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Subject: General Comments on 10/6/2020 Webinar Re: "Proposed 2022 Energy Code Solar Photovoltaic and Electrification", Docket No. 19-BSTD-03

To Whom It May Concern,

Thank you for the opportunity to participate in and comment on the staff workshop "Proposed 2022 Energy Code Solar Photovoltaic and Electrification", conducted on October 6, 2020 (Docket No. 19-BSTD-03). The Solar Rating & Certification Corporation (ICC-SRCC) is pleased to offer the following general comments in response to the call for comments associated with the workshop.

1) Technology-Agnostic Approach

The CASE reports outline a variety of goals for the 2022 Energy Code around electrification, load-shifting, self-consumption, efficiency and carbon reduction. However, when it comes to water heating applications, the approaches advocated by the CASE reports have focused almost exclusively on the combination of on-site PV, electrical energy storage and heat pump water heaters. While these is one worthwhile approach, it is by no means the only potential cost-effective solution to achieve the state goals for all situations and all building types.

Instead, ICC-SRCC advocates for a more diverse and technology-agnostic approach. There are other technologies that can and should be considered that can meet the goals, but with a different set of properties, advantages and disadvantages. By avoiding the trap of "putting all of the eggs in one basket", the energy code can promote choice, enhance flexibility, reduce the number of necessary exceptions and avoid unanticipated issues that could prevent the goals from being attained. ICC-SRCC believes that additional effort should be made to study the use of well-established technologies such as solar water heaters with electric backups, PV water heaters, thermal energy storage, small wind turbines and others. ICC-SRCC believes that no one technology can excel in all applications and by diversifying, the compliance options permitted, market forces can be harnessed to meet the state's goals. This approach also encourages innovation and the development of even more technological solutions that can contribute local jobs and expand California's economy.

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The refrigerants most commonly used in current Heat Pump Water Heaters (HPWHs) such as R32, R134, R410a and R417a have extremely high GWP values of 675, 1430, 2090, and 2346 respectively. Wide-scale deployment of HPWHs and HPSHs will invariably lead to a higher degree of refrigerant emissions, offsetting the carbon reductions resulting from their increased energy efficiency (relative to incumbent water heating technologies). While the volume of those emissions can be reduced through effective product design and installer & servicer practices and training, they can never be entirely eliminated.

The CASE Reports did acknowledge this important contribution to global warming but did not include it as a variable in the Statewide GHG Emission Reduction estimates associated with heat pump water heaters. ICC-SRCC believes that the effect of the refrigerants currently used in heat pump water heaters should be addressed in any analysis of GHG reduction. It should also be a consideration when assessing alternative water heating technology options. Certainly, there are other refrigerants under development and consideration, such as carbon dioxide, propane and even water vapor, with much lower GWP values. But these fluids have yet to be deployed broadly.

3) Workforce Considerations for Water Heaters

A further consideration not addressed in the CASE Reports is the availability and qualifications of service personnel for heat pump water heaters. Water heaters are typically installed and serviced by licensed plumbers. While licensed plumbers can and do install HPWHs, they often lack the training, expertise and equipment to service the refrigeration loops, compressors and condensers that are integral to heat pumps. HVAC contractors, who do have the expertise to service these components, often do not have the expertise or necessary licensing to service plumbing products. Consequently, the availability of qualified service personnel for these products may become a challenge for building owners.

ICC-SRCC proposes that the availability of qualified and skilled service personnel and domestic and California-manufactured products be considered in evaluations of water heating technologies and requirements.

4) End of Life Considerations

Additional consideration should be given to the end-of-life scenarios for the heat pump water heater/PV/energy storage system combination. Each of these devices contains materials that must be handled appropriately during decommissioning or removal to avoid environmental damage. Therefore, any analysis of the relative impact of water heating technologies should also include:

- Environmental and health impact of the constituent materials
- Costs associated with recycling and/or disposal
- Likelihood of proper decommissioning and disposal

Conclusion

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that a technology-agnostic approach should be adopted when considering water heating technologies to meet the stated goals. We also believe that considerations such as the global warming potential of refrigerants, workforce availability and end-of-life processes for products should be given greater weight for water heating solutions.

ICC-SRCC believes that this can be accomplished using existing cost-effective, safe, and reliable solar thermal and solar water heating technologies that have not been adequately considered by the CASE Reports to date. We would welcome the opportunity to collaborate with the CEC to further study the application of these technologies as described here.

Sincerely,

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