PUBLIC UTILITIES COMMISSION OF THE STATE OF CALIFORNIA

ENERGY DIVISION

Agenda ID# 23058
RESOLUTION E-5360
December 19, 2024

R E S O L U T I O N

Resolution E-5360. Order to Pacific Gas and Electric, Center for Sustainable Energy®, Southern California Edison Company, and Southern California Gas Company to Change Storage System Sizing in the Self-Generation Incentive Program

PROPOSED OUTCOME:

- Changes the Self-Generation Incentive Program's storage system sizing rules and procedures to encourage right-sized systems and spread funds over more households before the Residential Solar and Storage Equity budget opens.

SAFETY CONSIDERATIONS:

There are no safety considerations associated with this resolution.

ESTIMATED COST:

There are no costs associated with this resolution.

By the California Public Utilities Commission's own motion.

SUMMARY

The Commission issues this Resolution in response to Decision 24-03-071[1] and the forthcoming opening of the new Residential Solar and Storage Equity (RSSE) budget in the Self-Generation Incentive Program (SGIP).

[1] D.24-03-071, https://docs.cpuc.ca.gov/PublishedDocs/Published/G000/M527/K963/527963349.PDF

In sum, this Resolution:

- Replaces the 10 kilowatt (kW) load justification threshold with a 15 kilowatt-hour (kWh) load justification threshold for all storage projects;
- Changes the residential storage system sizing methodology for systems above 15 kWh from sizing to peak kW demand in the past 12 months to:
    - Sizing storage paired with solar generation to the average daily excess solar generation in a summer calendar month; or
    - Sizing a standalone storage system to the average daily energy consumption during the 4-9pm peak demand window during a summer calendar month; and
- Institutes a 30 kWh incentive cap for all single family household projects in the residential equity budgets in SGIP including RSSE, Equity Resiliency, and San Joaquin Valley Residential.

Table 1. Impacts of Resolution on SGIP Budget Categories

	Current Practice in SGIP		Resolution: Moving Forward in SGIP		
SGIP Budget Category	10 kW Load Justification Threshold	Size storage to annual peak demand (kW)	15 kWh Load Justification Threshold	Size residential storage to average daily excess solar generation (if paired with solar) or average daily energy consumption from 4-9 pm (kWh) (if standalone storage)	30 kWh Incentive Cap
Residential Solar and Storage Equity	Yes	Yes	Yes	Yes	Yes
Non-Residential Storage Equity	Yes	Yes	Yes	No	No
Equity Resiliency	Yes	Yes	Yes	Yes	Yes
Small Residential Storage	Yes	Yes	Yes	Yes	No
Large-Scale Storage	Yes	Yes	Yes	Yes, if residential. No change for commercial.	No
San Joaquin Valley Residential	Yes	Yes	Yes	Yes	Yes

San Joaquin Valley Non-Residential	Yes	Yes	Yes	No	No
Generation	No	No	No	No	No

These changes will allow incentivized projects to be appropriately sized for customer bill reduction, peak demand reduction, and serving critical customer resiliency needs while spreading the SGIP funds to fund more projects.

BACKGROUND

The SGIP currently requires no load justification for projects under 10 kW. For projects above 10 kW, the storage size must be justified by sizing the storage system to the peak demand, in kW, of the host customer over the past 12 months. Currently, there is no cap on the size of storage projects. For projects relying on future load from electrification measures in the load justification, the load must materialize by the time of submitting the Incentive Claim Form (ICF). If the host customer installs additional storage capacity above the load justified size, or if the future load growth does not materialize by ICF, the capacity above the justified size does not receive an SGIP incentive.[2]

Decision (D.) 24-03-071 Ordering Paragraph 31[3] authorized the SGIP program administrators (PAs; Pacific Gas and Electric Company, Center for Sustainable Energy®, Southern California Edison Company, and Southern California Gas Company) to submit a joint Tier 2 Advice Letter to update the storage system sizing requirements to kWh to align the storage sizing methodology with the storage incentive structure which is measured in dollars per kWh:

> "The [new] system sizing cap should continue to reflect the Commission intention to incentivize energy storage capacity at a reasonable level based on onsite customer energy usage with reasonable anticipated growth due to electrification measures. The system sizing cap should be designed to avoid incentivizing oversized systems. PAs may propose as a part of their system sizing rules, an overall incentive cap for projects."[4]

[2] SGIP Handbook 2024 at 52.
[3] D.24-03-071, https://docs.cpuc.ca.gov/PublishedDocs/Published/G000/M527/K963/527963349.PDF.
[4] *Id*. at 84.

On August 5, 2024, the SGIP PAs filed SCE AL 5347-E to open the Residential Storage and Equity budget (RSSE) with $252 million in incentives. Among other issues, the AL addressed a load justification threshold for incentivized solar systems in the RSSE budget. This AL was timely protested and is being addressed in a forthcoming draft resolution.

On September 20, 2024, the SGIP PAs held the Quarter 3 SGIP workshop where the SGIP evaluator presented possible storage sizing methodologies based on historic SGIP data and stakeholders provided feedback.[5] The options presented included sizing storage to 1) absorb all solar generation; 2) absorb solar generation equal to consumption during solar generating hours; 3) absorb solar generation net of consumption during solar generating hours; 4) enable solar self-consumption and minimize import of electricity and 5) meet energy consumption during 4-9 pm.

To date the SGIP PAs have not submitted a joint Advice Letter proposing an updated storage sizing policy and methodology. The PAs were authorized, but not ordered to file an Advice Letter on this topic. However, given the passage of time, the immanency of the opening of the new SGIP RSSE budget, and the addition of incentives for solar to the program and interaction of solar and storage sizing and incentive issues, the Commission issues this resolution to update storage sizing rules and procedures for load justification.

DISCUSSION

The Commission has reviewed the SGIP measurement and evaluation data collected for SGIP Impact Evaluation reports to determine that the storage system sizing methodology and load justification threshold must be reformed before the new RSSE budget opens. The primary reasons for this conclusion are:

1) Changing from measuring storage sizing based on kW to kWh better aligns with how SGIP incentives are calculated.
2) The current storage size load justification threshold of 10 kW (~25 kWh) appears to have resulted in oversized battery projects historically.
3) 15 kWh is a reasonable load justification threshold where storage systems under this size would require no load justification.
4) An incentive cap of 30 kWh of storage capacity in single family equity budgets in combination with a 15 kWh load justification threshold best serves the goals of

[5] SGIP Quarter 2 Workshop Slides, https://selfgenca.com/documents/workshops/2024/q3

incentivizing energy storage capacity at a reasonable level based on onsite customer energy usage with reasonable anticipated growth due to electrification measures while avoiding oversizing of storage systems. This policy brings appropriate fiscal prudency to the sizing of incentivized storage and enables the program to help more customers receive incentives.

We next discuss each topic in more depth.

1. Load Justification Threshold

This Resolution replaces the current 10 kW load justification threshold with a 15 kWh load justification threshold for all SGIP storage budgets. Storage systems under 15 kWh would not require load justification and storage systems over 15 kWh would require load justification. SGIP data shows that 46 percent of residential SGIP projects have installed a storage system under 15 kWh since 2020.[6] A 10 kW battery with a discharge duration of 2.5 hours[7] equates to a 25 kWh capacity. Figure 1 demonstrates that many residential projects in the SGIP install right to the 10 kW load justification limit where no load justification is required (the blue bar at (26-28]).[8]

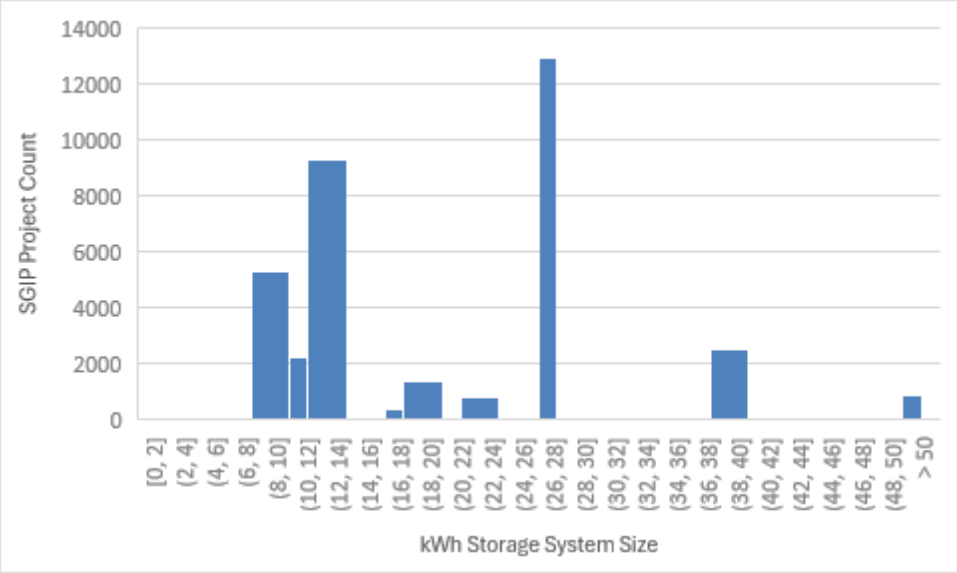


Figure 1. kWh capacity of residential storage systems installed in the SGIP since 2020.[9]

[6] Data accessed on 10/14/2024 from SGIP Data hosted on CaliforniaDGStats.

[7] Average discharge duration from residential storage systems in the SGIP from 2020-2022. Data accessed on 10/14/2024 from SGIP Data hosted on CaliforniaDGStats.

[8] Two Tesla Powerwall 2 storage system is 26.4 kWh.

[9] Data accessed on 10/14/2024 from SGIP Data hosted on CaliforniaDGStats.

The 2024 *Tracking the Sun* report found that 70 percent of paired solar generation and storage systems have a storage system capacity of under 13.2 kWh.[10] This storage system size aligns with the blue bar in Figure 1 at (12, 14] and 45 percent of residential SGIP systems fall under this threshold. Additionally, a separate study has found that a 10 kWh storage system paired with solar generation can provide sufficient critical resiliency for the average household in California.[11]

To encourage appropriate sizing of storage systems, the Commission finds this evidence reasonable to set the load justification threshold at 15 kWh to allow for system modularity that does not fit with the 13.2 kWh size found by *Tracking the Sun* and within SGIP. For example, in the current storage market, modular storage is offered in 5, 9.6, 13.2, 13.6, and 14.4 kWh module sizes by the major storage manufacturers in the SGIP. We find that 15 kWh would accommodate most storage modular configurations within the 15 kWh load justification threshold. We find that customers who require batteries larger than 15 kWh can follow the load justification process to receive incentives for a larger storage system. A load justification threshold set higher than average customer needs encourages over-sized storage systems, particularly for a program that covers most if not all of the equipment costs.

This timely change is needed before the opening of the RSSE, which will offer to pay for virtually the full cost of a storage and solar generation system. This proposal creates reasonable checks and balances for fiscal prudency on storage sizing and prevents unnecessary oversizing of storage systems. Most host customer needs can be accommodated by the load justification threshold of 15 kWh.

For multifamily, the Commission finds it reasonable to use a 12.5 kWh per tenant unit load justification threshold to replace the current 5 kW per tenant unit load justification threshold. This threshold is found by multiplying the current 5 kW threshold by the average 2.5 hour discharge duration[12] found in residential storage systems in the SGIP. Other than changing from kW to kWh there is no change to the storage load justification threshold for multifamily storage projects.

2. Storage Sizing Methodology

[10] Barbose, G., Darghouth, N., O'Shaughnessy, E., and Forrester, S. (2024). *Tracking the Sun.* LBNL.
[11] Gorman, W. et al. (2023). *County-level assessment of behind-the-meter solar and storage to mitigate long duration power interruptions for residential customers*. Applied Energy.
[12] Average discharge duration from residential storage systems in the SGIP from 2020-2022. Data accessed on 10/14/2024 from SGIP Data hosted on CaliforniaDGStats.

This Resolution replaces the current storage system sizing methodology for all residential SGIP budgets from sizing to peak kW demand in the past 12 months to:

a. Sizing storage paired with solar generation to the average daily excess solar generation in a summer calendar month; or
b. Sizing a standalone system to the average daily energy consumption during 4-9 pm during a summer calendar month.

From the 2021-2022 SGIP Impact Evaluation, average daily residential storage utilization was 45 percent of kWh capacity.[13] The Commissions finds that the current storage system sizing methodology is oversizing storage systems and must be changed. As one of the SGIP goals is to reduce greenhouse gas emissions[14] and it has been shown that the best way to reduce greenhouse gas emissions is to charge the storage system from paired solar generation,[15] the Commission finds it reasonable that storage systems be sized to absorb the average daily excess solar generation during a summer month in the last year. Additionally, Figure 2 shows that the actual daily discharge would be served by the kWh capacity justified by sizing storage to the average daily excess solar generation (option 3). The sizing of the solar generation to onsite load is being addressed separately in a forthcoming draft resolution.

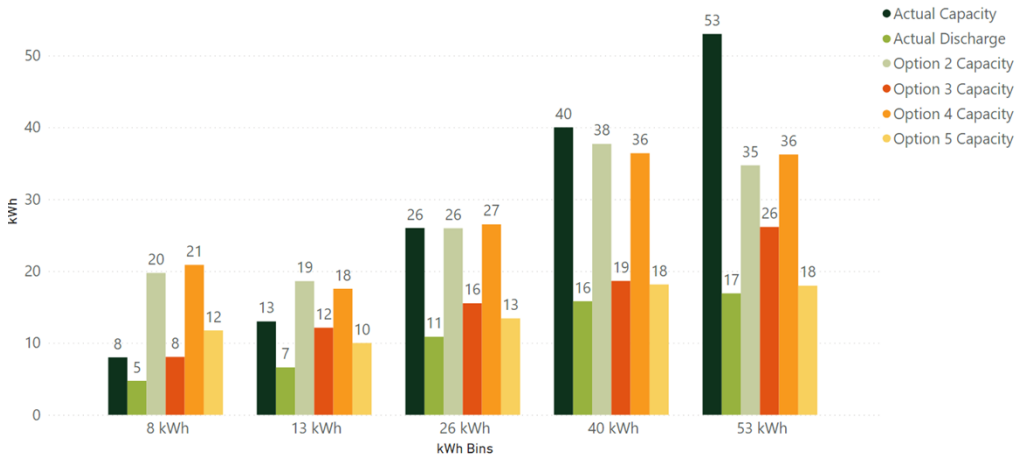


Figure 2. Summary of the kWh capacity storage resulting from the proposed system sizing methodologies from the SGIP evaluator that were presented at the Quarter 3 SGIP Workshop.[16] The kWh bins represent the size of actual SGIP projects and what the storage system would have been sized to based on the various sizing methodologies. Option 2 is storage sized to absorb solar generation equal to consumption during solar generating hours, option 3 is storage sized to absorb excess solar generation during solar

[13] 2021-2022 SGIP Impact Evaluation at 196.
[14] Pub. Util. Code Section 379.6(a)(1).
[15] 2021-2022 SGIP Impact Evaluation at 4.
[16] SGIP Quarter 3 Workshop Slides, https://selfgenca.com/documents/workshops/2024/q3

generating hours, option 4 is storage sized to enable solar self-consumption, and option 5 is storage sized to meet energy consumption during 4-9 pm.

For standalone storage systems, there is no solar generation occurring so a different residential storage sizing methodology is needed. The SGIP evaluator presented at the Quarter 3 SGIP workshop that sizing the storage system to meet on-peak energy consumption results in a similarly sized storage system as sizing storage to excess solar generation (comparing option 5 to option 3 kWh capacity in Figure 2). As another goal of the SGIP is to reduce customer demand during the peak grid hours of 4-9 pm,[17] the Commission finds it reasonable to size standalone storage systems to the daily average energy consumption during the hours of 4-9 pm in a summer month.

All storage systems above 15 kWh would be required to submit a load justification to their Program Administrator following the residential storage system sizing methodology or the existing storage sizing methodology for non-residential storage. The project will only receive SGIP incentives up to the kWh size determined in the load justification. For example, if a 26.4 kWh system is installed and the load justification is at 17 kWh, the maximum incentive in the SGIP is the incentive rate for that budget multiplied by 17 kWh. Developers need to help their customers by designing appropriately sized projects.

Illustrative Example of Residential Storage Sizing Methodologies

Storage Paired with Solar Generation

$$Storage\ Size\ (kWh) = \frac{(Estimated\ solar\ generation\ (kWh)\ over\ a\ summer\ calendar\ month\ -\ energy\ consumption\ over\ the\ same\ calendar\ month\ (kWh))}{\text{days of the calendar month}}$$

The customer would provide the developer with the monthly kWh energy use which can be found on a monthly energy bill. The developer would use the forthcoming Expected Performance Based Buydown (EPBB) calculator on the SGIP website[18] to get the estimated monthly kWh solar generation based on the capacity and location of the customer's existing or proposed solar system.

Standalone Storage

[17] Pub. Util. Code Section 379.6(a)(1).
[18] https://www.selfgenca.com/home/resources/

$$Storage\ Size\ (kWh) = \frac{Sum\ of\ energy\ consumption\ during\ 4\ to\ 9\ pm\ over\ a\ summer\ calendar\ (kWh)}{days\ of\ the\ calendar\ month}$$

The customer would download their green button data and share it with their developer who would determine the energy consumption from 4 to 9 pm.

3. Storage System Incentive Cap

This Resolution establishes a 30 kWh storage incentive cap for all single family projects in the RSSE, Equity Resiliency, and San Joaquin Valley Residential budgets in the SGIP. As the SGIP equity budgets are designed to incentivize most, if not all, of the cost of a storage system, the Commission finds it reasonable to place a cap on the maximum storage system size that can receive incentives to ensure the funds are able to reach as many households as possible.

Table 2 demonstrates that if all projects in the RSSE put in a 30 kWh storage system paired with a 7.5 kW solar system, 4,480 host customers could be reached. Nearly twice as many customers could benefit if host customers put in a 15 kWh storage system at the load justification threshold paired with a 5 kW solar system. If no cap is instituted, even fewer host customers could be reached as larger and more expensive storage systems would use large amounts of the RSSE budget.

Table 2. Illustrative Example of Incentive Amount for RSSE Projects

Storage Size (kWh)	Max RSSE Storage Incentive ($1.10/Wh)	Paired Solar Generation[19] (kW)	Max RSSE Solar Incentive ($3.10/W)	Total RSSE Projects (all paired)
15	$16,500	5	$15,500	7,875
30	$33,000	7.5	$23,250	4,480

From Figure 2, the actual daily discharge of the larger storage system sizes (the 40 kWh and 53 kWh bins) could have been amply covered by a 26 kWh storage system. A

[19] Paired Solar Generation was put at the proposed 5 kW load justification threshold as a conservative estimate from SCE AL 5347-E and at 7.5 kW to represent 150 percent oversizing for future expected electrification as we would expect these to be the most commonly installed solar generation sizes.

30 kWh storage system paired with solar generation was found to provide sufficient critical resiliency that included heating and cooling loads.[20]
Therefore, the Commission finds a 30 kWh storage incentive cap for all single family household projects in the SGIP equity budgets to be reasonable. These projects will still be allowed to install storage capacity above this limit, but the SGIP will only provide incentives for up to 30 kWh of the capacity.

We do not see a need to establish a storage incentive cap for non-equity budgets for the following reasons:

- SGIP incentives cover a very small portion of the total cost of these storage systems.
- The customer pays the vast majority of the costs out of pocket which serves as motivation to not oversize the storage system.

4. Implementation of the New Load Justification Threshold, Storage Sizing Methodology, and Incentive Cap

To ensure a smooth transition from the existing residential storage sizing method and process and a smooth opening of the RSSE, the SGIP PAs should develop and publish on the SGIP selfgen website a simple spreadsheet and/or tool for load justification that developers will fill out and submit on behalf of host customer applicants when a storage system is above 15 kWh. This spreadsheet will help to standardize the process and reduce burden on both the applicant and the SGIP PAs verifying the load justification. Alternatively, the load justification process could be automated in the application.

To familiarize developers with the new process, the SGIP PAs shall hold one or more educational webinars to walk developers through the new load justification process. This webinar shall be recorded and posted online for any future applicants to reference.

COMMENTS

Public Utilities Code section 311(g)(1) provides that this Resolution must be served on all parties and subject to at least 30 days public review. Any comments are due within 20 days of the date of its mailing and publication on the Commission's website and in accordance with any instructions accompanying the notice. Any replies to comments are due within 25 days of the date of its mailing and publication on the Commission's

[20] Gorman, W. et al. (2023). *County-level assessment of behind-the-meter solar and storage to mitigate long duration power interruptions for residential customers*. Applied Energy.

website and in accordance with any instructions accompanying the notice. Section 311(g)(2) provides that this 30-day review period and 20-day comment period may be reduced or waived upon the stipulation of all parties in the proceeding.

FINDINGS

1. On March 21, 2024, the CPUC issued Decision 24-03-071 *Decision Implementing Assembly Bill 209 and Improving Self-Generation Incentive Program Equity Outcomes* (Decision)
2. The Decision authorized the SGIP program administrators (PAs; Pacific Gas and Electric Company, Center for Sustainable Energy®, Southern California Edison Company, and Southern California Gas Company) to reform the storage sizing methodology, load justification threshold, and introduce an incentive cap.
3. The Decision Ordering Paragraph 31 stated:
   "The [new] system sizing cap should continue to reflect the Commission intention to incentivize energy storage capacity at a reasonable level based on onsite customer energy usage with reasonable anticipated growth due to electrification measures. The system sizing cap should be designed to avoid incentivizing oversized systems. PAs may propose as a part of their system sizing rules, an overall incentive cap for projects."
4. The Decision directed the SGIP PAs to open a new Residential Solar and Storage Equity budget (RSSE) to cover most, if not all, of the costs of a residential storage system or a solar generation-paired storage system.
5. On August 5, 2024, the SGIP PAs filed SCE AL 5347-E to open the RSSE.
6. On September 20, 2024, the SGIP PAs held a Quarter 3 SGIP workshop where stakeholders discussed storage sizing options presented by the SGIP evaluator.
7. Over 46 percent of residential storage systems in the SGIP are under 15 kWh.
8. A 10 kWh residential storage paired with solar generation is sufficient to provide critical resiliency for the average household in California.
9. A 15 kWh load justification threshold would accommodate most storage modular configurations from major storage manufacturers in the SGIP.
10. It is reasonable to use a load justification threshold of 15 kWh for all storage systems in the SGIP to achieve goals of resiliency, avoiding oversizing of storage systems, and reaching more host customers.
11. For multifamily, it is reasonable to use a load justification threshold of 12.5 kWh of storage per tenant unit to align the sizing methodology with the incentive rate.
12. Evaluation of the SGIP has shown that residential storage systems use an average of 45 percent of kWh capacity daily.

13. Two of the SGIP goals are to reduce greenhouse gas emissions and to reduce peak demand on the grid.
14. Evaluation of the SGIP has shown that charging storage from solar generation and discharging during on-peak hours is the best way to reduce greenhouse gas emissions.
15. It is reasonable to size residential storage systems paired with solar generation to the average daily excess solar generation during a summer calendar month.
16. It is reasonable to size residential standalone storage systems to the average daily energy consumption during 4-9 pm during a summer calendar month.
17. Evaluation of the SGIP has shown that residential storage systems larger than 30 kWh could have been served by a system smaller than 30 kWh to meet daily use.
18. A 30 kWh residential storage system paired with solar generation is sufficient for critical resiliency in areas with high heating and cooling loads.
19. It is reasonable to establish a 30 kWh storage system incentive cap for single family projects in equity SGIP budgets to achieve fiscal prudence by avoiding oversizing storage systems and reaching more residential host customers.
20. It is reasonable for the SGIP PAs to implement these changes before the RSSE opens and to notify the SGIP proceeding Service List when the changes are implemented.
21. To ensure a smooth transition while incorporating these changes, the SGIP PAs shall release a simple spreadsheet or other tool for developers to use for load justification and hold a webinar to demonstrate how to use the tool and apply the new method.

THEREFORE IT IS ORDERED THAT:

1. SGIP PAs shall replace the storage system 10 kW load justification threshold with a 15 kWh load justification threshold in all SGIP storage budgets.
2. SGIP PAs shall replace the multifamily storage system 5 kW per tenant unit load justification threshold with a 12.5 kWh per tenant unit load justification threshold in all SGIP storage budgets.
3. SGIP PAs shall replace the residential storage sizing methodology for storage systems above 15 kWh from sizing to the peak demand in the past 12 months in kW to:
   a) Sizing a storage system paired with solar generation to the average daily excess solar generation during a summer calendar month in kWh; and
   b) Sizing a standalone storage system to the average daily energy consumption during the 4-9pm window during a summer calendar month in kWh.

4. SGIP PAs shall establish a 30 kWh incentive cap for all single family projects in the RSSE, Equity Resiliency, and San Joaquin Valley Residential budgets in the SGIP.
5. The changes ordered in this Resolution are effective in SGIP immediately as of the date of this Resolution.
6. The SGIP PAs shall pause applications in all affected SGIP budget categories from the date of this Resolution. The SGIP PAs shall notice this pause to the selfgen website and to the SGIP Service List.
7. Within 15 days from the date of this Resolution, the SGIP PAs shall file a Tier 1 Advice Letter and issue an announcement on the selfgen website to update the SGIP Handbook and SGIP application in accordance with the changes ordered in this Resolution. The SGIP application pause will end on the effective date of the Tier 1 Advice Letter.
8. SGIP PAs shall develop a simple spreadsheet or tool for developers to use for the new residential load justification methodology.
9. SGIP PAs shall hold one or more webinars, noticed to the SGIP Service List, to educate developers on using the new tool for the residential sizing methodology before the RSSE budget opens. The webinar(s) shall be recorded and posted on the selfgen website afterwards.

This Resolution is effective today.

I certify that the foregoing resolution was duly introduced, passed, and adopted at a conference of the Public Utilities Commission of the State of California held on December 19, 2024; the following Commissioners voting favorably thereon:

_____
Rachel Peterson
Executive Director