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Mitsubishi Comments on 2025 Energy Code Pre-Rulemaking

Additional submitted attachment is included below.

1340 Satellite Boulevard
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October 6, 2023
Mr. David Hochschild, Chair
Dr. Andrew McAllister, Commissioner
California Energy Commission
1516 Ninth Street
Sacramento, CA 95814-5512
Re: Docket 22-BSTD-01

(Submitted electronically to Docket 22-BSTD-01: Mitsubishi Comments on 2025 Energy Code Pre-Rulemaking)

Dear Chair David Hochschild and Commissioner Andrew McAllister,

Mitsubishi Electric HVAC submits the following comments in response to the 2025 Energy Code Pre-Rulemaking. We appreciate the challenge in front of the Energy Commission as it seeks to continually evolve California's Building Energy Efficiency Standards. We also applaud its efforts over the last four plus decades to cost efficiently deliver ever better performing buildings for Californians to call home.

Mitsubishi Electric HVAC manufacturers only all-electric equipment and is a leading supplier of variable capacity heat pumps to the US market. In California, our all-climate heat pumps provide cost effective and high performing heating and cooling across all 16 climate zones. Mitsubishi Electric branded equipment is stocked at more than 47 distributor locations serving thousands of installing contractors statewide.

We are excited to work with the Commission and building professionals across California as the state strives to install six million heat pumps by 2030. And we are honored to work with a robust network of trained contractors, service technicians, and sales professionals that are helping to make California residents (and businesses) more comfortable every day. It is in this spirit of partnership that we offer the following comments.

Current HVAC industry regulations

As we head into the 2025 code update, we do so against the backdrop of three major energy efficiency and HVAC regulatory changes at the national level. Namely, the transition from M to M1 metrics, the transition from Energy Star version 6 to Energy Star version 6.1, and changes to the CEE Efficiency rating tiers. Heat pump manufacturers are still scrambling to rate and rerate thousands of system pairings in order just to be legal, much less alone qualified for the major incentive programs launched under the Inflation Reduction Act.

Subsequently, we will begin the refrigerant transition, which is major undertaking, not just for manufacturers, but also for distributors, installing contractors, energy raters, and code inspectors. The Jan. 1, 2025 (systems with capacity <65k btu) and Jan. 1, 2026 (systems 65k and larger) transition dates mean attention and resources will already be stretched thin at the same time the 2025 energy code update will go into effect.

Given known challenges with existing code requirements and verification procedures and considering the implications of the already crowded regulatory landscape impacting the industry, it seems valuable to use the 2025 update to focus on clean-up of existing code requirements and verification protocols and helping CEC partners promote training for best practice installations and code enforcement.

Additional complexities of variable capacity equipment

While we urge this slower approach to allow for better field practices and installation/verification procedures that are in compliance with the current code, we also understand the CEC is proposing heat pumps as the prescriptive baseline for nearly all of California's climate zones with the 2025 code update. We know it is important therefore to continue to push for best practices and we support several of the HVAC performance measures presented at the August 23, 2023, CEC workshop. However, we also urge the Commission to take the time and effort necessary to get this right for the most energy efficient heat pumps – inverter driven, variable capacity compressors.

Variable capacity heat pumps (VCHPs), like Mitsubishi Electric's inverter driven all-climate heat pumps, operate on inherently different principles of how to heat and cool homes compared to traditional furnaces and non-variable capacity (typically single and two stage) air-conditioners and heat pumps. Modulated compressor output, variable air speeds at the fan coil, and multi-head indoor configurations with variable output are just some of the strategies VCHPs use to deliver high-efficiency heating and cooling. But current code and field verification procedures, built for single stage systems, do not appropriately (nor clearly) address how efficiently these VCHP technologies perform.

There is still a gap between field understanding of the application of code requirements to inverter driven VCHP systems. We believe the next three years should be focused on closing that gap through training and education, while simultaneously gathering input from installers and verifiers on appropriate and feasible requirements and procedures for VCHPs that can be integrated in time for the 2028 code update.

In the interim as these protocols are developed, we believe the CEC has an existing tool, the VCHP Compliance Credit, to effectively integrate VCHPs into cost effective and high performing designs and buildings. More importantly, expanding the credit to include mid- and high-static ducted VCHPs, using the CBECC-Res Detailed VCHP Compliance Option, will enable the full range of VCHP products, ductless, ducted and hybrid, to receive appropriate compliance credit for their established performance. Enabling the Detailed VCHP Compliance Credit now under the 2022 code for ducted VCHPs will enable valuable market feedback to help inform feasible requirements and procedures that could be targeted by the CEC for 2028 implementation.

With that transition envisioned through the next two code update cycles, we offer the following comments for the proposed 2025 HVAC performance measures, which we group into the following three categories for ease of discussion: system performance, system controls, and installation verification.

System Performance

Proposal - Design (Sizing, Equipment Selection, and Ducts/Diffusers): Require documentation of load calculations and system sizing; provide details on duct/diffuser design; minimum heating capacity—not including supplementary heating.

Comment: We support inclusion of load calculations and system sizing in the appropriate compliance and or permitting documents, possibly the CF1R.

Recommendation: Support the proposal.

System Controls

Proposal - Supplementary Heating: Install and field verify controls that lock out supplementary heating above a certain outdoor temperature; impose strip heating capacity limits.

Proposal – Defrost: Set defrost delay timer optimally.

Comment: In general, no concern as to how these impact inverter driven VCHPs but believe it important to highlight that when products are installed in more challenging outdoor conditions they will operate as designed with the proper specification, installation, and site protection consistent with code requirements. As a manufacturer, therefore, it is our emphasis on training and proper practice that allows us to design products that perform as expected in the design conditions of the location. We would therefore generally encourage and want the Commission to craft standards that establish high-efficiency performance criteria (ideally aligned with other leading national and internal code making efforts) for manufacturers to meet and more gently regulate how the criteria is met. For example, a performance criteria where standby power cannot exceed X in any certain 24-hour period under Y conditions is a target which manufacturers can design to. But to then say, for example, that criteria has to be met without any sort of compressor heater preheater function that exceeds 50 watts is limiting, in that depending upon the climate and the actual weather conditions the system may very well need that extra power to ensure that there is not liquid refrigerant entering the compressor. We need to let system engineers design and build systems that perform to defined performance metrics.

Recommendation: Neutral on the proposals; generally little impact on inverter driven variable capacity heat pumps.

Installation Verification:

Proposal - Refrigerant Charge Verification (RCV): Require documentation when refrigerant weigh-in method used and allow remote verification.

Comment: We would first like to acknowledge that there remains the need to enable some form of automated refrigerant verification function into our products. Despite our interest and intent to achieve this, Mitsubishi Electric equipment does not currently offer this capability. And so, absent a verification function integrated into our systems, the

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responsibility and burden for refrigerant charge verification falls to the installing contractors and the verifiers. Therefore, field testing protocols and reporting mechanisms need to be clear and technically appropriate for the technology. We repeatedly hear confusion and misalignment for how variable capacity equipment is treated in terms of verification, including, for example, how refrigerant charge to individual air handlers should be measured and reported for multizone heat pumps. The emphasis here should be to ensure that protocols and reporting strategies are appropriate for inverter driven technology and where appropriate different from single and two stage equipment.

Proposal - Variable Capacity Systems: Modify fan efficacy test procedure; clarify definition of system airflow; compliance model revisions to account for distribution loss impacts of variable capacity systems.

Comment – Fan efficacy for a single multizone outdoor heat pump connected to multiple indoor units, including potentially multiple ducted air handlers, presents many complications that are currently not well addressed by current or proposed verification and reporting requirements. This does not even include the additional complication of air handler systems with zone dampers, a common practice. Installers often use third-party zoning systems, presenting the challenge of multiple OEMs being responsible for a product's controls logic. Considering this, we would similarly encourage that field verification protocols and reporting strategies be developed that are appropriate for inverter driven compressor technology and where appropriate different from single and two stage equipment.

Recommendation: Hold/delay current installation verification proposals to allow stakeholders to work with the heat pump industry on appropriate verification protocols and reporting requirements.

Again, we would like to thank the Commission and its stakeholders for making California homes and businesses more energy efficient and we look forward to working with our partners across the state to ensure our variable capacity inverter driven heat pumps deliver on that opportunity.

Sincerely,

Chris Bradt

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