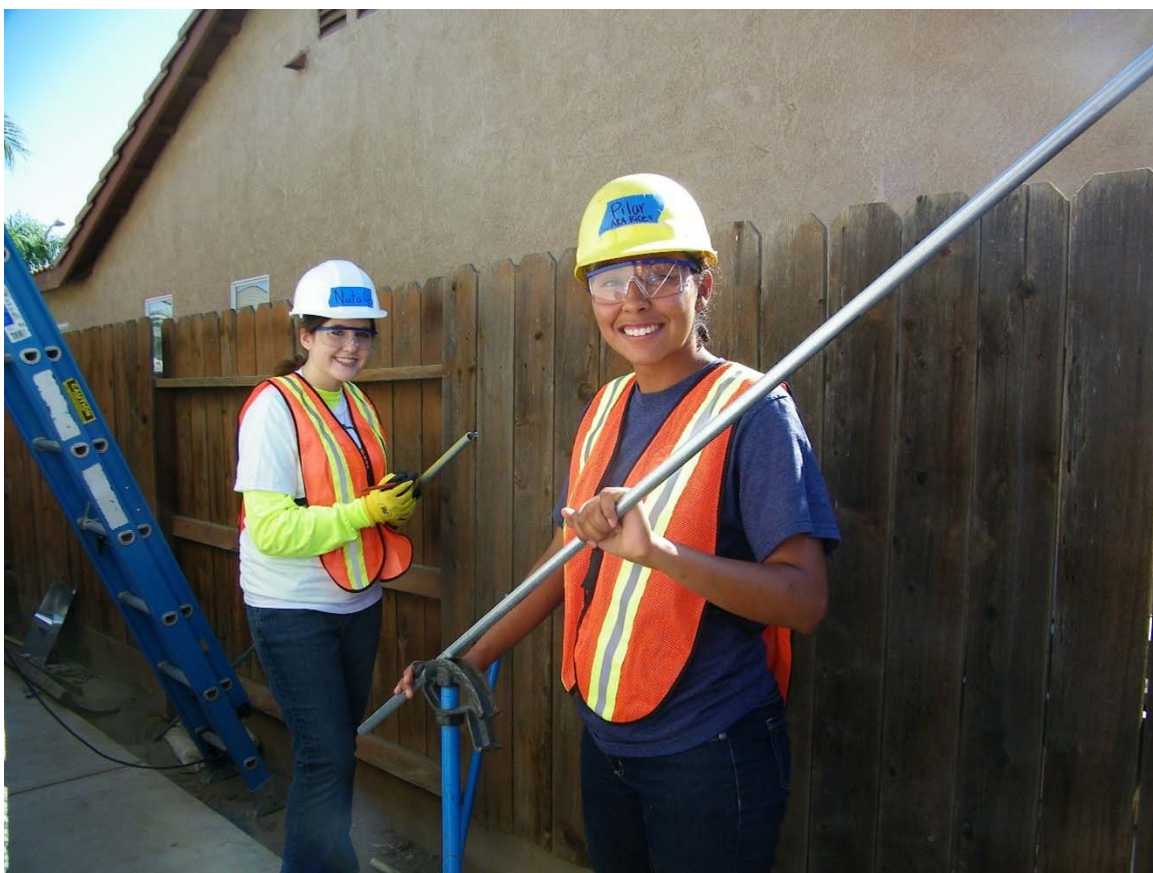


Single-family Affordable Solar Homes (SASH) Program

Semi-annual Progress Report



January 2023



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1. Program Summary

The Single-family Affordable Solar Homes (SASH) Program was one of the California Solar Initiative's (CSI) two low-income solar programs. GRID Alternatives (GRID), a non-profit solar contractor, is the statewide Program Administrator for the SASH Program. The SASH incentive was available to qualifying low-income homeowners in the Pacific Gas and Electric (PG&E), Southern California Edison (SCE), and San Diego Gas and Electric (SDG&E) Investor-Owned Utility (IOU) service territories but is now closed to new applicants statewide.

The SASH Program was designed to be a comprehensive low-income solar program. In addition to providing incentives, SASH is structured to promote or provide energy efficiency, workforce development and green jobs training opportunities, and broad community engagement with low-income communities. There is no other solar program in California that has had such a diverse range of benefits for low-income communities.

The SASH incentive provides low-income families with free or low-cost solar photovoltaic (PV) systems that significantly reduce household energy expenses and allow families to direct those savings toward other basic needs. GRID Alternatives' volunteer-based installation model has proven to be a highly efficient model that makes solar affordable for low-income homeowners while also creating valuable job training opportunities. In addition to being the primary installer for SASH, GRID provides education on and access to energy efficiency programs that further reduce a household's energy consumption and expenses.

In implementing the SASH Program, GRID Alternatives has provided opportunities for volunteers to assist with installations and engage with their communities. Over time GRID has trained over 45,323 volunteers and job trainees in California to help promote and install solar in low-income communities. GRID requires volunteers to participate in a solar orientation that educates these potential solar adopters about solar PV and energy efficiency. This consumer

education program can enhance state goals of promoting the use of solar PV technology and helping build community support for solar electric technologies and energy efficiency.

GRID partners with local job training programs to give their trainees an opportunity to get hands-on installation experience. The SASH Program also promotes partnerships between solar contractors and local workforce development programs by including a job training requirement for all sub-contracted SASH projects. This is a double benefit to low-income communities, since many job trainees come from the same communities that SASH serves.

2. Background

In 2006, the California Assembly Bill 2723 directed that no less than ten percent of the overall CSI funding be directed towards programs assisting low-income households in obtaining the benefits of solar technology. In D.07-11-045, the Commission established the \$108.34 million SASH Program as a component of the CSI Program. The SASH Program provides incentives “for homeowners who occupy their homes and meet the definition of low-income housing established in Public Utilities Code Section 2852.”¹ The goal of the SASH Program established in D.07-11-045 is “to provide existing low-income single-family homes with access to photovoltaic (PV) systems to decrease electricity usage and bills without increasing monthly household expenses.”²

Assembly Bill 217 (Bradford, 2013) extended the SASH Program from its scheduled sunset in 2016 with new funding and coupled with new program objectives. In D.15-01-027, the Commission established revised program requirements for energy efficiency, job training, and a modified incentive structure.³ Resolution E-4719, approved June 25th, 2015 by the

¹ D.07-11-045, Appendix A, p.1.

² D.07-11-045, Appendix A, p.1.

³ D.15-01-027, p.12-14; 44-48.

Commission, allows for a unique third-party ownership (TPO) model in SASH under AB 217's funding. The TPO model has been designed to maximize household savings and include consumer protection measures as required in D.15-01-027.⁴ The SASH Program extended under AB 217 with an additional \$54M in funding took on new incentive reservations until December 31, 2021, with final installations taking place in early 2022. The original SASH allocation of \$108M with D.07-11-045 is referred to as "SASH 1.0" and the reauthorized SASH program with \$54M in additional funding through D.15-01-027 is referred to as "SASH 2.0." Program details can be found in the SASH Program Handbook⁵ or at www.gridalternatives.org/sash.

3. Q3-Q4 2022 Update

This is the SASH program's final report, as the official end date for all program elements was December 31, 2022. In the second half of 2022, the program's *new* solar electric capacity was 215kW CEC-AC, interconnected for the benefit of 58 low-income households. At the end of 2022, 4,552 PV projects had been installed using the SASH 2.0 incentive budget, or a total of 9,818 if the original SASH 1.0 budget is included. The SASH program has been highly successful, serving close to 10,000 low-income households across the state, and has served as a model for researchers, other states, and program implementers around the country. Total savings for SASH program households are estimated at \$4.67 million/year, or over \$200 million over the course of the full PV system life in terms of utility bill savings.

Activities: In Q3 GRID finalized all SASH program installations and in Q4 GRID managed several city inspections and SCE interconnections, before the final incentive claim forms were

⁴ Resolution E-4719, June 15, 2015, and D.15-01-027, Minimum Consumer Protection standards for SASH TPO model, at pgs. 52-53. D.15-01-027 online at <http://docs.cpuc.ca.gov/PublishedDocs/Published/G000/M145/K938/145938475.PDF>.

⁵ www.gosolarcalifornia.ca.gov/documents/SASH_Handbook.pdf

submitted in early December. For the few projects that were unable to be interconnected by the end of November, households were advised that they cannot move forward as SASH 2.0 projects and new funding will be located, or the project will be paused; this consisted of less than one dozen projects. As before, GRID worked closely with affordable housing partners such as Habitat for Humanity, to install and interconnect the final SASH PV systems. In addition, GRID kept utility SCE apprised of delayed New Construction projects and worked closely with SCE to expedite new utility account setup to ensure interconnection in a timely manner before the end of year deadline. Finally, GRID continued implementing the Program's Third-Party Ownership (TPO) model which provided additional funding for projects and was structured to maximize homeowner benefit and champion consumer protection.⁶ Of the SASH 2.0 projects installed, 78% or over 3,500 projects utilized the TPO model (as illustrated in Chart 3 below and [on CalDG Stats](#)).

Future activities: Moving forward, GRID's service maintenance staff will continue taking calls from SASH participants to address maintenance and other questions, as will Sunrun's customer service department for any SASH 2.0 TPO clients (there are no SASH 1.0 TPO clients). GRID will direct some program participants to their respective utility provider as it does now, if questions are related to utility rates or increased electric power usage. GRID's labor warranty has a 10-year duration, and it will be valid through 2031 for the most recent projects signed in 2021. Within those ten years, GRID will address or fix warranty issues, for example we will replace failed panels or inverters that are still under manufacturer warranty. GRID is actively exploring ways to fund non-TPO participants' inverter replacements, as those are not included for them. Finally, the program's annual survey will continue to be sent and collected once per year.

⁶ Resolution E-4829, March 2, 2017.

4. Budget

The original SASH Program budget from D.07-11-045 is \$108.34 million. D.15-01-027 extended the SASH Program with an additional \$54 million, bringing the total Program budget to \$162.34 million. The SASH program was funded by PG&E, SCE, and SDG&E according to these percentages.

Table 1: Budget Allocations by Utility Territory

	PG&E	SCE	SDG&E	Total
Budget %	43.7%	46%	10.3%	100%
Budget (\$ in millions) in D.07-11-045 (SASH 1.0)	\$47.34	\$49.8	\$11.2	\$108.34
Extended Budget (millions) in D.15-01-027 (SASH 2.0)	\$23.59	\$24.84	\$5.57	\$54.00
Total Budget (millions) (Entire SASH Program)	\$70.93	\$74.64	\$16.77	\$162.34

The SASH Program budget is allocated between program functions, as detailed in Table 2. For this final program report, the only number that changed in the table below is the SASH 2.0 incentives “expensed through Q4” cell, which increased by \$837,261 in the second half of 2022.

Table 2: Budget Allocations by Program Function

	Budget %	Budget, \$ D.07-11-045 SASH 1.0	Budget, \$ D.15-01-027 SASH 2.0	Expensed through Q4 2022
Incentives	85%	\$92,089,000	\$45,900,000	\$92,049,369 (SASH 1.0) \$45,659,062 (SASH 2.0)
Administration	10%	\$10,834,000	\$5,400,000	\$16,234,000
Marketing and Outreach	4%	\$4,333,600	\$2,160,000	\$6,493,599
Evaluation	1%	\$1,083,400	\$540,000	Budget resides w/ CPUC
Total Program Budget	100%	\$108,340,000	\$54,000,000	\$160,436,030

5. Program Growth and Project Details

Tables 3 and 4 below summarize the status of all SASH applications through Q4 2022.

Table 3: SASH 1.0 Applications by Status and Service Territory

Application Status	Number of Applications				Total kW, (CEC-AC)	Total Incentives, \$ millions
	PG&E	SCE	SDG&E	Totals		
STEP 1: Applications under review	0	0	0	0	0.0*	\$0.0*
STEP 2: Confirmed Applications/Reservations	0	0	0	0	0.0	\$0.0
STEP 3: Completed/Installed	2,293	2,412	559	5,264	16,044	\$92.05
TOTAL	2,293	2,412	559	5,264	16,044	\$92.05

Table 3: Last updated in early 2016, with program end date of December 31, 2015.

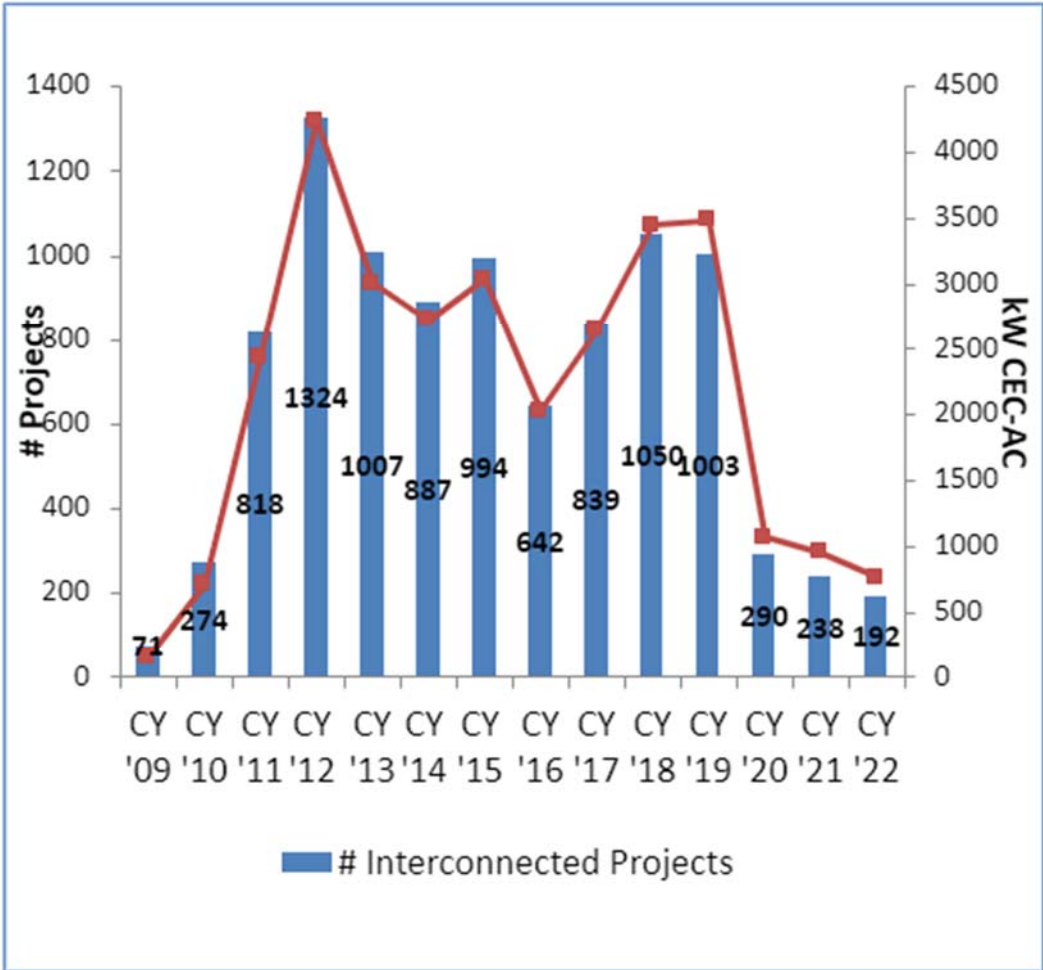
Table 4: SASH 2.0 Applications by Status and Service Territory

Application Status	Number of Applications				Total kW, (CEC-AC)	Total Incentives (\$ millions)
	PG&E	SCE	SDG&E	Total		
STEP 1: Applications under review	0	0	0	0	0	\$0.00
STEP 2: Confirmed Applications/Reservations	0	0	0	0	0	\$0.00
STEP 3: Completed/Installed	2,126	1,923	504	4,552	15,225.4	\$45.65
TOTAL	2,126	1,923	504	4,552	15,225.4	\$45.65

Table 4: Data collected January 19, 2023. *Step 1 system sizing (kW) and incentives (\$) were estimates based on an average system size of 3.5kW, CEC-AC and incentive level of \$3.00/W.

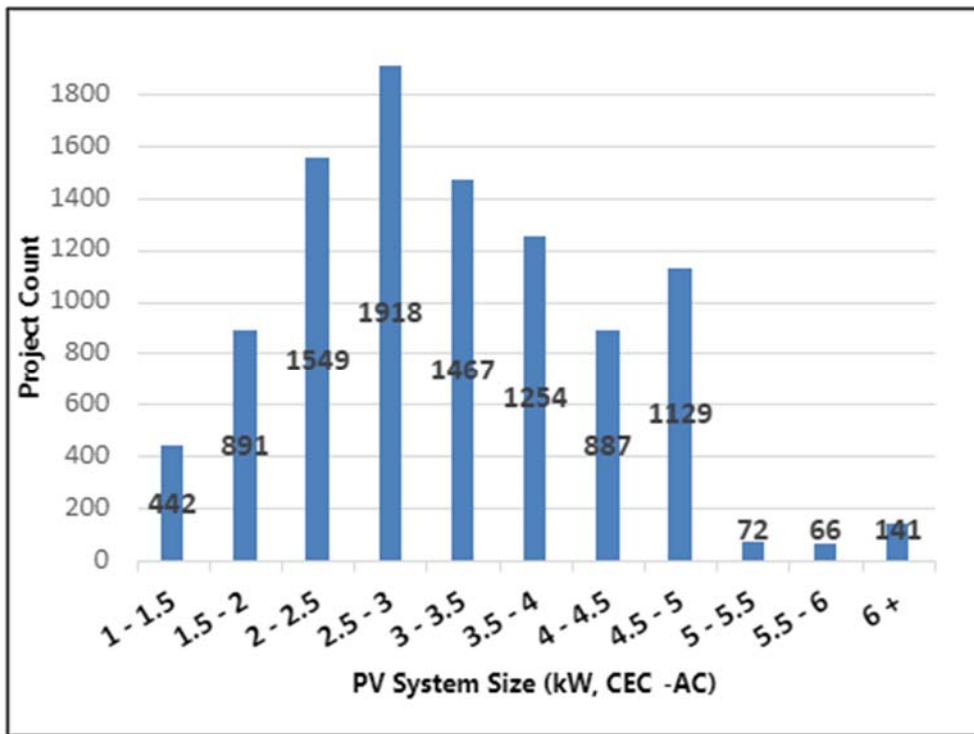
Below, Chart 1 illustrates the progress of the SASH Program over the past decade. Over 9,800 projects have been installed and completed (i.e., interconnected to the electric utility) through Q4 2022. In 2020 and 2021, installations decreased as PG&E and SDG&E incentives became fully encumbered and as focus began to shift to the new DAC-SASH program.

Chart 1: Completed or Interconnected Projects by Year



Below, Chart 2 indicates that roughly half of installed SASH solar PV systems are 3kW CEC-AC or greater, and the average installed SASH project is 3.2kW CEC-AC.

Chart 2: Installations by System Size through Q4 2022



Where the system size is not constrained by roof space, system sizing is based on the client’s annual usage (kWh) minus energy efficiency savings the client may realize by adopting basic energy efficiency measures. SASH systems are capped at 5kW.

6. Incentives and Project Financing

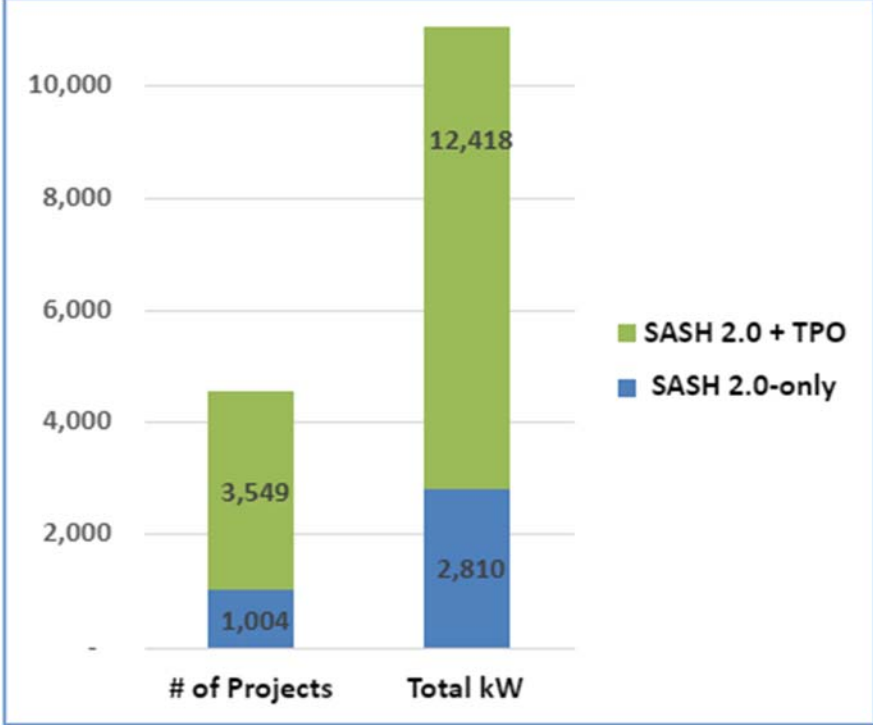
The SASH Program was designed to be a comprehensive low-income program and serve homeowners in the most distressed and impoverished areas of California. Roughly 80% of SASH clients qualify for the California Alternate Rates for Energy (CARE) Program that offers reduced electric rates to income-qualified households. Because CARE uses 200% of the Federal Poverty Level as its income limit (whereas SASH uses 80% of Area Median Income or AMI), more SASH clients from lower cost-of-living counties qualify for CARE than those in higher cost-of-living counties.

In all instances in recent years, GRID has aided in overcoming the gap financing obstacle for families by contributing the organization's own non-profit fundraising dollars and additional resources toward covering the gap between the available incentive and true project costs. GRID's contributions toward covering these financing gaps include general philanthropy, in-kind equipment donations, proceeds from a third-party ownership model, and corporate sponsorships. GRID's long-standing partnerships with major equipment manufacturers including Enphase Energy, and SMA Solar continues to help cover SASH clients' gap funding requirements. GRID utilizes philanthropic and in-kind contributions to augment gap financing efforts for the SASH Program and its next iteration, DACS-ASH. Given tight economic conditions in many low-income communities, gap financing remained an obstacle for low-income families to participate in the SASH Program.

Through its families-first TPO model, GRID was able to leverage the federal Investment Tax Credit (ITC) to help finance SASH 2.0 projects, while providing additional benefits to participating families, including a performance guarantee, system monitoring, and 25-year warranty coverage. In 2017 GRID began partnering with Sunrun to further expand its third-party ownership (TPO) model for SASH 2.0 as approved by the Commission in Resolution E-4829. All 2019 and later TPO installations were financed with partner company Sunrun Inc. As

demonstrated in Chart 3, of the 4,552 SASH 2.0 projects completed, over 80% of the kW (CEC-AC) capacity installed utilized the TPO funding model, or over 75% of the projects count. The remainder were host-customer (homeowner) owned and maintained.

Chart 3: SASH 2.0 Projects with Third-Party Ownership (TPO) through Q4 2022



7. Marketing and Outreach

GRID Alternatives currently has eight California regional offices, located in Oakland (PG&E), Willits (PG&E), Los Angeles (SCE), San Diego (SDG&E), Fresno (SCE/PG&E), Riverside (SCE), Chico (PG&E), and Sacramento (PG&E). The map below shows the location of completed SASH applications through Q2 2021 (GRID will not update the map moving forward), illustrating that GRID has qualified SASH applicants over a wide geographic area throughout the utility territories.

Map 1: SASH projects by California county⁷

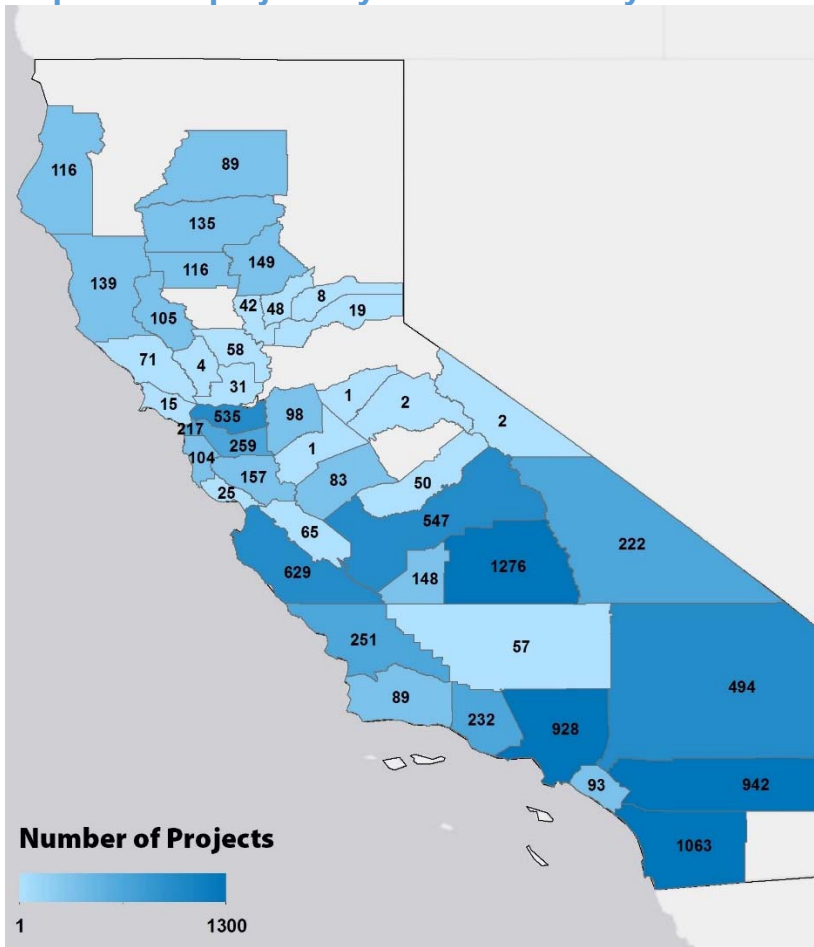
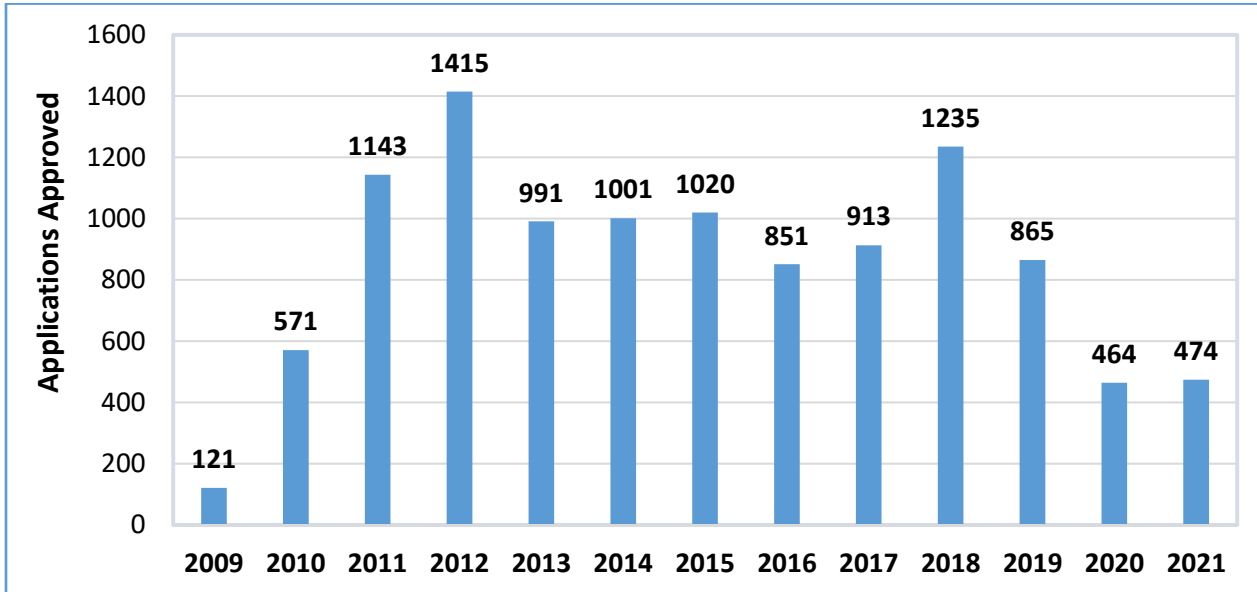


Chart 4 below shows that GRID processed zero applications in 2022 as the SASH program was and is now closed to new applications. The total number of approved SASH applications is over 11,000 from program start. Some of these applications did not turn into projects due to barriers such as construction barriers, but close to 10,000 did move forward as SASH projects.

⁷ This map captures projects through Q2 2021. For the most updated map, click here: <https://www.californiadgstats.ca.gov/charts/li/>

Chart 4: Applications Approved by Year



GRID Alternatives’ staff continued to utilize many of the ME&O methods proven to be effective for recruiting SASH clients and building brand recognition since the inception of the Program. These activities include leveraging partnerships with organizations trusted by low-income homeowners, offering consumer education sessions, and increasing community exposure to SASH (and now DAC-SASH) through media, marketing collateral and some events. GRID found that co-marketing with a city, county, or utility to compile a co-branded mailer sent directly to target populations was an effective method to create interest.

GRID also leveraged its existing relationships with key community partners to spearhead outreach efforts in low-income communities. GRID encouraged adopters of the SASH Program to discuss their experiences with neighbors and acquaintances and encourage them to contact GRID. Often a former SASH client would invite neighbors to their own home to help promote the SASH Program in their neighborhood. Involving neighbors, volunteers, and civic supporters at installations also helps to build the SASH brand recognition on-the-ground and for a wide audience of stakeholders.

8. Volunteer and Workforce Development

GRID Alternatives' unique volunteer-based installation model and organization-wide focus on green jobs training has made every SASH project a workforce development opportunity for a broad range of professional interests. GRID Alternatives has created 88,000 installation workday positions for volunteers in California since the inception of the program (over 1,100 in the second half of 2022, not all were for SASH). 20,591 of these workdays have been filled by groups of students from California job training programs. These volunteer and job training opportunities help strengthen California's solar industry by providing consumer education and a means for individuals from diverse backgrounds to learn about PV-solar design and installation through hands-on experience.

GRID ensures that the volunteers on SASH projects are trained in safety and installation techniques and understand the fundamentals of the SASH Program and the benefits of PV-solar by requiring all volunteers to attend a volunteer orientation. GRID Alternatives has trained over 45,700 community volunteers in these pre-installation orientations and the majority have gone on to participate in a SASH installation. Volunteers and job trainees formed the backbone of GRID's installation model before the pandemic began. Finally, GRID has incorporated "green job" training and workforce development initiatives into the SASH Program. This includes the following initiatives:

- **Hands-on solar installation experience for low-income job training programs.** GRID Alternatives presently partners with 18⁸ active job training organizations (JTOs) and has worked with over 80 California job JTOs all-time to incorporate its volunteer-based installation projects into their construction training curricula. GRID has dedicated approximately 20% of its in-house installations to these trainees to gain hands-on

⁸ Job Training Organizations (JTOs) included are those that are considered active JTO partners that GRID has worked directly on SASH installations in the past 2 years.

experience with solar installations. This is a double benefit to the low-income community, since many job trainees come from the same neighborhoods that the program aims to serve.

- **The Installation Basics Training (IBT) program awards trainees with certificates for industry-relevant skills learned under the supervision of GRID’s professional solar installation staff.** GRID’s IBT program provides job trainees’ valuable hands-on training, support for development of a specific skillset solicited by employers, and access to potential employment opportunities. IBT trainees earn certificates by demonstrating their competency on specific skills while working on installations. GRID offers 10 Skills Certificates that cover a variety of array and electrical skills. To earn all 10 Skills Certificates, IBTs typically need to dedicate 130-300 hours in the field (8-20 complete installations). Employment opportunities for IBT trainees include on-site networking opportunities with corporate sponsors, referrals to companies hiring for installation positions in the solar industry, and access to GRID’s Resume Bank, which connects job seekers and employers.
- **Team Leader and hands-on opportunities for job trainees.** In addition to reserving installations for job training partnerships, GRID gave individual job trainees priority to participate on other installations. Job trainees could also participate in GRID’s “Team Leader Program” that provides leadership roles on its volunteer installations. Almost 800 volunteers were trained as Team Leaders, giving job trainees the opportunity to get more critical, hands-on PV-installation experience.
- **Team Leaders may apply their experience toward NABCEP certification.**

The North American Board of Certified Energy Practitioners (NABCEP) is recognized as the leading certification for solar energy professionals. An individual pursuing NABCEP's PV solar installer certification must meet the Board's minimum requirement of leading five PV solar installations in order to



sit for the certifying exam. One of the auxiliary benefits for GRID Team Leaders is that their experience working directly under professional installers while leading other volunteers can be applied toward meeting this NABCEP requirement for certification.

- **Paid work and job placement for training graduates.** Students or graduates of JTOs may receive short-term paid work and/or long-term job placement in the solar PV industry through the *SASH Sub-Contractor Partnership Program (SPP)*. Trainees from over 50 different CA job training programs have worked alongside experienced installers from 55 for-profit companies to install SASH systems. These opportunities provide the job trainees and the contractors with extended, paid "field interviews" where the trainees can be evaluated for long-term installer positions within the company. Since the inception of the SPP, over 2,700 paid job opportunities have come to fruition for 270 unique trainees through SPP installations. Although the minimum requirement is to hire one job trainee per SPP installation, over 15% of SPP installations have employed two or three job trainees on SASH projects.
- **General volunteer opportunities.** Over 45,700 individual volunteers have completed GRID's volunteer/solar orientation since the commencement of the SASH Program. The orientation program allows GRID to promote solar energy and educates volunteers on solar technologies, the importance of energy efficiency. Individuals who complete the volunteer/solar orientation leave not only with eligibility to work on SASH installations,

but also with heightened knowledge about the solar industry. Volunteer opportunities were paused in 2020 during the pandemic and did not resume before the SASH program closed.

GRID has incorporated job training into every SASH project since the program's inception. With the addition of SASH 2.0 requirements under D. 15-01-027, GRID reports on specific types of attendees, ensuring that each volunteer-based installation includes either one Solar Corp, one Team Leader, or three students from a job training organization.⁹ This enhanced the job training opportunities created by the SASH program.

In June 2020, GRID submitted Advice Letter (AL) 15 to propose two modifications to the program's job training requirements. The AL was approved on July 10, 2020 and created a waiver process for SASH job training requirements, to be used on a limited basis for up to 10% of projects for 12 months; this was due to COVID-19 social distancing requirements. Only eleven SASH waivers were needed total. The above Advice Letter also permanently aligned job training requirements between the SASH and DAC-SASH programs, with two new types of job training categories that were allowed for SASH as well, listed below:

- Three (3) or more participants in Installation Basics Training (IBT); or
- One (1) Design and Construction Intern

⁹ D.15-01-027, requirements for volunteer-based installations on pg. 21. Requirements for SPP installations include an affidavit signed by subcontractor and job trainee, and specific reporting requirements, on pg. 23.

9. Energy Efficiency

Energy efficiency is the essential first step to implement in clients' homes before installing PV solar. To this end, GRID works with the Energy Savings Assistance Program (ESAP) administrators to refer and enroll eligible homeowners, and with the IOUs to streamline ESAP enrollment for SASH clients. Table 5 below summarizes all SASH applicants who were referred to the IOUs for enrollment into ESAP through Q2 2022; all applications were submitted by the end of 2021, so there are no updates to this table for the second half of 2022.

Table 5: ESAP Referrals (by Utility) for SASH 1.0 and 2.0¹⁰

Utility	Enrolled	Total Referred	% Enrolled in ESAP
PG&E	1,907	4,835	39%
SCE	2,353	5,267	45%
SDG&E	576	835	69%
Total	4,861	10,937	44%

APPENDIX A Data Annex

Confidential to CPUC per D. 15-01-027

¹⁰ Because all SASH applications were submitted by the end of 2021, there are no updates to this table for the second half of 2022, as all referrals were made in early 2022.