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NEMA Comments on "45-Day" Proposal for Title 24 Programmable Communicating Thermostat (PCT) Requirements

NEMA is the trade association of choice for the electrical manufacturing industry. Founded in 1926 and headquartered near Washington, D.C., its approximately 450 member companies manufacture products used in the generation, transmission and distribution, control, and end-use of electricity, including residential and commercial thermostats.

Residential thermostats are within the scope of the Residential and Commercial Controls Section. Participating companies concerned with the CEC PCT initiative are Apcom, Inc.; Emerson/White-Rodgers; GE Consumer & Industrial; Honeywell, Inc.; and Johnson Controls, Inc.

NEMA has been involved in PCT discussions with the CEC since long before the first draft regulatory text was issued for comment and NEMA remains committed to working with the Commission on this matter.

As stated in NEMA comments submitted on previous proposed CEC requirements for PCTs, we are very concerned that the proposed requirements 1) are not clear, 2) are not complete, and 3) prescribe features that add cost and complexity to the PCT without providing significant value.

With reference to the 45-day language itself, the main text for Section 112(c), Thermostats, states that a PCT [will be] "certified by the manufacturer to the Energy Commission to meet the requirements of Subsections" 112(c)(1) for "Setback Capabilities" and 112(c)(2) for "Communicating Capabilities" for "Price Events" and "Emergency Events." No mention is made of section 112(c)(3), "Other Required Capabilities".

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This is quite confusing because a strict interpretation of the 112(c) text would not require a manufacturer of a PCT to *certify* to the Commission that the requirements of 112(c)(3), "Other Required Capabilities" are met by the product. However, the text of 112(c)(3) implies that a PCT must also meet those requirements (expansion port, information display, standardized terminal mapping, randomized setpoint return and addressability). Some clarification is needed in this instance. The Commission must ensure that the requirements PCT manufacturers must meet are clear so that they can be met.

Concerning the Reference Joint Appendix JA5, we have some major concerns as well.

First, the new JA5 requires the PCT to support a firmware upgrade while also allowing reversion to the original firmware. Although this requirement adds a lot of complication to the thermostat, there is no explanation or justification in the appendix or the 45-day language about why this capability is required. It is unrealistic that the CEC would require homeowners to do the firmware upgrade themselves, so it is not realistic to require this for all devices. While some manufacturers may design some models with this capability, we disagree this should be a Title 24 requirement.

Second, the JA5 states that the PCT must be made addressable by utility, area, substation, feeder, billing point, demand response program, setting radio options, and possibly providing a public security key. This requires the unit to accept a 26-to-28 hex character string. The thermostat must have the ability to enter the hex character string and display it for checking. It is not clear how the homeowner or installer is to obtain this hex character string. Moreover, we feel it would be very difficult to enter and display this hex character string in a cost-effective thermostat user interface. Even if the user interface problems are solved, manually entering a 26 to 28 hex character string anywhere will be very challenging for homeowners and installers to do without error.

Third, according to JA5, messages sent to the PCT will not be encrypted, but will be digitally signed. We understand this is to enable the unit to reject messages that are not properly signed with the private keys. In the stated method, the thermostat must receive the system owner's public keys and the system operator's public key. To accomplish this, the documents describe an activation process. First, at manufacture, each thermostat is embedded with a random number that can be stored in 256 bits. At installation, the homeowner or installer is to retrieve this random number from the thermostat display. The homeowner is to contact the system operator and provide this number, by phone, for example. The system owner's public keys and the system operator's public key are then broadcast by radio in such a way that only a device that knows that random number can retrieve the public security keys. We see a large problem here.

Two hundred fifty-six bits can represent a very large number with over 70 numerals. JA5 does not state how many digits the number will have. We believe that it is not reasonable for a homeowner or installer to retrieve a large number from a display, record it manually, and transmit it by phone. If addressing is done with entry of hex characters locally, why are multiple private keys needed for activation? If there were one or two statewide private keys, the

corresponding public keys could be embedded in the PCT at the time of manufacture without the activation step.

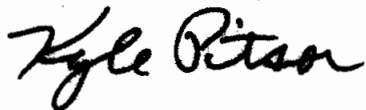
Finally, JA5 states that the PCT must be capable of detecting the type of communication being used through an inserted card. It is unclear how this would work unless the types of communicating modules were pre-defined.

In addition, we believe it would be extremely beneficial to CEC's efforts to mandate use of PCTs if the Commission were to prepare and issue a publication that would give HVAC equipment installers *and* homeowners a clear idea of all of the steps required to install and setup a PCT so, as the Commission requires, the unit operates within "the statewide DR communications system."

In closing, the Commission should be aware that the scope of the proposed PCT requirements has changed substantially over time. Several years ago, consultants costed a Home Depot retail thermostat and added in the extra material to make a PCT. With the added display, encryption and expanded messaging requirements, not only has the complexity of the unit grown but also the cost. The California PCT is no longer an off-the-shelf product with a few additions. As a result, the choices available to the consumer in 2009 will be severely limited when compared to today.

Thank you for consideration of these comments. We look forward to working with you to resolve these matters. Please contact Craig Updyke of NEMA Government Relations at 703 841 3294 or cra_updyke@nema.org for additional information.

Respectfully submitted,



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