Committee Action Report (CAR) on Public Review 1 Comments

Base Draft for Proposals: ICC 900/SRCC 300 PR1 Draft
Solar Thermal Standard Consensus Committee (IS-STSC)
Call for Comments Conducted: 12/4/2024-1/27/2025

Number: 1-01	Section: Definitions & § 304.2.2	Proponent: David Springer, Frontier Energy Inc.

Proposed Changes:

PHOTOVOLTAIC (PV) SOLAR WATER HEATING COLLECTOR. A subsystem that converts solar radiation into electrical potential using one or more photovoltaic modules, used to supply power a water heater directly ~~and exclusively~~ to an electrical water heating device. Typically, a combination of one or more PV modules, DC-AC inverters or DC-DC converters and other controls that are used to provide electrical input power directly to one or more electrical water heating elements, devices and/or electrical water heaters.

304.2.2 Photovoltaic solar water heating collectors. Where one or more photovoltaic (PV) modules are used as part of a *PV water heating system*, ~~they must supply power exclusively to electrical water heating devices installed on the solar water heating system. The electrical output of such modules shall not be connected to, or supply any power to any other electrical device, or the main electrical panel, or be exported to the electrical grid.~~ PV modules, inverters, power conditioners, controls, tracking systems, wiring and connectors used as part of a PV solar water heating system shall be located at the site and be in addition to any solar mandate minimum system size and they must prioritize power to electrical water heating devices installed on the solar water heating system. Once hot water heating demands are satisfied, the excess electrical output of such modules may be connected to or supply power to any other electrical device, electric battery, or main electrical panel, or be exported to the electrical grid. The PV production must meet or exceed instantaneous electrical demands of the water heater as part of corresponding solar fraction and comply with and be installed in accordance with the requirements of Section 304.11, and all applicable local codes.

Rationale Statement:

Prior to co-founding the Davis Energy Group Inc. in 1981(since acquired by Frontier Energy Inc. by which I continue to be employed), in 19741 founded Natural Heating Systems, a pioneering Northern California manufacturer and installer of solar water heating and space heating systems. I have seen the industry through many changes in that capacity including as a staff member of the California Energy Commission Solar Office (1979-1980). Eliminating the risk of freezing and the simplification made possible by generating electricity to heat water is a huge technological improvement.

A large part of the work Frontier Energy performs primarily out of its Davis office is to support changes to the California Title 24 energy standards. Our role is to identify energy-saving opportunities, research their cost-effectiveness and potential market impacts, and prepare

Codes and Standards Enhancement Reports that include proposed improvements to the standards. Solar water heating has long been accommodated by the code, and over the past two code cycles photovoltaic systems have been prescriptively required. Among the alternative prescriptive code requirements, the 2025 standards update allows:

150.1(c)8C. "A solar water-heating system with electric backup meeting the installation criteria specified in Reference Residential Appendix RA4 and with a minimum annual solar savings fraction of 0.7." In turn, Appendix RA4 provides for both SRCC OG-100 and OG-300 certification along with certain other provisions.

Title 24 standards increasingly account for carbon emissions as well as energy use and cost-effectiveness. To require that a solar water heater using PV-generated electricity not be permitted to also serve other building loads, charge batteries, and export power to the grid when excess capacity is available significantly decreases cost-effectiveness and provides no additional value for reducing carbon emissions. An SRCC requirement that PV modules be dedicated to heating water only is a terrible waste of PV module capacity and roof real estate, which is at a premium for buildings that are striving to achieve zero net energy and zero carbon emissions.

Such a requirement is akin to installing separate, independent arrays to serve lighting and HVAC electrical demand, for example. Allowing the water heater to tap the full capacity of a PV array designed to serve the needs of the entire residence also allows increased storage of thermal energy in the water heater tank to offset peak loads and reduce on-peak electricity costs for the increasing number of utility customers on time-of-use rates. This is important for the energy future of California and all states across this great nation of ours.

IS-STSC Resolution:

Number: 1-02	**Section:** Definitions & § 202, 304	**Proponent:** Bronte Payne, Sunrun

Proposed Changes:

PHOTOVOLTAIC (PV) SOLAR WATER HEATING COLLECTOR. A subsystem that converts solar radiation into electrical potential using one or more photovoltaic modules, used to supply power ~~directly and exclusively~~ to an electrical water heating device. Typically, a combination of one or more PV modules, DC-AC inverters or DC-DC converters and other controls that are used to provide electrical power ~~directly~~ to one or more electrical water heating devices and/or electrical water heaters.

PHOTOVOLTAIC (PV) WATER HEATER. A solar water heating system designed to convert energy contained within solar radiation using one or more photovoltaic modules supplying electricity to electric water heaters and/or electric heating elements ~~solely~~ for the purpose of heating water.

304.2 Heating energy sources. Solar thermal systems shall include at least one solar ~~thermal~~ collector complying with Section 304.2.1 or Section 304.2.2. Auxiliary water heaters and boilers included as part of solar thermal systems shall comply with Section 304.2.~~2~~3. Supplemental heaters incorporated into solar tanks that are not listed as standalone water heaters shall comply with ICC 903/SRCC 500.

304.2.1 Solar thermal collectors. Solar thermal collectors installed as part of solar thermal systems shall be listed and labeled to ICC 901/SRCC 100 and shall be used in the system in accordance with the collector manufacturer's instructions.

Exception: Solar thermal collectors inseparable from solar tanks for testing purposes (i.e. integrated collector storage (ICS) and inseparable thermosiphons) shall comply with ICC 901/SRCC 100 but shall not be required to be separately listed and labeled.

304.2.2 Photovoltaic solar water heating collectors. Where one or more photovoltaic (PV) modules are used as part of a PV water heating system, they must supply power ~~exclusively~~ to electrical water heating devices installed on the solar water heating system. ~~The electrical output of such modules shall not be connected to, or supply any power to any other electrical device, or the main electrical panel, or be exported to the electrical grid.~~ PV modules, inverters, power conditioners, controls, tracking systems, wiring and connectors used as part of a PV solar water heating system shall be located on or near the residential building that they serve and be connected to the electrical system of the building, and shall be permitted to serve other building loads. Systems shall comply with and be installed in accordance with the requirements of Section 304.10, and all applicable local codes.

304.2.~~2~~3 Auxiliary water heaters and boilers. Auxiliary water heaters and boilers used as part of solar thermal systems shall be listed and labeled to at least one of the standards listed in Table 304.2. Water heating equipment installed in outdoor locations shall be listed and labeled for outdoor installation.

Rationale Statement:

These proposed changes would allow PV modules used as a part of a PV water heating system to serve other building loads by removing language requiring the PV to exclusively serve electrical water heating devices installed on the hot water system. These changes would help maximize the benefits of the installed PV modules by allowing the generated electricity to be used to heat water and for other loads in the building, including battery storage. Allowing the PV to serve additional loads in the building, including battery storage, will allow all of the PV modules installed to be used to offset load or be exported to the grid to be used by neighboring buildings if generation exceeds hot water needs or electrical load at any given time.

IS-STSC Resolution:

Number: 1-03	Section: Definitions & § 304.2.2	Proponent: Joe Boney, Heat Wave Systems on Behalf of Sensible Technologies

Proposed Changes:

PHOTOVOLTAIC (PV) SOLAR WATER HEATING COLLECTOR. A subsystem that converts solar radiation into electrical potential using one or more photovoltaic modules, used to supply power a water heater directly ~~and exclusively~~ to an electrical water heating device. Typically, a combination of one or more PV modules, DC-AC inverters or DC-DC converters and other controls that are used to provide electrical input power directly to one or more electrical water heating elements devices and/or electrical water heaters.

304.2.2 Photovoltaic solar water heating collectors. Where one or more photovoltaic (PV) modules are used as part of a *PV water heating system*, ~~they must supply power exclusively to electrical water heating devices installed on the solar water heating system. The electrical output of such modules shall not be connected to, or supply any power to any other electrical device, or the main electrical panel, or be exported to the electrical grid.~~ PV modules, inverters, power conditioners, controls, tracking systems, wiring and connectors used as part of a PV solar water heating system shall be located at the site and be in addition to any solar mandate minimum system size and they must prioritize power to electrical water heating devices installed on the solar water heating system. Once hot water heating demands are satisfied, the excess electrical output of such modules may be connected to or supply power to any other electrical device, electric battery, or main electrical panel, or be exported to the electrical grid. The PV production must meet or exceed instantaneous electrical demands of the water heater as part of corresponding solar fraction and comply with and be installed in accordance with the requirements of Section 304.11, and all applicable local codes.

Rationale Statement:

What the ICC SRCC Standards Committee is fundamentally trying to determine is how to justify adding solar PV modules to homes and businesses for domestic hot water. The SETS system does this simply and safely while maximizing efficient use of solar production and roof space. All power created by the PV system is always utilized. When the PV system is grid tied, it allows power production diversity. The SETS system is prioritized for domestic hot water production and storage, and when the DHW system tank temps reach set point of around 140F, the DHW electrical usage turns off, and the excess power is now available to be used by other household electrical needs, or be stored in electric batteries, or continue on to the grid. How this works: let's follow the ions. When the PV modules creates the ions, they travel to the electrical main just like all PV systems. Along the way to the electrical main, a current sensor in the SETS control reads if there are enough amps to power the DHW electric heater. If there are, then the ions from the solar modules that are going to the electrical main are now diverted to the electric DHW heater. When the DHW heater is satisfied, the ions are used elsewhere. When the power production falls below the threshold of the DHW requirements for amps, like when the sun is setting or there is major cloud cover, the grid power automatically takes over. An ion created + ion utilized = ion saved.

IS-STSC Resolution:

Number: 1-04	Section: Definitions & §304.2.2	Proponent: Francesco Marchesi, Messana Inc. and Hydronica

Proposed Changes:

PHOTOVOLTAIC (PV) SOLAR WATER HEATING COLLECTOR. A subsystem that converts solar radiation into electrical potential using one or more photovoltaic modules, used to supply power a water heater directly ~~and exclusively~~ to an electrical water heating device. Typically, a combination of one or more PV modules, DC-AC inverters or DC-DC converters and other controls that are used to provide electrical input power directly to one or more electrical water heating elements devices and/or electrical water heaters.

304.2.2 Photovoltaic solar water heating collectors. Where one or more photovoltaic (PV) modules are used as part of a *PV water heating system*, ~~they must supply power exclusively to electrical water heating devices installed on the solar water heating system. The electrical output of such modules shall not be connected to, or supply any power to any other electrical device, or the main electrical panel, or be exported to the electrical grid.~~ PV modules, inverters, power conditioners, controls, tracking systems, wiring and connectors used as part of a PV solar water heating system shall be located at the site and be in addition to any solar mandate minimum system size and they must prioritize power to electrical water heating devices installed on the solar water heating system. Once hot water heating demands are satisfied, the excess electrical output of such modules may be connected to or supply power to any other electrical device, electric battery, or main electrical panel, or be exported to the electrical grid. The PV production must meet or exceed instantaneous electrical demands of the water heater as part of corresponding solar fraction and comply with and be installed in accordance with the requirements of Section 304.11, and all applicable local codes.

Rationale Statement:

My name is Francesco Marchesi, co-founder of Messana Inc. and Hydronica. Messana has been a leader in the field of radiant cooling and heating systems for over 15 years, while Hydronica operates as an installation company.

For years, we used solar thermal systems until we discovered S.E.T.S. This simple system allows end-users to optimize solar panels, which are now "mandatory" in California, in the best way possible. Compared to thermal systems, photovoltaic solar eliminates the costs associated with periodic maintenance and the risks caused by high temperatures in the pipes.

It makes installation safer, easier, and more economical compared to thermal systems.
Aesthetically, it provides uniformity in the type of panels, something impossible when using two different types of panels.
We believe that S.E.T.S. represents the present and the future of how an efficient home should be designed, built, and utilized.

I hope my considerations can be heard and taken into account. Thank you.

IS-STSC Resolution:

Number: 1-05	Section: Definitions & §304.2.2	Proponent: Shannon Gomez

Proposed Changes:

PHOTOVOLTAIC (PV) SOLAR WATER HEATING COLLECTOR. A subsystem that converts solar radiation into electrical potential using one or more photovoltaic modules, used to supply power a water heater directly ~~and exclusively~~ to an electrical water heating device. Typically, a combination of one or more PV modules, DC-AC inverters or DC-DC converters and other controls that are used to provide electrical input power directly to one or more electrical water heating elements, devices and/or electrical water heaters.

304.2.2 Photovoltaic solar water heating collectors. Where one or more photovoltaic (PV) modules are used as part of a *PV water heating system*, ~~they must supply power exclusively to electrical water heating devices installed on the solar water heating system. The electrical output of such modules shall not be connected to, or supply any power to any other electrical device, or the main electrical panel, or be exported to the electrical grid.~~ PV modules, inverters, power conditioners, controls, tracking systems, wiring and connectors used as part of a PV solar water heating system shall be located at the site and be in addition to any solar mandate minimum system size and they must prioritize power to electrical water heating devices installed on the solar water heating system. Once hot water heating demands are satisfied, the excess electrical output of such modules may be connected to or supply power to any other electrical device, electric battery, or main electrical panel, or be exported to the electrical grid. The PV production must meet or exceed instantaneous electrical demands of the water heater as part of corresponding solar fraction and comply with and be installed in accordance with the requirements of Section 304.11, and all applicable local codes.

Rationale Statement:

No Comment.

IS-STSC Resolution:

Number: 1-06	Section: Definitions & §304.2.2	Proponent: John Grose, Sensible Technologies Inc.

Proposed Changes:

PHOTOVOLTAIC (PV) SOLAR WATER HEATING COLLECTOR. A subsystem that converts solar radiation into electrical potential using one or more photovoltaic modules, used to supply power a water heater directly ~~and exclusively~~ to an electrical water heating device. Typically, a combination of one or more PV modules, DC-AC inverters or DC-DC converters and other controls that are used to provide electrical input power directly to one or more electrical water heating elements devices and/or electrical water heaters.

304.2.2 Photovoltaic solar water heating collectors. Where one or more photovoltaic (PV) modules are used as part of a *PV water heating system*, ~~they must supply power exclusively to electrical water heating devices installed on the solar water heating system. The electrical output of such modules shall not be connected to, or supply any power to any other electrical device, or the main electrical panel, or be exported to the electrical grid.~~ PV modules, inverters, power conditioners, controls, tracking systems, wiring and connectors used as part of a PV solar water heating system shall be located at the site and be in addition to any solar mandate minimum system size and they must prioritize power to electrical water heating devices installed on the solar water heating system. Once hot water heating demands are satisfied, the excess electrical output of such modules may be connected to or supply power to any other electrical device, electric battery, or main electrical panel, or be exported to the electrical grid. The PV production must meet or exceed instantaneous electrical demands of the water heater as part of corresponding solar fraction and comply with and be installed in accordance with the requirements of Section 304.11, and all applicable local codes.

Rationale Statement:

My name is John Grose of Sensible Technologies, Inc. I have been in the solar thermal business for 44 years. I have been involved in the installation or servicing of over 10,000 solar thermal systems in Northern California over the years. I was a keynote speaker for PGE for 7 years regarding solar thermal explaining the CSI program and solar installation sizing, design and installation best practices.

What the ICC SRCC Standards Committee is fundamentally trying to determine is how to justify adding solar PV modules to homes and businesses for domestic hot water. The SETS system does this simply and safely while maximizing efficient use of solar production and roof space. All power created by the PV system is always utilized. When the PV system is grid tied, it allows power production diversity. The SETS system is prioritized for domestic hot water production and storage, and when the DHW system tank temps reach set point of around 140F, the DHW electrical usage turns off, and the excess power is now available to be used by other household electrical needs, or be stored in electric batteries, or continue on to the grid. How this works: let's follow the ions. When the PV modules creates the ions, they travel to the electrical main just like all PV systems. Along the way to the electrical main, a current sensor in the SETS control reads if there are enough amps to power the DHW electric heater. If there are, then the ions from the solar modules that are going to the electrical main are now diverted to the electric DHW heater. When the DHW heater is satisfied, the ions are used elsewhere. When the power production falls below the threshold of the DHW requirements for amps, like when the sun is setting or there is major cloud cover, the grid power automatically takes over. An ion created + ion utilized = ion saved.

Please see past how solar thermal used to make hot water since the 1970's. Recalling my solar tech days, I'd see solar thermal systems get up to 160°F in the middle of the day and turn off, wasting half the day's opportunity of solar gains by not collecting available solar energy, and consequently wasting roof space. With the SETS grid tie-in, we never waste power production. The SRCC SETS OG 300 certification requires

an additional 2.8 KW over the T24 solar minimum requirement, this is a good thing for the solar PV industry, and for the plumbers. Common sense code writing provides guidelines for safety, best practices, and a framework.

IS-STSC Resolution:

Number: 1-07	**Section:** Definitions & § 304.2.2	**Proponent:** Christopher Bradt, LG Electronics

Proposed Changes:

PHOTOVOLTAIC (PV) SOLAR WATER HEATING COLLECTOR. A subsystem that converts solar radiation into electrical potential using one or more photovoltaic modules, used to supply power ~~directly and exclusively~~ to an electrical water heating device. Typically, a combination of one or more PV modules, DC-AC inverters or DC-DC converters and other controls that are used to provide electrical power ~~directly~~ to one or more electrical water heating devices and/or electrical water heaters

PHOTOVOLTAIC (PV) WATER HEATER. A solar water heating system designed to convert energy contained within solar radiation using one or more photovoltaic modules supplying electricity to electric water heaters and/or electric heating elements ~~solely~~ for the purpose of heating water.

304.2.2 Photovoltaic solar water heating collectors.

Where one or more photovoltaic (PV) modules are used as part of a PV water heating system, they must supply power ~~exclusively~~ to electrical water heating devices installed on the solar water heating system. ~~The electrical output of such modules shall not be connected to, or supply any power to any other electrical device, or the main electrical panel, or be exported to the electrical grid.~~ In addition to any solar mandate minimum system size, the PV solar water heating system must prioritize power to the connected electrical water heating devices. Once hot water heating demands are satisfied, the excess electrical output of such modules may be connected to or supply power to any other electrical device, electric battery, or main electrical panel, or be exported to the electrical grid. The PV production must meet or exceed instantaneous electrical demands of the water heater as part of corresponding solar fraction. PV modules, inverters, power conditioners, controls, tracking systems, wiring and connectors used as part of a PV solar water heating system shall comply with and be installed in accordance with the requirements of Section 304.10, and all applicable local codes.

Rationale Statement:

I provide today's comment to help encourage ICC 900/SRCC 300 to not adopt changes to its definition and guidance for water heating powered by photovoltaic solar systems that are overly prescriptive. Building and water heating electrification strategies benefit from flexible load shifting strategies and technologies. Hard wired and locally networked controls are enabling and optimizing the ability of our buildings' equipment and

appliances to communicate demand, balance load, and direct electrons where they're needed when. Current language in the first draft limits how solar PV generated electrons can be used to heat water and, by introducing the concept of dedicated PV equipment exclusively for water heating, creates cost burden and limits financial offset/utility bill savings for customers seeking to optimize water heating with solar PV.

Revised language as proposed above will still allow for water heating demands to be prioritized and met fist with available power collected from the solar PV, while also allowing for excess power to be used elsewhere in the building or exported to the grid for the benefit of the solar system owner/operator.

IS-STSC Resolution:

Number: 1-08	**Section:** Definitions & § 202, 304	**Proponent:** Jacob Saub, Ripcord Engineering

Proposed Changes:

Section 202

PHOTOVOLTAIC (PV) SOLAR WATER HEATING COLLECTOR. A ~~subsystem~~ subassembly that converts solar radiation into electrical potential using one or more photovoltaic modules, used to ~~supply~~ power a water heater ~~directly and exclusively to an electrical water heating device~~. Typically, a combination of one or more PV modules, DC-AC inverters or DC-DC converters and other controls that are used to provide electrical input ~~power directly~~ to one or more electrical ~~water~~ heating elements ~~devices and/or electrical water heaters~~.

SOLAR THERMAL SYSTEM. A system that converts solar radiation to thermal energy in a fluid for use in heating applications.

~~PHOTOVOLTAIC (PV) WATER HEATER. A solar water heating system designed to convert energy contained within solar radiation using one or more photovoltaic modules supplying electricity to electric water heaters and/or electric heating elements solely for the purpose of heating water.~~ (inconsistent with definition of Solar Thermal System above)

WATER HEATER. Any heating *appliance* or equipment that heat potable water and supplies such water to the potable hot water distribution system. (IRC 2021 / Chapter 2 Definitions)

Section 304

304.2. Heating energy sources. Solar thermal systems shall include at least one solar thermal collector complying with Section 304.2.1. Auxiliary water heaters and boilers included as part of solar thermal systems shall comply with Section 304.2.2. Supplemental heaters incorporated into solar tanks that are not listed as standalone water heaters shall comply with ICC 903/SRCC 500.

~~304.2.2 Photovoltaic solar water heating collectors. Where one or more photovoltaic (PV) modules are used as part of a *PV water heating system*, they must supply power exclusively to electrical water heating devices installed on the solar water heating system. The electrical output of such modules shall not be connected to, or supply any power to any other electrical device, or the main electrical panel, or be exported to the electrical grid. PV modules, inverters, power conditioners, controls, tracking systems, wiring and connectors used as part of a PV solar water heating system shall comply with and be installed in accordance with the requirements of Section 304.10, and all applicable local codes.~~ (not referenced by 304.2 above)

304.2.2 Auxiliary water heaters and boilers. Auxiliary water heaters and boilers used as part of solar thermal systems shall be listed and labeled to at least one of the standards listed in Table 304.2. Water heating equipment installed in outdoor locations shall be listed and labeled for outdoor installation.

Rationale Statement:

Ripcord Engineering is a consulting engineering firm responsible for the safe and economical design of mechanical and plumbing systems. I am the Chief Technical Officer of Ripcord Engineering. I was made aware of the upcoming change to ICC 900 by a Producer that offers a product to dispatch PV module power in accordance with site demand.

In my opinion, the proposed change to ICC 900 places the interests of a Producer with a unique and limited product capability over the interests of the General and User categories in the community. The structure of the proposed change seems to seek to limit the ability of General and User interests to dispatch PV module power in accordance with site demand. Limiting the ability of General and User interests to dispatch PV module power in accordance with site demand will tend to (1) drive up the cost of transitioning the community to renewable energy and (2) drive down the pace of the transition to renewable energy.

Please consider structuring the proposed change to ICC 900 such that dispatch of PV module power in accordance with site demand is not excluded as an option for the General and User categories in the community.

IS-STSC Resolution:

Number: 1-09	Section: Definitions & § 304.2	Proponent: Gary Klein, Gary Klein & Associates, Inc.

Proposed Changes:

PHOTOVOLTAIC (PV) SOLAR WATER HEATING COLLECTOR. A subsystem that converts solar radiation into electrical potential using one or more photovoltaic modules, used to supply power ~~directly and exclusively~~ to an electrical water heating device. Typically, a combination of one or more PV modules, DC-AC inverters or DC-DC converters and other controls that are used to provide electrical power ~~directly~~ to one or more electrical water heating devices and/or electrical water heaters.

PHOTOVOLTAIC (PV) WATER HEATER. A *solar water heating system* designed to convert energy contained within solar radiation using one or more photovoltaic modules supplying electricity to electric water heaters and/or electric heating elements ~~solely~~ for the purpose of heating water.

304.2 Heating energy sources. Solar thermal systems shall include at least one solar thermal collector complying with Section 304.2.1. Photovoltaic solar water heating collectors shall comply with Section 304.2.2. Auxiliary water heaters and boilers included as part of solar thermal systems shall comply with Section ~~304.2.2~~ 304.2.3. Supplemental heaters incorporated into solar tanks that are not listed as standalone water heaters shall comply with ICC 903/SRCC500.

(no change, shown here for completeness) 304.2.1 Solar thermal collectors. Solar thermal collectors installed as part of solar thermal systems shall be listed and labeled to ICC 901/SRCC 100 and shall be used in the system in accordance with the collector manufacturer's instructions.

Exception: Solar thermal collectors inseparable from solar tanks for testing purposes (i.e. integrated collector storage (ICS) and inseparable thermosiphons) shall comply with ICC 901/SRCC 100 but shall not be required to be separately listed and labeled.

304.2.2 Photovoltaic solar water heating collectors. Where one or more photovoltaic (PV) modules are used as part of a *PV water heating system*, they must supply power ~~exclusively~~ to electrical water heating devices installed on the solar water heating system. ~~The electrical output of such modules shall not be connected to, or supply any power to any other electrical device, or the main electrical panel, or be exported to the electrical grid.~~ PV modules, inverters, power conditioners, controls, tracking systems, wiring and connectors used as part of a PV solar water heating system shall comply with and be installed in accordance with the requirements of Section 304.10, and all applicable local codes.

~~304.2.2~~ **304.2.3 Auxiliary water heaters and boilers.** Auxiliary water heaters and boilers used as part of *solar thermal systems* shall be listed and labeled to at least one of the standards listed in Table 304.2. Water heating equipment installed in outdoor locations shall be listed and labeled for outdoor installation.

Rationale Statement:

My name is Gary Klein. I have been working to improve the performance of hot water systems for more than 30 years. I am commenting on the proposed to help ensure that provisions allow for more than one way to comply, creating a more vibrant market for the installation of photovoltaic water heating systems.

The original Standard allowed for any PV system to be connected to electric water heating devices. It did not require that it be a system dedicated solely to that purpose. This openness allowed for innovation in the industry. My comments revise the definitions and the provisions in Section 304.2 to bring this back.

The charging paragraph in Section 304.2 was missing a reference to the subsection on photovoltaic solar water heating collectors. This reference has been added and the numbering revised to reflect this addition.Thank you for considering this comment.

IS-STSC Resolution:

Number: 1-10	**Section:** Definitions & § 303.2	**Proponent:** Peter Kornbluth, The Las Canoas Co., dba Construction Plumbing

Proposed Changes:

PHOTOVOLTAIC (PV) SOLAR WATER HEATING COLLECTOR. A subsystem that converts solar radiation into electrical potential using one or more photovoltaic modules, used to supply power a water heater directly ~~and exclusively~~ to an electrical water heating device. Typically, a combination of one or more PV modules, DC-AC inverters or DC-DC converters and other controls that are used to provide electrical input power directly to one or more electrical water heating elements devices and/or electrical water heaters.

304.2.2 Photovoltaic solar water heating collectors. Where one or more photovoltaic (PV) modules are used as part of a *PV water heating system*, ~~they must supply power exclusively to electrical water heating devices installed on the solar water heating system. The electrical output of such modules shall not be connected to, or supply any power to any other electrical device, or the main electrical panel, or be exported to the electrical grid.~~ PV modules, inverters, power conditioners, controls, tracking systems, wiring and connectors used as part of a PV solar water heating system shall be located at the site and be in addition to any solar mandate minimum system size and they must prioritize power to electrical water heating devices installed on the solar water heating system. Once hot water heating demands are satisfied, the excess electrical output of such modules may be connected to or supply power to any other electrical device, electric battery, or main electrical panel, or be exported to the electrical grid. The PV production must meet or exceed instantaneous electrical demands of the water heater as part of corresponding solar fraction and comply with and be installed in accordance with the requirements of Section 304.11, and all applicable local codes.

Rationale Statement:

My name is Peter Kornbluth. I am President of The Las Canoas Co., Inc., dba Construction Plumbing. We are a commercial and residential plumbing contractor with yearly sales over $5,000,000.
We have installed over 1000 solar thermal and water heating systems since our founding in 1983.

In our opinion, this proposed change to the SRCC OG 300 program is a major error, which will lead to increased use of fossil fuels and all the downstream climate problems that follow. The SETS systems are the most efficient and rational solution to the need for photovoltaic energy to be utilized to heat domestic water.

We strongly encourage you not to make this change.

IS-STSC Resolution:

Number: 1-11	**Section:** Definitions & § 304.2.2	**Proponent:** Scott Shelton, SEED Engineering

Proposed Changes:

PHOTOVOLTAIC (PV) SOLAR WATER HEATING COLLECTOR. A subsystem that converts solar radiation into electrical potential using one or more photovoltaic modules, used to supply power a water heater directly ~~and exclusively~~ to an electrical water heating device. Typically, a combination of one or more PV modules, DC-AC inverters or DC-DC converters and other controls that are used to provide electrical input power directly to one or more electrical water heating elements devices and/or electrical water heaters.

304.2.2 Photovoltaic solar water heating collectors. Where one or more photovoltaic (PV) modules are used as part of a *PV water heating system*, ~~they must supply power exclusively to electrical water heating devices installed on the solar water heating system. The electrical output of such modules shall not be connected to, or supply any power to any other electrical device, or the main electrical panel, or be exported to the electrical grid.~~ PV modules, inverters, power conditioners, controls, tracking systems, wiring and connectors used as part of a PV solar water heating system shall be located at the site and be in addition to any solar mandate minimum system size and they must prioritize power to electrical water heating devices installed on the solar water heating system. Once hot water heating demands are satisfied, the excess electrical output of such modules may be connected to or supply power to any other electrical device, electric battery, or main electrical panel, or be exported to the electrical grid. The PV production must meet or exceed instantaneous electrical demands of the water heater as part of corresponding solar fraction and comply with and be installed in accordance with the requirements of Section 304.11, and all applicable local codes.

Rationale Statement:

I am Scott Shelton, a Professional Engineer and the President of SEED Engineering, a firm focusing on sustainability and energy efficiency. We provide a wide array of services including Design and Engineering, Cx, Energy Consulting, etc.

For Section 304.2.2, where we are using solar PV for DHW, the system should prioritize DHW, but any excess should be allowed to serve any other electric consuming device (ie appliances) or be stored in batteries or sent back to the grid. There is no reason to limit the capacity of the system.

IS-STSC Resolution:

Number: 1-12	**Section:** Definitions & § 304.2.2	**Proponent:** David Knight, Monterey Energy Group

Proposed Changes:

PHOTOVOLTAIC (PV) SOLAR WATER HEATING COLLECTOR. A subsystem that converts solar radiation into electrical potential using one or more photovoltaic modules, used to supply power a water heater directly ~~and exclusively~~ to an electrical water heating device. Typically, a combination of one or more PV modules, DC-AC inverters or DC-DC converters and other controls that are used to provide electrical input power directly to one or more electrical water heating elements devices and/or electrical water heaters.

304.2.2 Photovoltaic solar water heating collectors. Where one or more photovoltaic (PV) modules are used as part of a *PV water heating system*, ~~they must supply power exclusively to electrical water heating devices installed on the solar water heating system. The electrical output of such modules shall not be connected to, or supply any power to any other electrical device, or the main electrical panel, or be exported to the electrical grid.~~ PV modules, inverters, power conditioners, controls, tracking systems, wiring and connectors used as part of a PV solar water heating system shall be located at the site and be in addition to any solar mandate minimum system size and they must prioritize power to electrical water heating devices installed on the solar water heating system. Once hot water heating demands are satisfied, the excess electrical output of such modules may be connected to or supply power to any other electrical device, electric battery, or main electrical panel, or be exported to the electrical grid. The PV production must meet or exceed instantaneous electrical demands of the water heater as part of corresponding solar fraction and comply with and be installed in accordance with the requirements of Section 304.11, and all applicable local codes.

Rationale Statement:

My name is David Knight, and I own a California based MEP and solar engineering firm. 46 years ago, I installed my first solar thermal system for DHW system. If the goal is to take solar thermal for DHW technology back to 1979, the proposed changes do just that.

The fundamental problem with solar thermal for DHW is if the hot water is not needed, the solar produced energy is wasted. To that end, along with my partner John Grose, have envisioned, patented, gained multiple SRCC listings, UL listing, and convinced LG, one of the world's largest manufactures to partner with us as they introduced their new heat pump water heater. Our system is called S.E.TS. (Solar Electric Thermal Storage) and it seems our system is being specifically targeted by the new and regressive regulations.

Our S.E.T.S. PV to LG HPWH system requires 2.8KW of PV greater than California's solar mandate to obtain our OG 300 net solar

fraction and the associated California energy code (T-24) credit. It takes about 2 hours of sunshine to produce a typical California families daily demand for hot water. Once the 80 gallon LG HPWH is filled with 140F water, the solar produced electricity is available to provide for the homes lights, appliances, plug in loads, HVAC, car charging, well pumping, pool heating and battery charging. In our system, solar produced energy is never wasted. California electric rates, between 4PM and 10PM, are now well over $0.60/KWH and our 3 largest utilities have been granted 12.5% increase for each year for the next 5. To waste any solar produced electricity is a sin against our environment and California rate payers. In our system, the DHW is prioritized per existing SRCC guidelines, but once the DHW demand is meet, solar powers the rest of the house. What could possibly be wrong with that?

We have no problem with updated OG 300 wording stating that only a PV system located on site can be used, or that PV panels must be in addition to any solar mandate minimum.

At a minimum, please delay any decision on this issue until John and I, and other stake holders, have an opportunity to Zoom

IS-STSC Resolution:

Number: 1-14*	**Section:** Chapter 6	**Proponent:** Chris Mobley, UL Solutions

Proposed Changes:

94—~~2024~~ 2023 Tests for Flammability of Plastic Materials for Parts in Devices and Appliances with revisions through January 9, 2024 ..... D.5.2

174—2004 Household Electric Storage Tank Water Heaters—with revisions through ~~October 2021~~ November 1, 2024...Table 304.2, 304.3.1, D.6.2

499—2014 Electric Heating Appliances—with revisions through ~~February 2017~~ February 4, 2025..... Table 304.2

723—2018 Test for Surface Burning Characteristics of Building Materials-with revisions through April 27, 2023..... 304.5.2, D.2.3, D.3.1, D.5.2

726—1995 Oil-Fired Boiler Assemblies—with revisions through ~~October 2013~~ September 24, 2024..... Table 304.2

732—~~2018~~2023 Oil-Fired Storage Tank Water Heaters—~~with revisions through August 2018~~ ..... Table 304.2, 304.3.1

746B—2018~~2024~~ Polymeric Materials - Long Term Property Evaluations with revisions through May 9, 2024..... D.3.1

778—~~2014~~ 2016Standard for Motor-Operated Water Pumps with revisions through June 23, 2024..... Table 304.10, 304.7

795—~~2016~~ 2024 Commercial-Industrial Gas Heating Equipment ~~– with revisions through 2020~~..... Table 304.2

834—2004 Heating, Water Supply, and Power Boilers - Electric—with revisions through ~~July 2019~~July 8, 2024 ..... Table 304.2

873—~~2012~~2007 Standard for Safety Temperature-Indicating and Regulating Equipment with revisions through February 6, 2015... Table 304.10

969—~~2023~~ 2017 Marking and Labeling Systems with revisions through May 9, 2023..... D.7

1030—2015 Standard for Sheathed Heating Elements with revisions through March 10, 2025..... Table 304.10

1453—2016 Electric Booster and Commercial Storage Tank Water Heaters—with revisions through ~~May 2018~~ February 4, 2025 ..... Table 304.2, 304.3.1

1703—2002 Standard for Flat-Plate Photovoltaic Modules and Panels—with Revisions through ~~November 2014~~ May 15, 2024 .....303.2.2.2, Table 304.10, 403.2.8

1741—~~2010~~ 2021Standard for Inverters, Converters, Controllers and Interconnection System Equipment Use with Distributed Energy Resources with revisions through October 23, 2024..... Table 304.10

1977—2022 Component Connectors for Use in Data, Signal, Control and Power Applications..... Table 304.10

2523—2009 Oil-Fired Storage Tank Water Heaters—with revisions through ~~March 2018~~October 20, 2022..... Table 304.2

3703—2015 Standard for Solar Trackers—with revisions through April 2020 ..... Table 304.10

60335-2-40—2022 Household and Similar Electrical Appliances - Safety - Part 2-40: Particular Requirements for Electrical Heat Pumps, Air-Conditioners and Dehumidifiers..... Table 304.2, 304.3.1

~~61730—2023~~ 61730-1-2022 Photovoltaic (PV) Module Safety Qualification – Part 1: Requirements for Construction.. Table 304.10, 403.2.8

60730-1—2024 Automatic Electrical Controls for Household and Similar Use - Part 1: General Requirements.....Table 304.10

Rationale Statement:

I went through the reference standards section and updated the info for UL standards. Most of these are just changes to the date of the latest editions, and revisions. However, the PV standard had a typo in the number of the standard itself (missing the -1) which would also need to be corrected in the body of the standard in several places.

IS-STSC Resolution:

Number: 1-15*	**Section:** Appendix D, Section D.4	**Proponent:** Alex Ward, Rive Energy
Proposed Changes: **D.4.10 Drainback tanks.** Drainback tanks incorporated into subassemblies shall comply with Section 304.3 **D4.11 Electric heaters.** Sheathed electric heating elements installed in subassemblies shall comply with UL 1030. Electric air-water and water-water heat pump units incorporated into subassemblies shall comply with UL 60335-2-40.		
Rationale Statement: We have developed a product that would typically fall within the scope of SRCC 300, but we feel it is necessary to clarify the prerequisites of SRCC 300 regarding the incorporation of a resistive element and a heat pump when they are inseparable from the pumps station. The proposed language adds the appropriate guidance for the integration of components of pump stations.		
IS-STSC Resolution:		

** Comment received after the close of the formal public comment period. Consideration as part of the CAR at the discretion of the IS-STSC.*