DOCKETED	
Docket Number:	22-BSTD-01
Project Title:	2025 Energy Code Pre-Rulemaking
TN #:	252881
Document Title:	CABEC Advocacy Committee Comments on Pre-Rulemaking Peak Cooling Compliance Test
Description:	N/A
Filer:	System
Organization:	CABEC Advocacy Committee
Submitter Role:	Public
Submission Date:	11/1/2023 1:19:48 PM
Docketed Date:	11/1/2023

Comment Received From: CABEC Advocacy Committee
Submitted On: 11/1/2023
Docket Number: 22-BSTD-01

Comments on Pre-Rulemaking Peak Cooling Compliance Test

Additional submitted attachment is included below.

October, 30 2023
California Energy Commission
Docket Office, MS-4
1516 Ninth Street
Sacramento, CA 95814
docket@energy.ca.gov

RE: 2025 Peak Cooling Metric

On behalf of the CABEC Advocacy committee, we'd like to take this opportunity to provide comment on the proposal for additional compliance tests and metrics for the 2025 energy code. As energy consultants providing compliance documentation for a large portion of the state's single-family residential projects, this additional test will directly impact us documentation authors and advisors of compliance pathways on our projects.

We have summarized our comments below. There is also an Appendix of charts showing some results of modeling that we've done to put EDR2 and Peak Cooling test into context.

1. **We have reached consensus that the Commission <u>has not demonstrated</u> that the Peak Cooling compliance test is necessary and prudent.**
   As shown in the charts in the appendix, the Peak Cooling test results and Long-Term Systemwide cost margins are poorly correlated in some climate zones, and anticorrelated in others. From this we draw the conclusion that according to the Commission's own cost metrics (i.e. LSC), the Peak Cooling test will hamper mitigation of Long-term Systemwide costs. To wit, the Peak Cooling test, in the current context of compliance modeling, will succeed in supporting cooling-focused measures in new single-family homes, but at the larger expense of overall long-term systemwide cost.

   We presume that this conclusion is wrong, so we entreat the Commission to help us reconcile the values inherent in the LSC metrics and this proposed Peak Cooling test. According to the Sept. 28th meeting, both tests are in support of ensuring that peak weather events don't result in "unnecessary demand". Unfortunately, in the current compliance modeling context, they are antagonistic (if not actually zero-sum): mitigation of peak cooling exacerbates peak heating and vice versa.

   Lastly– if the Commission is concerned that the LSC metrics don't sufficiently capture peak cooling events in the 30-year time horizon, then it seems that a correction to those hourly factors is warranted. It is exactly these factors (previously as TDV) that were designed and implemented in the aftermath of the 2001 Energy Crisis to manage peak cooling in the efficiency tests. Implementing another compliance test which sabotages performance in the long-standing EDR2 efficiency tests strikes us as gauche.

2. **We have agreed that the metric is reasonably intuitive and simple to explain to clients and laypeople**

3. **Our recommendation: Don't adopt Peak Cooling test, or add and revise measures to mitigate antagonism with LSC**
   We note that LSC metrics have a long history and substantial rigor to them (which isn't to say they're a perfect policy tool). They incorporate a broad set of grid costs, and do so on an hourly basis. They, along with corresponding weather events

represent a reasonable simulacrum of actual peak grid-weather events. In contrast, the proposed Peak Cooling test is simply a cumulation of space cooling site-energy usage during TOU Super-Peak hours (4-9pm)[1] and has no nuance for actual peak grid-weather events. In this understanding, we find the LSC metrics a superior tool for evaluating grid costs. In our review of the LSC hourly factors, we find numerous peak cooling events captured in those factors. Given these attributes of the LSC factors, we find them to be facially sufficient to capture the concerns that the Commission is expressing, and thus the Peak Cooling test is not needed.
But, we do have doubts here that we hope the Commission will respond to: *why does the Commission <u>not believe</u> that LSC factors are sufficient? Wouldn't these concerns have been most appropriately addressed and endogenized into the LSC metrics themselves?* We are struggling to reconcile this apparent incoherence.

These procedural questions are not really our primary concern, however. We share and applaud continuous vigilance to make sure compliance tests and policy goals are properly aligned. Moving forward, we agree that there is a high-probability of increased frequency in extreme weather events (on both heating and cooling sides), and that it is prudent to use the Title 24 asset tests to promote readiness for those events. As a general question of building physics, there's no reason that we can't manage both at the same time. However, the currently available measures in Title 24 rules handicap and/or otherwise distract design professionals from managing both. This can be easily remedied[2].

There are many technologies that can be deployed that don't force a trade-off between peak heating and cooling. Most salient is operable shading or tuning systems on glazing systems. Since a majority of cooling load is as a result of direct solar gains through fenestration, a variety of technologies from operable shades to electrochromic windows can be a part of the asset to make the building capable of responding to grid-weather events. Currently, only fixed shading systems can be modeled as a part of compliance, and these systems are increasingly ill-suited to provide optimal solar control as grid peaks dissociate from solar noon and weather events dissociates from the solstice[3].

But many other technologies could be enabled or refined (they all already exist in a limited or more dormant state) in the compliance software ruleset enable projects to manage and/or mitigate their energy consumption during peak hours. :

- Precooling thermostat settings
- Revision of whole House fan de-ratings
- More nuanced capabilities for materials, assemblies, and geometries in performance modeling
- Cool walls (per CRRC)
- Energy storage systems (both thermal and electrochemical)

[1] Notably, we could not ascertain how exactly the calculation was done, and our best efforts at doing hand calculations to match reported results were unsuccessful.
[2] 'Easily' in a technical sense, but perhaps not with a lot of hand-wringing on measure 'tuning' and discounting.
[3] On Oct 19, 2023 San Francisco reached a high of 87 degrees.

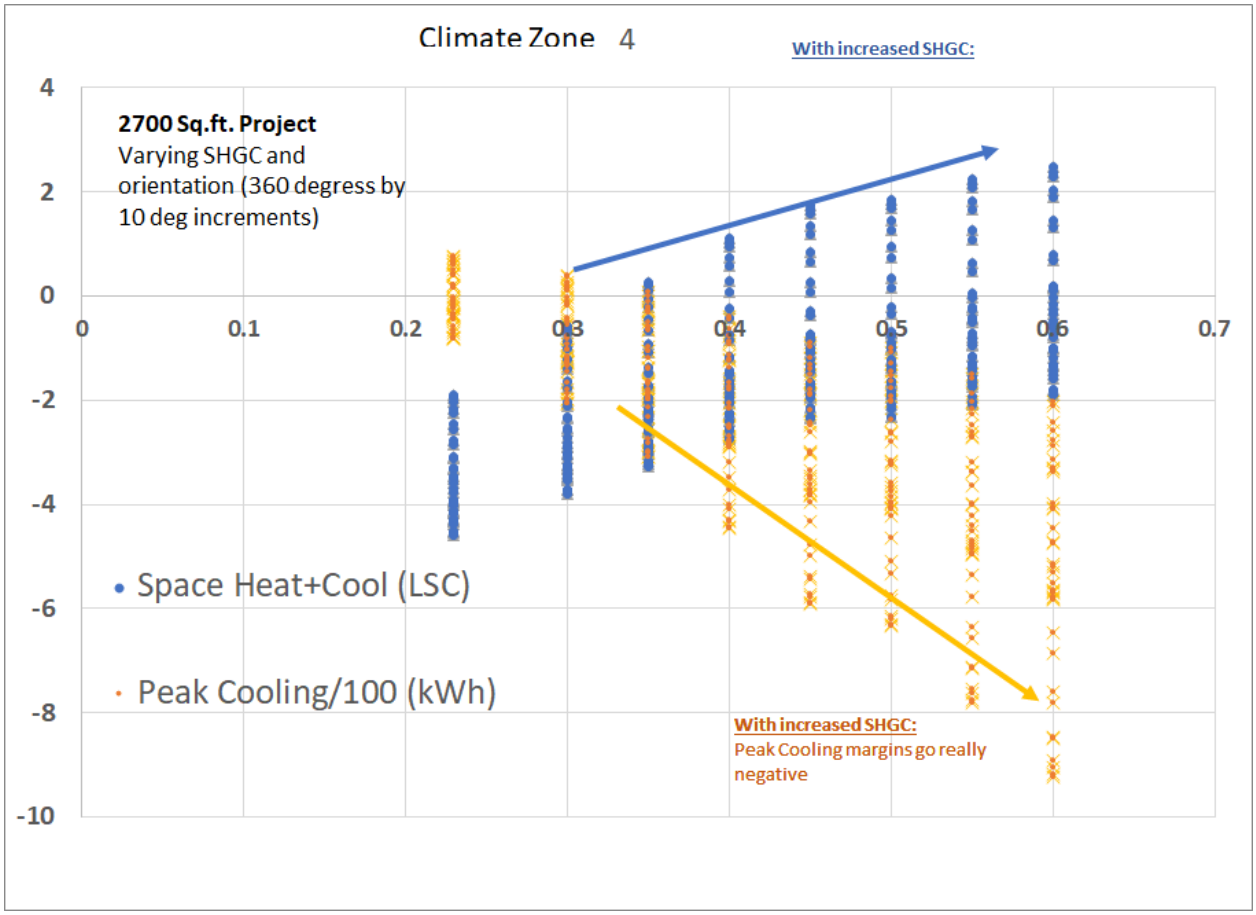
We urge consideration of all of these (and perhaps other) technologies and approaches in order to reconcile the incoherence of LSC and Peak Cooling tests.

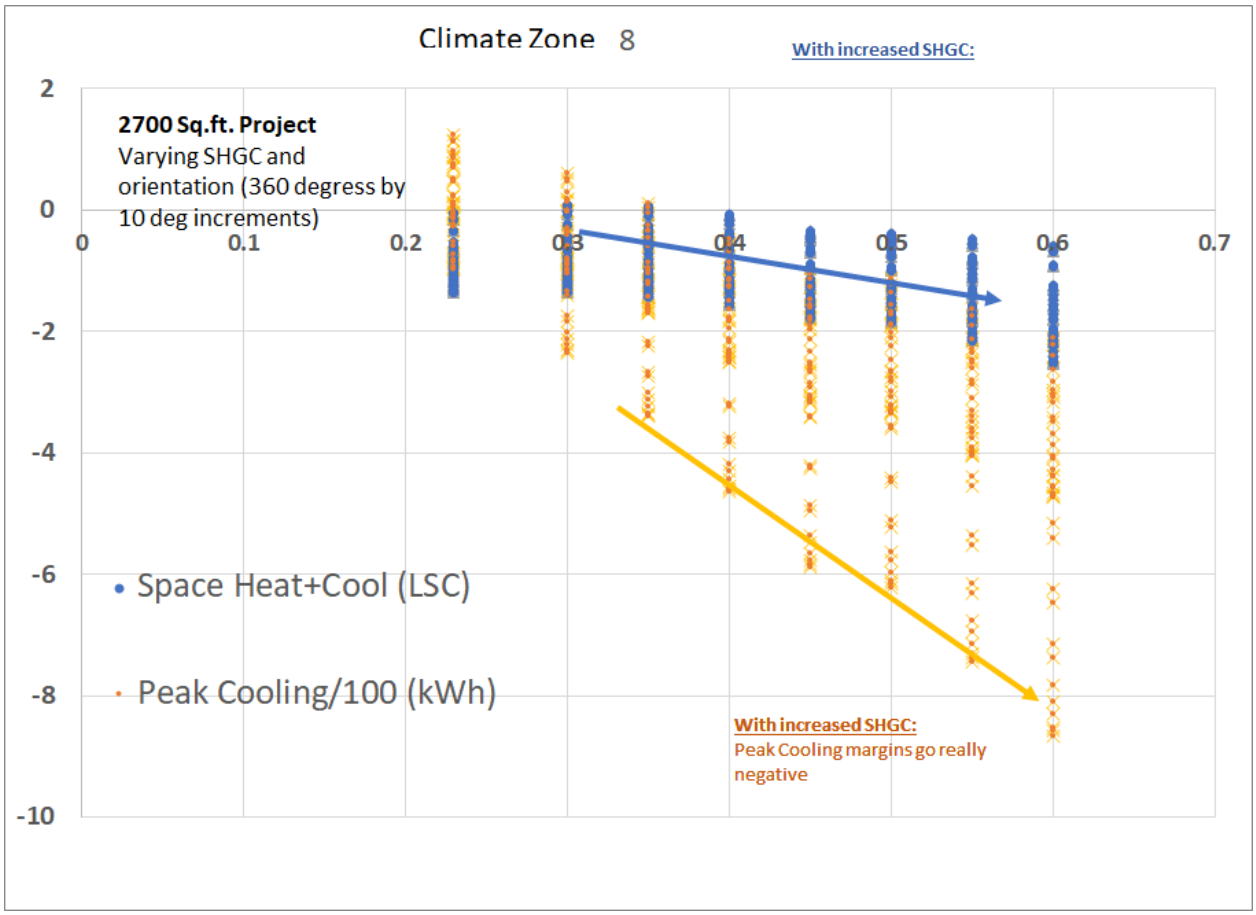
As a parting thought– at this moment of the anthropocene, the watchword of a warming/weirding world is ‘adaptation’. We need buildings that can be ready to adapt to a future climate with perhaps more extreme weather events on both ends, all while adapting to evolving infrastructure constraints. Our measure of success is also path-dependent. We believe these broader constraints support notions of efficiency which themselves embrace adaptation and eschew schlerotic processes and atavistic frameworks. This is how we best address challenges due to future peak weather events.

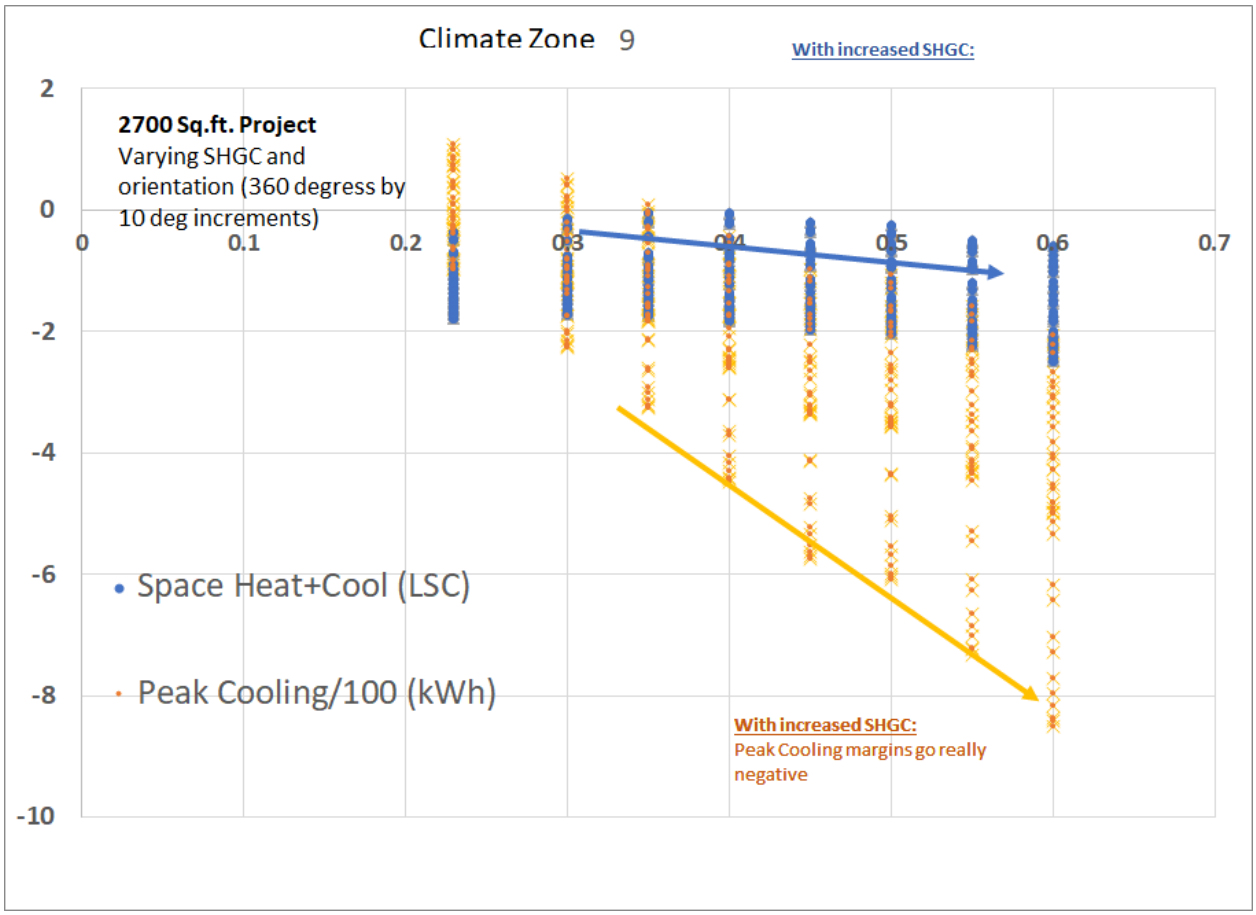
Sincerely,

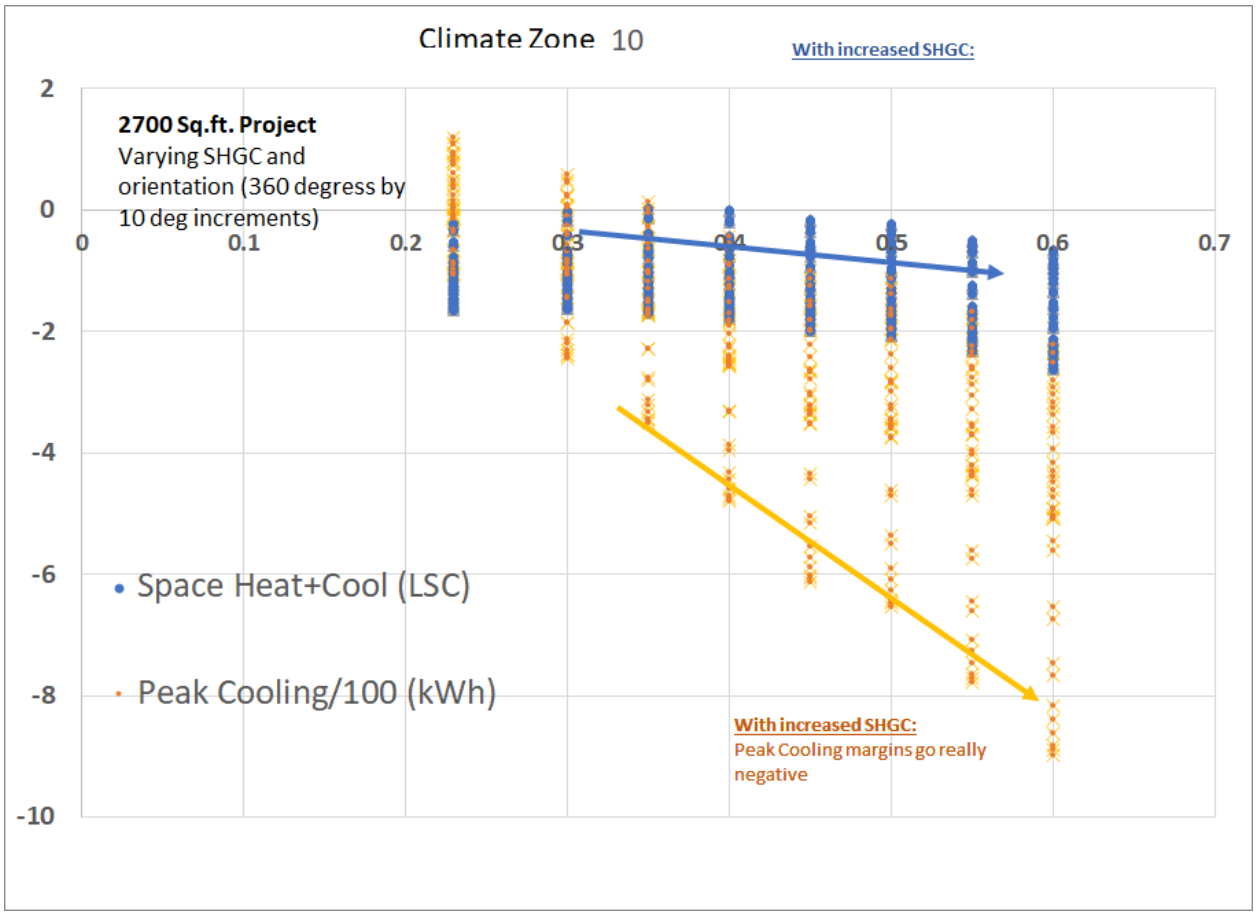
Lucas Morton, on behalf of the
CABEC Advocacy Committee

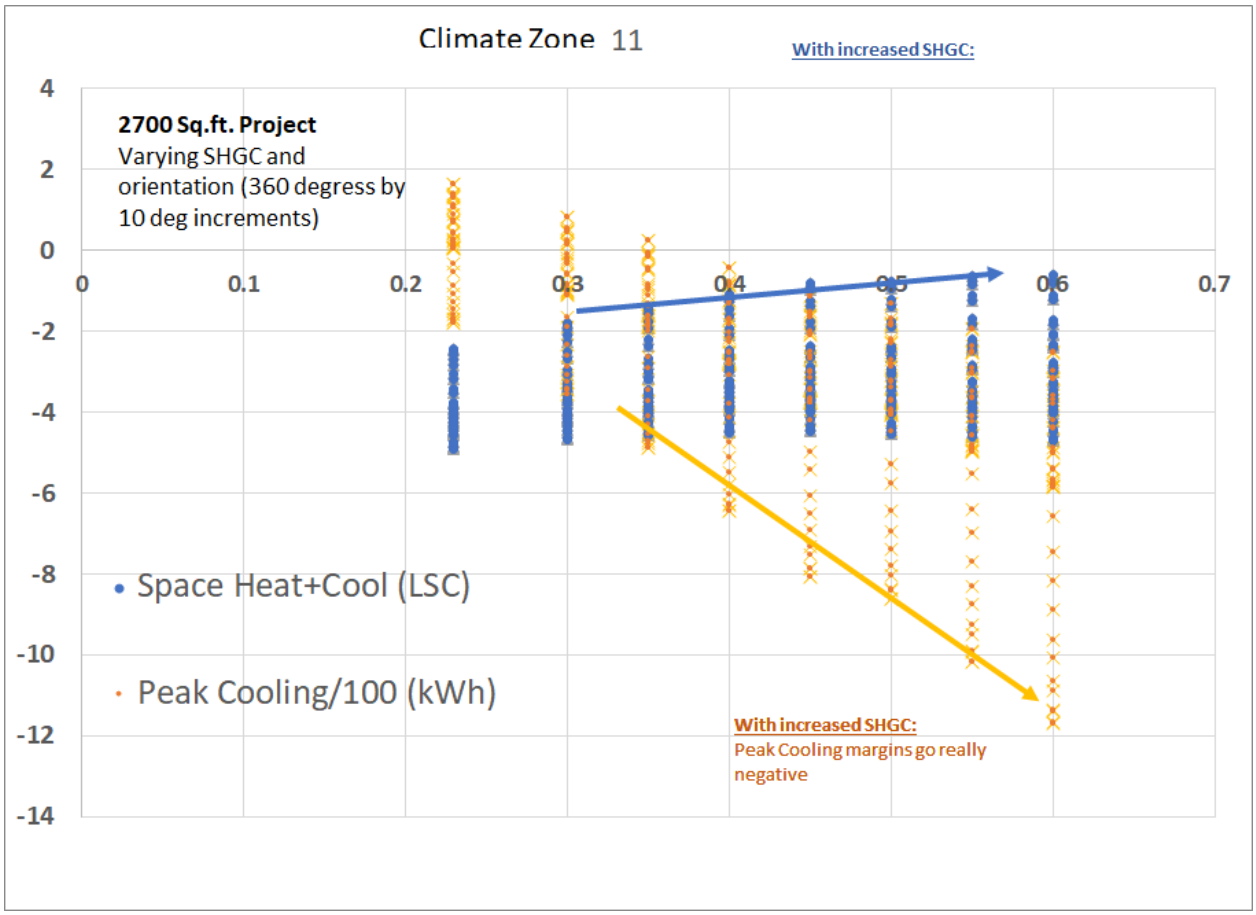
Appendix:
We have compiled an energy modeling study of the 2700 sq.ft. single-family new construction prototype to show some trends. In this data set, window SHGC is varying from 0.23 to 0.60, and the home has been modeled in all 16 CZ's

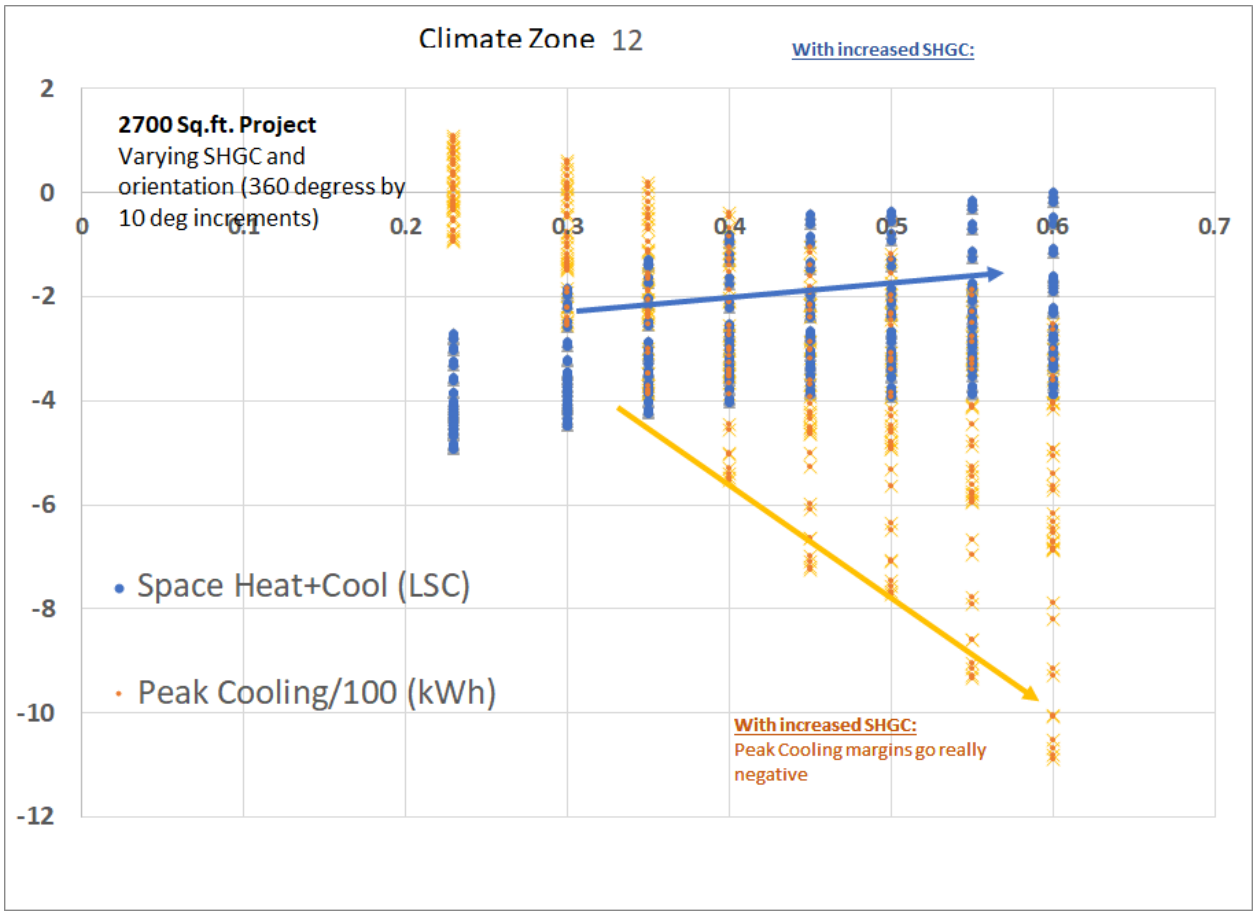


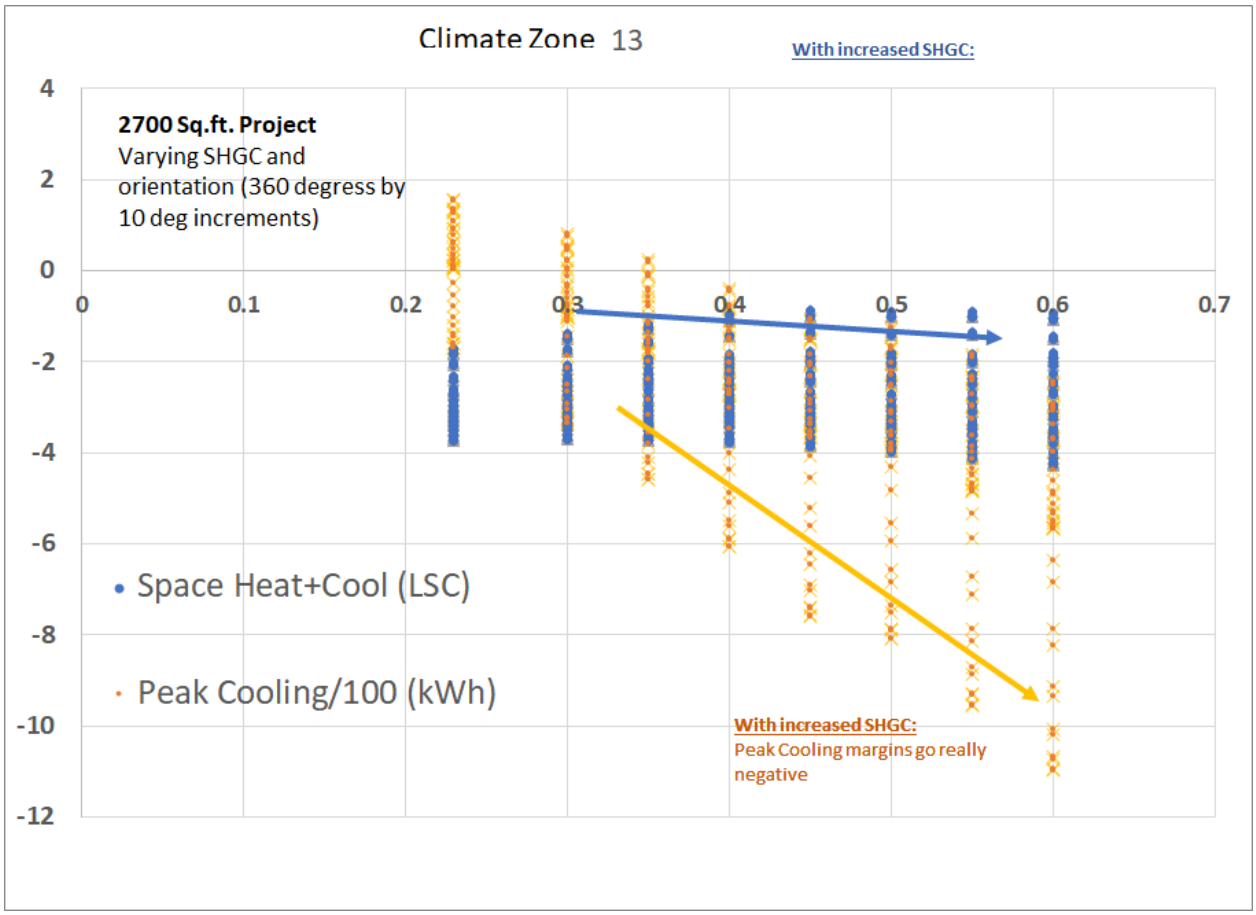

Climate Zone 8
With increased SHGC:
2700 Sq.ft. Project
Varying SHGC and orientation (360 degress by 10 deg increments)
2
0
-2
-4
-6
-8
-10
0
0.1
0.2
0.3
0.4
0.5
0.6
0.7
Space Heat+Cool (LSC)
Peak Cooling/100 (kWh)
With increased SHGC:
Peak Cooling margins go really negative

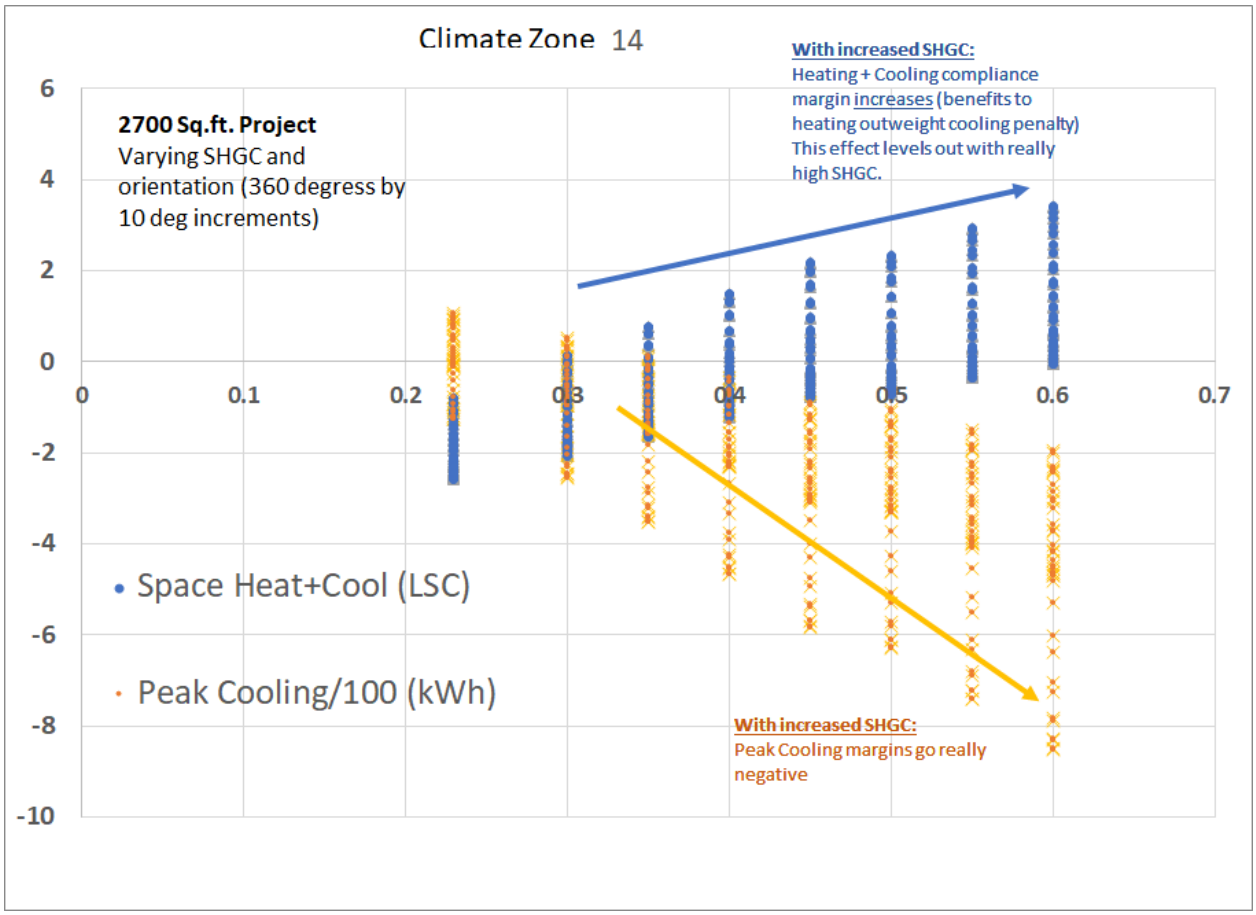

Climate Zone 9
With increased SHGC:
2700 Sq.ft. Project
Varying SHGC and orientation (360 degress by 10 deg increments)
2
0
-2
-4
-6
-8
-10
0
0.1
0.2
0.3
0.4
0.5
0.6
0.7
Space Heat+Cool (LSC)
Peak Cooling/100 (kWh)
With increased SHGC:
Peak Cooling margins go really negative

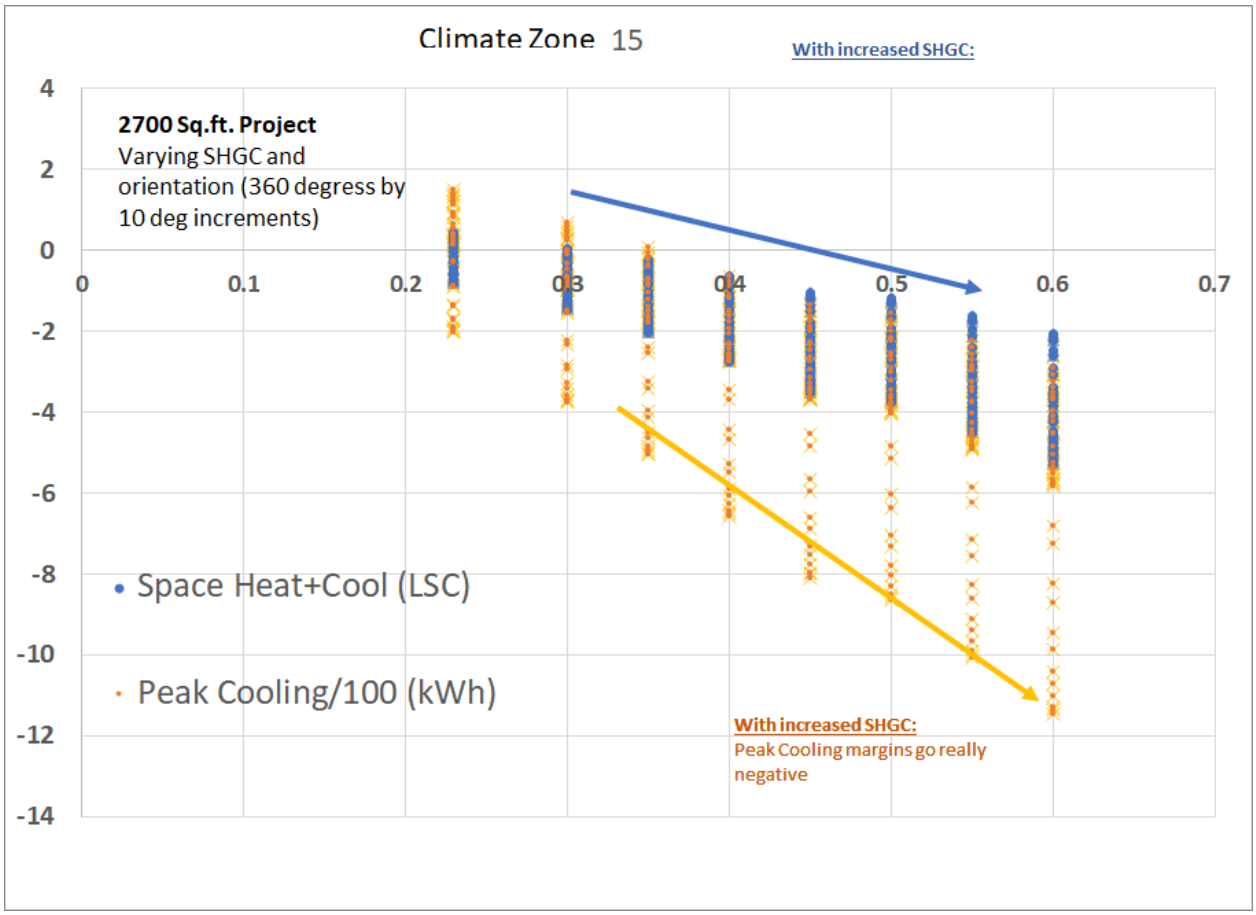

Climate Zone 10
With increased SHGC:
2700 Sq.ft. Project
Varying SHGC and orientation (360 degress by 10 deg increments)
2
0
-2
-4
-6
-8
-10
0
0.1
0.2
0.3
0.4
0.5
0.6
0.7
Space Heat+Cool (LSC)
Peak Cooling/100 (kWh)
With increased SHGC:
Peak Cooling margins go really negative


Climate Zone 11
With increased SHGC:
2700 Sq.ft. Project
Varying SHGC and orientation (360 degress by 10 deg increments)
4
2
0
-2
-4
-6
-8
-10
-12
-14
0
0.1
0.2
0.3
0.4
0.5
0.6
0.7
Space Heat+Cool (LSC)
Peak Cooling/100 (kWh)
With increased SHGC:
Peak Cooling margins go really negative


Climate Zone 12
With increased SHGC:
2700 Sq.ft. Project
Varying SHGC and orientation (360 degress by 10 deg increments)
2
0
-2
-4
-6
-8
-10
-12
0
0.1
0.2
0.3
0.4
0.5
0.6
0.7
Space Heat+Cool (LSC)
Peak Cooling/100 (kWh)
With increased SHGC:
Peak Cooling margins go really negative


Climate Zone 13
With increased SHGC:
2700 Sq.ft. Project
Varying SHGC and orientation (360 degress by 10 deg increments)
4
2
0
-2
-4
-6
-8
-10
-12
0
0.1
0.2
0.3
0.4
0.5
0.6
0.7
Space Heat+Cool (LSC)
Peak Cooling/100 (kWh)
With increased SHGC:
Peak Cooling margins go really negative


Climate Zone 14
With increased SHGC:
Heating + Cooling compliance margin increases (benefits to heating outweight cooling penalty)
This effect levels out with really high SHGC.
2700 Sq.ft. Project
Varying SHGC and orientation (360 degress by 10 deg increments)
6
4
2
0
-2
-4
-6
-8
-10
0
0.1
0.2
0.3
0.4
0.5
0.6
0.7
Space Heat+Cool (LSC)
Peak Cooling/100 (kWh)
With increased SHGC:
Peak Cooling margins go really negative


Climate Zone 15
With increased SHGC:
2700 Sq.ft. Project
Varying SHGC and orientation (360 degress by 10 deg increments)
4
2
0
-2
-4
-6
-8
-10
-12
-14
0
0.1
0.2
0.3
0.4
0.5
0.6
0.7
Space Heat+Cool (LSC)
Peak Cooling/100 (kWh)
With increased SHGC:
Peak Cooling margins go really negative