CPUC Comments on SWWH032-01 Solar Thermal Water Heating, Residential

Lead PA: SCG

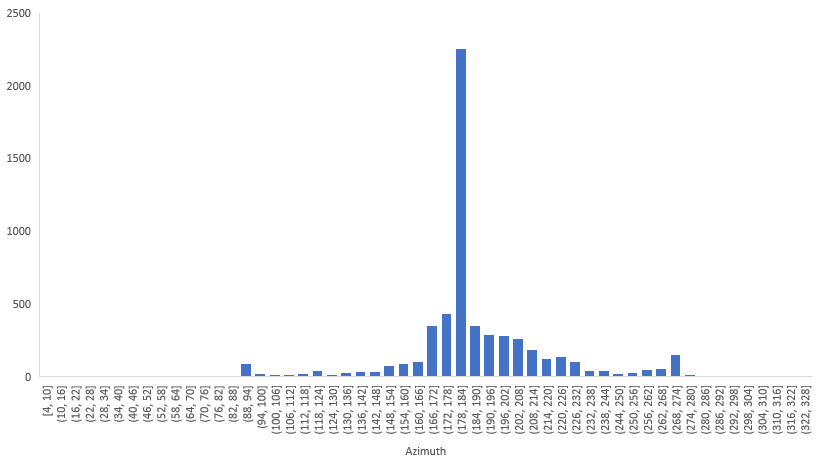
Workpaper Submittal Date: 7/5/2021

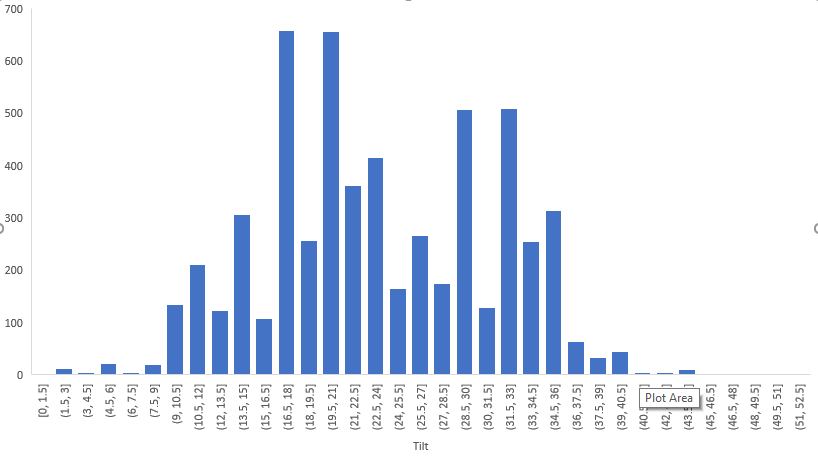
CPUC Review Date: 7/13/2021

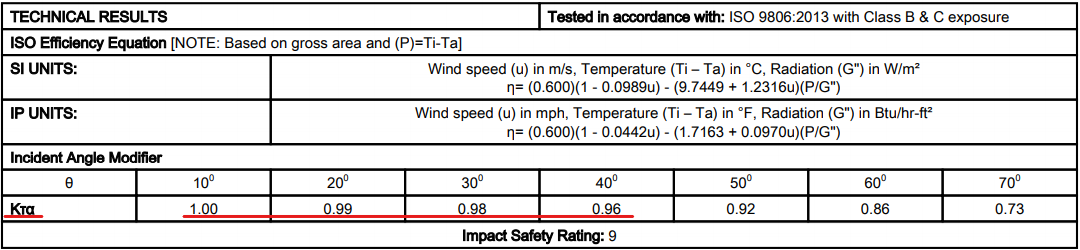
SoCalGas Response Date: 8/2/2021

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| CPUC Comment | PA Response |
| Do you expect there to be need for a measure offering where the existing water heater type = tankless and the measure = SWH w/ storage backup? Did this ever occur in the CSI program? | The CSI program didn’t collect existing baseline information for the heating system being replaced, so this data may not exist. Because the pre-existing water heater can be either storage WH or tankless WH, the workpaper includes both baselines.  Replacing tankless WH with Solar WH + storage backup would not save much energy, and there shouldn’t be any demand for this offering. SoCalGas does not plan to offer a measure for this case. |
| Under the Code Requirements section, the workpaper states: “While there are insulation requirements for storage tanks of a solar water heating system, the solar water  heating systems are not required by the California energy efficiency codes or standards.”  The sentence is a bit confusing or at least needs context. Could you explain the intent of the sentence? It reads like there are insulation requirements (CA EE codes/standards) for SHW storage tanks but SHW systems themselves are not required by CA C&S. Is there a purpose for mentioning this? | We will work to clarify this issue in the workpaper.  It was meant to say that there are tank insulation requirements for the solar system if installed, but solar water heating systems are not required by code and do not have minimum efficiency criteria above what is required for the backup water heater.  Section 110.3 (c) (3)  Insulation requirement is in Title-24 and requires at least R-12 |
| Downstream and DI offerings should include more data collection requirements. Recommended points are:   * Collector OG-100 number * System OG-300 number * Brand and model number (matching EnergyStar certification) * Quantity * Climate zone * Collector orientation and slope * Backup water heater make/model   Are there other performance-based collection points commonly available when systems are installed in compliance with the SRCC standards and guidelines?  The drive for collecting these data would be to weight from the SRCC energy savings study the individual systems and their savings (rather than the straight average) | Agree, more direction can be given on the data collection requirements   * Collector OG-100 number   + This is part of OG-300 certification and is not needed to be collected separately.   + OG-100 certification includes all specifications such as the collector type, size, and performance ratings. * System OG-300 number   + This will be collected. It contains all information on the solar heating system collector and backup water heater, including OG-100 number, make and model. * Brand and model number (matching EnergyStar certification)   + This is part of OG-300 certification and doesn’t need to be collected separately. * Quantity   + The quantity is expected to be 1 (SWH system) for each rebate application /enrollment per household. * Climate zone   + CZ will be identified from the site location/address which will be provide with the enrollment application. * Collector orientation and slope   + This may be difficult to self-report for downstream and might not be reliable/needed. However, this will be included as an optional requirement. * Backup water heater make/model   + This is part of the OG-300 certification * Water heater serial number   + To avoid double dipping for Water heater rebates |
| Can you provide data (perhaps from CSI?) highlighting differences in estimated system savings based on collector orientation and slope? Does the CSI data suggest that there is a large variation in these parameters? | All solar collectors certified by SRCC include a term called the Incident Angle Modifier (IAM), which provides the ratio of the peak efficiency at a given angle of incidence and the peak efficiency at normal incidence. These are published for each solar thermal collector SRCC certifies. The Models and OG-300 ratings utilize it as part of the minute-by-minute energy balance equations to determine the system output throughout the day as the angle of incidence varies with the movement of the sun across the sky. For the analysis in the workpaper, we used an installed collector slope that has been optimized for the geographic location (latitude), which varies between 30-35 degrees.  We assumed that the azimuth of all collectors was due South.  CSI Residential data collected this type of data, and the average azimuth for all single-family residential programs is around 187 and average tilt is around 24. The majority of Single-Family Projects are installed 178-184 azimuth and tilt was in the effective range between 10 and 40 the majority of the time as seen in the charts below this table  Generally, solar thermal collectors are relatively insensitive to changes in orientation. The resource availability, or the amount of thermal energy available to the solar panel, is relatively unchanged between angles of 10-40 and Azimuth between 140-240, as seen in the chart provided below. |
| # of systems described can be confusing in the workpaper. Some areas mention 10 systems, some says 20 systems. Please mention in a footnote that the systems are in pairs (one has the BU storage, one has the BU tankless)  Example  “A total of 20 systems were run and the savings were averaged over all systems in each measure classification.”  “….The added load from the pumps and controls of the solar water heating systems were modeled using TRNSYS and outputs were averaged over the 10 systems for both measure cases.” | We will work to clarify this issue |
| Are the savings normalized to effective area across the 10 modeled systems? | Effective area is another metric which is a combination of collector area and performance, however this is not a published metric.  There is a non-linear correlation between Effective Area and Single Family savings and use of effective area as normalizing unit can make the deemed measure more complicated.  (Savings vs. Effective Area)  Savings were normalized per system. The CSI program had savings normalized as collector square footage which encouraged larger systems to achieve higher rebates, however solar water heating systems have overheating issues when oversized and not enough demand for the solar energy.  We normalized on per system for single family because hot water load is fixed for single-family (DEER hot water load assumption), and this won’t give the contractors incentive to oversize systems for more rebate dollars. The larger effective area results in higher savings, but there is a much smaller savings increase as effective area gets larger. |

Please note responses to comments in the table below, revise workpaper, and upload the entire package to the WPA. If needed, please reach out to Workpaper Review Team to set up a call to discuss.

(Collector orientation, CSI-Thermal data) 

(Collector slope/tilt, CSI-Thermal data)

(Incident angle modifier, OG-100 certificate, example)

(CSI-Thermal Handbook)