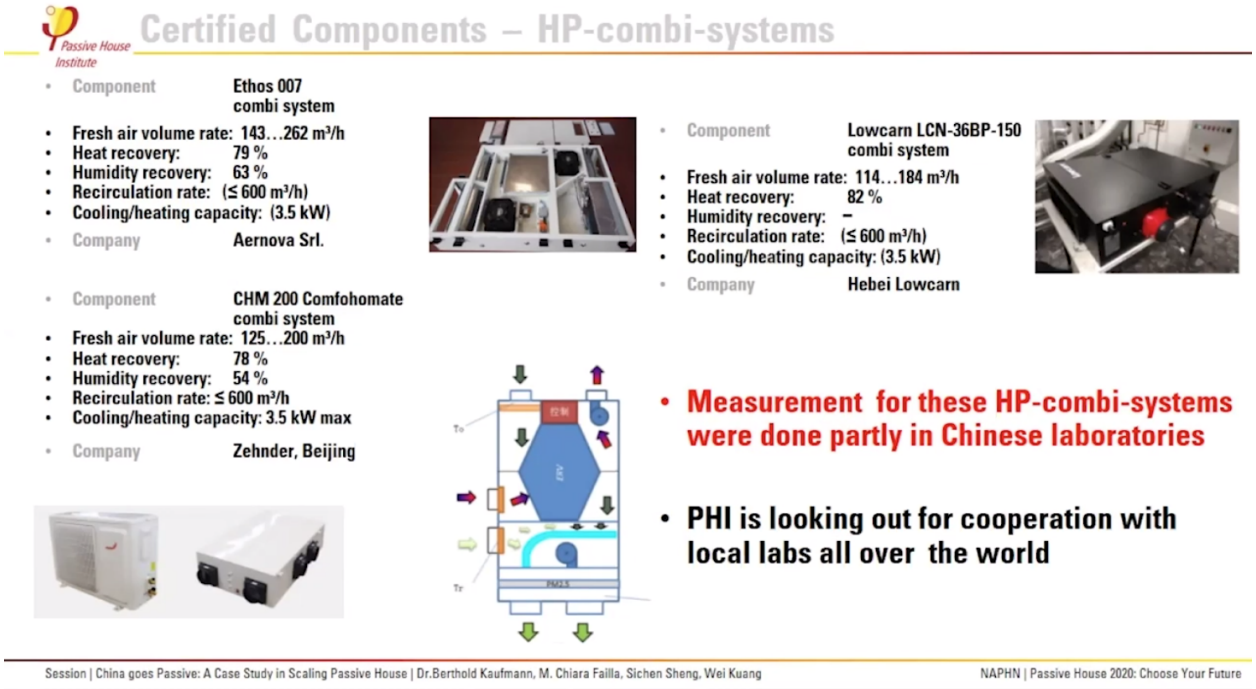


Image 1: Images and performance data for three combi HRV + Heat Pump units currently being manufactured in China. Source: NAPHN Conference, PH2020, presentation by Berthold Kaufmann

This benefit extends to larger commercial buildings. This report[2] issued by a team working under the direction of the Northwest Energy Efficiency Alliance (NEEA) recorded the excellent results obtained from their pilot study of commercial units that utilized combined HRV and heat pump conditioning technology. The study confirms the benefits of incentivizing not just heat recovery, but VERY HIGH efficiency recovery, and further supports our next point: to consider a more robust testing methodology than currently used for measuring recovery efficiency.

Updates to HVI performance testing:

While we support and appreciate the valuable service that the Home Ventilation Institute (HVI) has provided to the industry as the need for, and accurate assessment of mechanical ventilation has grown, we humbly submit that their testing methodology could and should be updated. A deviation in how effective recovery of HRV's is measured exists between HVI's testing protocol and that used by a number of HRV testing protocols commonly used in Europe, including that used by the Passive House Institute. The difference hinges upon which location in the ventilator that the heat recovery is measured: HVI measures this at the outflow, while the other commonly accepted protocols (including that used by the Passive House Institute) measure at the point of extraction.

[2] https://betterbricks.com/uploads/resources/VHE-DOAS_SummaryReport.pdf

The graphic included below shows results for three separate HRV units from different manufacturers when tested using the two protocols. The n_{Ext} results vary significantly for the less effective units, compared to the n_{Su} results for the same units.

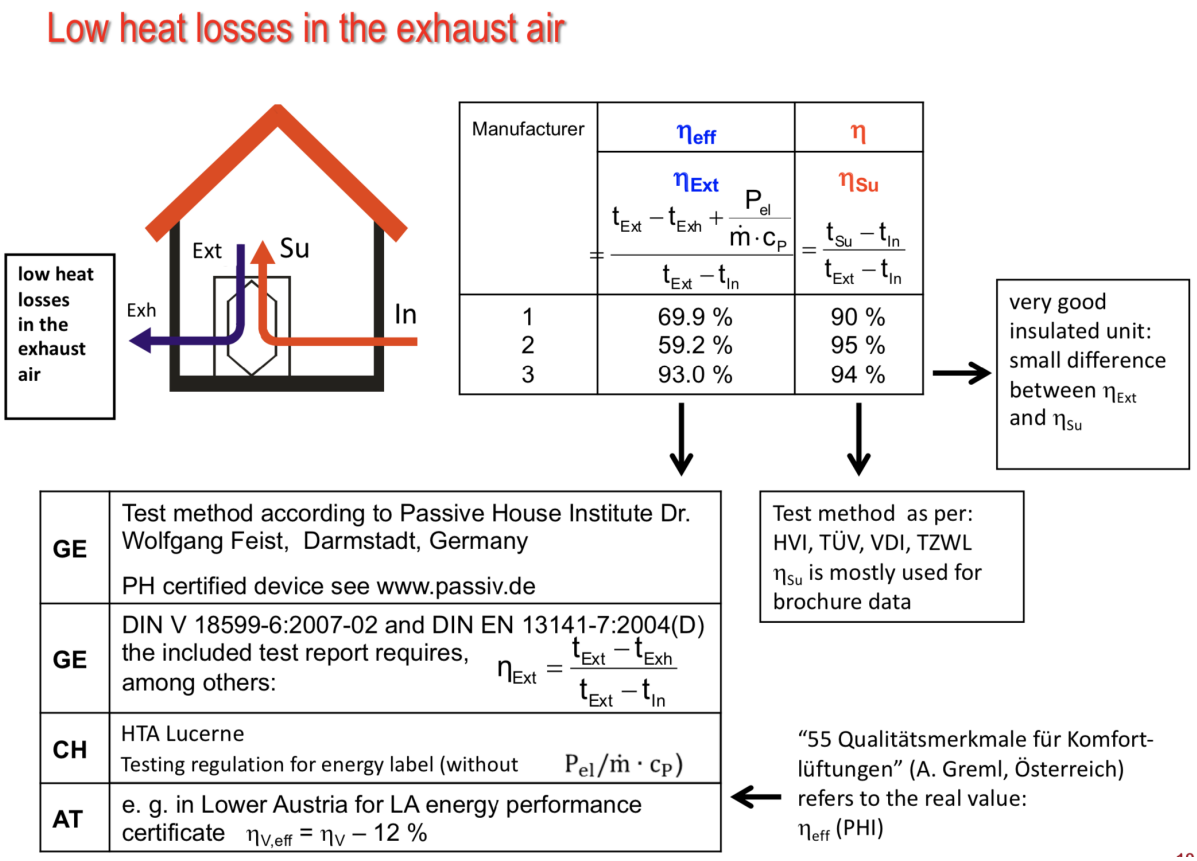
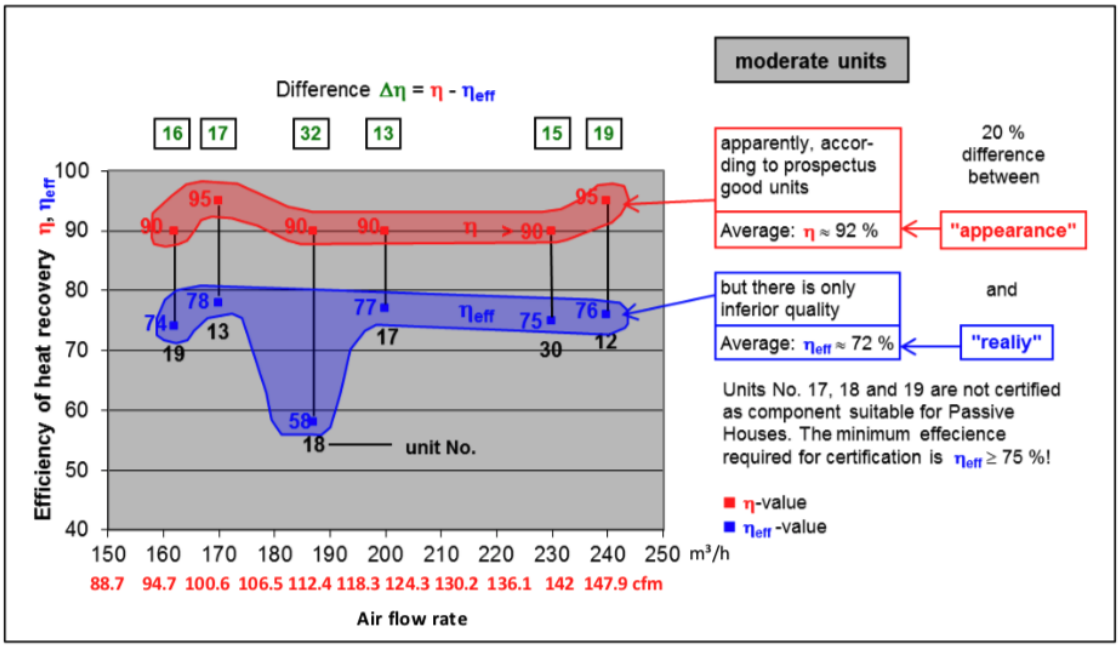


Image 2: Comparative testing results for three HRV's showing HVI results (in red) compared to DIN V 18599-6:2007-02 and DIN EN 13141-7:2004(D) testing protocol results. Info source: Mr. Eberhard Paul, ZehnderPaul.

For a more robust explanation of the above information, please refer to Section 6 in this paper issued by the North American Certifiers Circle here: http://www.passivehouseacademy.com/images/library/hints_tips/Protocols_for_H_ERV_Use_in_North_America_Final_Issued.pdf.

In a series of tests run by the staff at Zehnder/Paul, Germany, on a larger number of HRV's, the inconsistency of results using the two protocols was further confirmed. A deviation in results was found to be particularly pronounced for moderately efficient units.

Different heat recovery values for the same unit

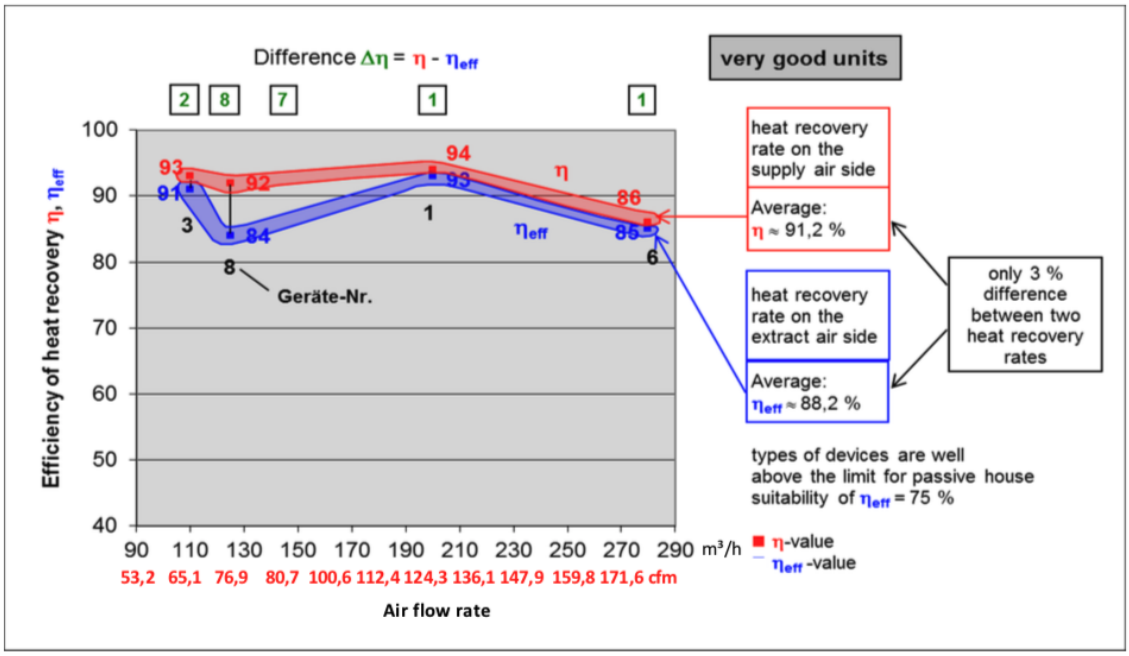


Less effective heat recovery units measured different degrees of heat recovery rate:
η – based on supply air measured air heating
η_{eff} – based on extract air measured air cooling

Image 3: Comparative testing results for moderately efficient HRV's showing HVI results (in red) compared to DIN V 18599-6:2007-02 and DIN EN 13141-7:2004(D) testing protocol results. Info source: Mr. Eberhard Paul, ZehnderPaul.

When units rated with much higher effective capture efficiency were tested, results became more aligned in both protocols. These results support our proposal above to **consider providing higher credit points for units with effective recovery efficiencies above 80%, and underscore our motivation to modify HVI testing protocols, or accept alternate testing protocols for E/ERV's.**

Different heat recovery values for the same unit



Measured heat recovery rate (η, η_{eff}) of good heat recovery units with only minor differences

Image 4: Comparative testing results for highly efficient HRV's showing better alignment in HVI results (in red) when compared to DIN V 18599-6:2007-02 and DIN EN 13141-7:2004(D) testing protocol results. Info source: Mr. Eberhard Paul, ZehnderPaul.

In summary, we strongly urge you to

1. not derate the current credits assigned to HRV's in CBECC-Res
2. to use this opportunity to shift the Overton Window towards higher performance and incentivize higher performance HRV's
3. to consider recognizing testing protocols other than that of HVI.

All three of these measures will not only help transform the building industry here in California, but provide a benefit to anyone and everyone who breathes in buildings.

Thank you for the opportunity to submit these comments.

Respectfully yours,

Bronwyn Barry, RA, CPHD
NAPHN Board President