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Comments Regarding Solar Water Heating for 10-6-2020 Webinar

See attached document.

Additional submitted attachment is included below.

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October 20, 2020

Solar Rating & Certification Corporation (ICC-SRCC)
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Subject: SWH 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 in response to the call for comments associated with the workshop.

1) Heat pump Baseline for Lowrise and Highrise Residential Buildings.

During the workshop, staff described an approach that would add 2 EDR credits in Title 24, Part 6, for multi-family builders who voluntarily switch to both heat pump water heaters and heat pump space heaters. An accompanying proposed change to Title 24, Part 11 that would include heat pump water heaters in the standard design was also described.

ICC-SRCC believes that solar water heaters (SWH) utilizing an electrical backup should be considered as an optional alternative to heat pump water heaters (HPWHs) for the proposed EDR credit and standard design. Properly sized and installed, solar water heating systems utilizing electrical backup have the potential to provide comparable or superior levels of carbon reduction, load shifting, self-consumption and energy efficiency as current heat pump water heaters. Solar water heaters incorporate both energy collection and thermal storage functions without contributing to the “duck curve”. Solar water heaters do so while utilizing less than 1/3 of the roof space (for equal energy production) compared to photovoltaic modules. Incremental costs for solar water heaters vary, but costs for systems that are appropriate for all CA climate zones (except Climate Zone 16) can be as low as \$2,000 - \$3,000. This is comparable to or less than the \$3,000 incremental cost associated with heat pump water heaters, as described in the CASE Reports, and is before available incentives are factored in.

Solar water heaters can provide a useful alternative to heat pump water heaters overall, but it may also be able to address several applications that are challenging for the heat pump water heater/photovoltaic combination. These include applications where interior space for the tank or

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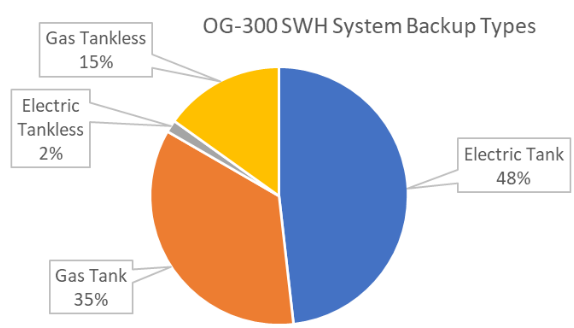
appropriate rooftop space for the PV modules are limited. Solar water heaters do not create a parasitic load for interior space heating systems and do not produce condensate, as HPWHs do. SWH produce significant amounts of carbon-neutral water, without the use of fluids with high global warming potential (GWP).

Most types of solar water heaters incorporate thermal storage, heating the water far above the setpoint of the backup system using entirely carbon-free solar energy during daylight hours when hot water demand is typically low. Properly designed and sized, a SWH can heat the stored water to temperatures as high as 180 °F, then utilizing a thermostatic mixing valve to deliver hot water at a safer temperature of approximately 120 °F. This is done without the use of electrical batteries or any contribution to the "duck curve" since SWHs produce energy like photovoltaic systems. HPWHs, on the other hand, rely on enhanced efficiency and a continuous supply of electrical energy.

Unlike HPWHs that are only available in a few standard sizes and configurations, SWHs are a diverse and varied set of technologies that can be customized and scaled to a wider range of applications. <u>ICC-SRCC currently certifies 194 different solar water heating systems using all-electric backup water heaters.</u> This represents approximately half of the available OG-300 systems and ensures that there are wide range of all-electric sizes, configurations and options to meet nearly any application.



ICC-SRCC recommends the inclusion of solar water heaters as an optional alternative to air-to-water heat pump water heaters for single-family, low-rise multi-family and high-rise multifamily service water heating applications. This can be done specifically for water heaters, or also in conjunction with accompanying reductions in the size of minimum requirements for photovoltaic and/or battery storage systems. Solar water heaters simultaneously accomplish the functions of the PV/HPWH/ESS combination at a lower price point and while meeting goals for efficiency, carbon reduction, load shifting and self-consumption.

2) ADU and Low EASAA Exceptions

Proposed new exceptions to the PV system requirements for accessory dwelling units and applications where the Available Effective Annual Solar Access Area (EASAA) does not permit full NEM compliance were discussed during the workshop. ICC-SRCC proposes that the use of solar thermal energy systems for water or space heating be considered in lieu of some or all PV system requirements in these cases. As noted above, most solar thermal collectors produce 3 or more times energy per unit area than current PV modules. This higher energy production density can be used to ensure that more applications with space constraints can also achieve the goals of the 2022 energy code – improved efficiency, load-shifting, carbon reduction and self-consumption. Solar thermal systems are highly scalable to address the specific loads and building design constraints for many of the exceptions

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discussed in the workshop. A wide range of cost-effective systems are available to address these applications. Notably, these systems ensure all energy derived is consumed onsite, and avoid the cost and complexity associated with net metering. Solar thermal systems can meet both the space and water heating needs of ADUs and tiny houses at an appropriate price point.

ICC-SRCC therefore proposes that the CEC study the use of solar thermal technology to the exceptions noted in the workshop in order to ensure that these applications contribute to state carbon-reduction goals in a space and cost-effective manner.

Conclusion

In conclusion, ICC-SRCC welcomes the opportunity to address the workshop presentation. We believe that inclusion of solar water heaters with electric backups as a means of achieving electrification and carbon-reduction goals will provide the following benefits:

- Greater flexibility to designers, architects and builders and choices for consumers to comply with the energy code;
- Hundreds of available all-electric solar water heater configurations to meet the unique needs of a wider range of applications;
- Alternatives to PV and ESS system exemptions related to size, space and building type, increasing total state-wide carbon reductions;
- Increased electrical load shifting and self-consumption reducing stresses on the grid compared to other all-electric water heaters;
- No high-GWP refrigerants;
- Greater resiliency, with the potential to provide hot water during power interruptions;
- Carbon-free energy production and thermal energy storage in one system without the need for batteries or net-metering.

ICC-SRCC believes that this can be accomplished using existing cost-effective, safe, and reliable all-electric 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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