



# Evaluation of Single-Family Affordable Solar Housing and Disadvantaged Communities Single-Family Affordable Solar Housing Programs

*Public Webinar – Draft  
Research Plan  
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# Study Objectives

## DAC-SASH

- ✓ Independently measure and verify program's impacts.
- ✓ Document performance of the PA, a summary of administrative costs, and recommendations for improvement.
- ✓ Develop a program theory and logic model.
- ✓ Document and establish comprehensive program metrics and goals.
- ✓ Establish/verify data collection protocols necessary for program evaluation to be conducted in future independent evaluations.

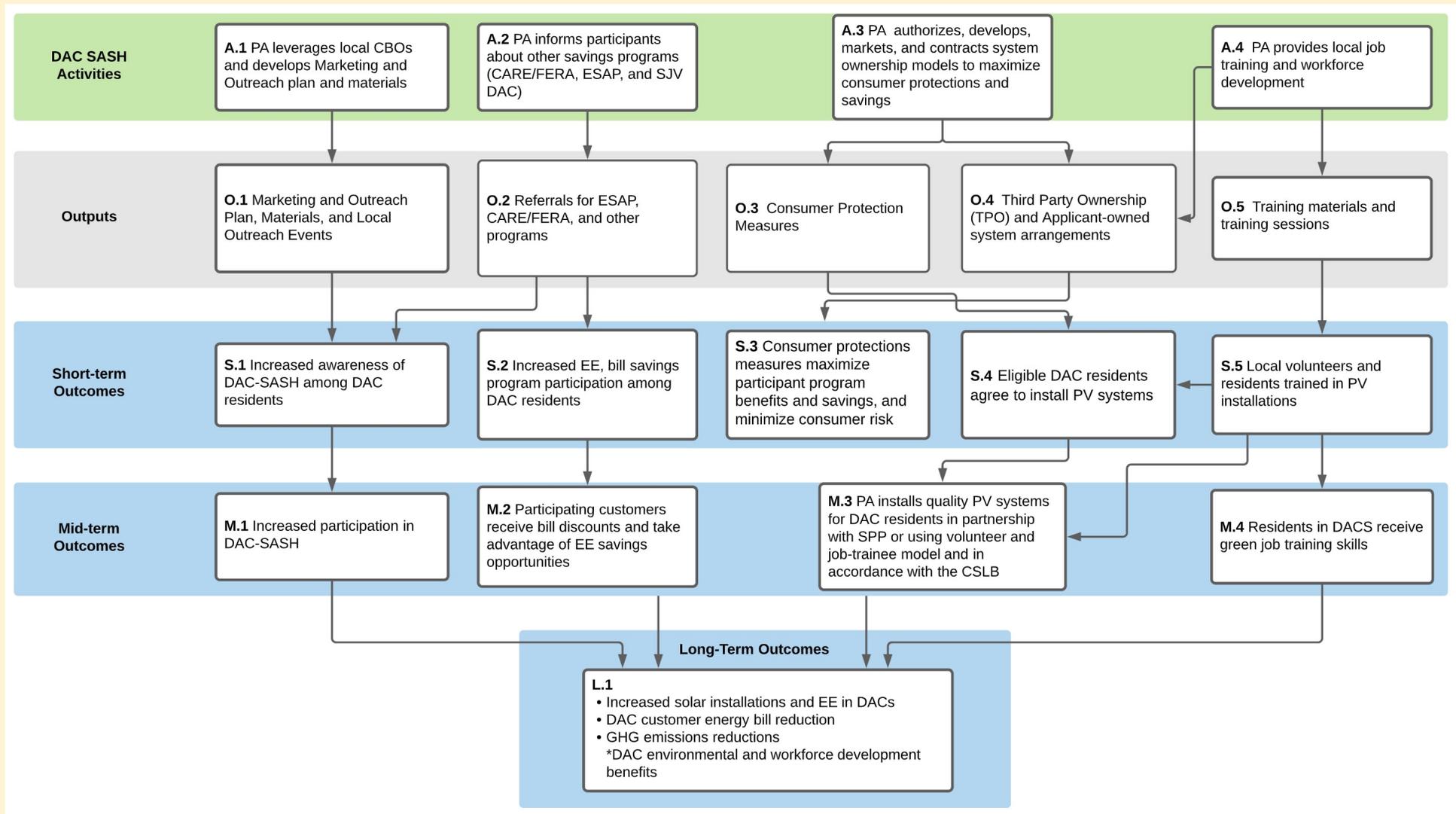
## SASH

- ✓ Independently measure and verify program's impacts.
- ✓ Document performance of the PA, a summary of administrative costs, and recommendations for improvement.

Each program will have own report



# Logic Model and Metrics





# Logic Model and Metrics

## Program Marketing

- % of customers aware of various marketing channels
- customer opinions on clarity of marketing materials

S.1, S.2, M.1,  
M.2

## Customer Participation

- The programs' geographic coverage across the state, including DACs
- # and location of eligible customers (SAIDS) and enrolled customers
- # of eligible non-participants that the PA reached out to but did not recruit
- Total Population estimates of eligible customers by different metrics (e.g., CARE)
- # and location of eligible customers not served
- # of eligible non-participants that already have solar
- # of installations completed and pending
- Overall participation levels in relation to customer segment size
- # of eligible customers who have successfully enrolled in CARE and FERA in the process of signing up for the program
- Other clean energy programs that customers have participated in along with enrolling in either program (e.g., SJV pilot communities programs)
- Customer satisfaction with the program
- PA performance from perspective of participants
- Effectiveness of each program in addressing specific barriers to solar adoption facing low-income customers in DACs
- Perception of non-participants / exploration of program participation barriers among qualified customers

S.1, S.2, M.1,  
M.2

## PV System Performance

- PV System Performance, Degradation - Expected v. Metered Performance
- Cost-Benefit test results (TRC, RIM, SCT)
- Average system costs by equipment, installation, and/or other customer acquisition costs

M.3, L.1

## Customer Bill Impacts

- Monthly bill reduction outcomes from program participants
- Changes in post participation energy use patterns

S.3, M.3

## Environmental Benefits

- Environmental benefits - program PV installation GHG and other emission impacts (PM-10, NOx)
- Participating and non-participating customer understanding and perception of the program's environmental and social benefits

L.1

## Workforce Development and Job Training

- # of leveraged job training programs
- # of local job hires linked to the program
- # of trainees and job outcomes

S.4, M.4



# Study Research Questions

- **Program administration:** How effective is program administration? What have the programs spent to-date by category? Have there been issues related to underutilizing budget (for DAC-SASH only) or other issues with tracking administrative costs?



# Study Research Questions

- **Program marketing:** How effective has program marketing been? Has the PA made use of customer data provided by the IOUs, and has that impacted program enrollment?



# Study Research Questions

- **Customer participation:** What are the characteristics of participants v. eligible non-participants? What are the main barriers to participation? Are customers satisfied with the programs? How effective are the programs in driving enrollment in other related programs? What is the size of the total eligible customer pool? How many out of program / market adoptions are happening among the eligible population?



# Study Research Questions

- **PV system performance:** Have systems degraded over time since installation? What factors contribute to such degradation? How cost-effective was the SASH program?



# Study Research Questions

- **Customer bill impacts:** What is the average monthly bill reduction outcome for program participants? Are there any measurable changes in energy usage post-participation?



# Study Research Questions

- **Environmental benefits:** What environmental benefits are the programs creating as a result of installed projects? Are participating customers aware of the programs' environmental benefits?



# Study Research Questions

- **Workforce development:** What job training programs are being leveraged? How many local jobs are being created? What are the longer-term job outcomes for trainees?



# Study Tasks Overview

## Task 1

Project Initiation Meeting

## Task 2

Detailed Research Plan and Schedule

## Task 3

Conduct Public Webinar

## Task 4

Program Material Review

## Task 5

Research and Analysis

## Task 6

Monthly Status Reports and Interim Drafts

## Task 7

Draft Results and Report

## Task 8

Public Webinars and Response to Comments



# Tasks 1-3: Project Planning

**Completed or in-progress: project initiation meeting, draft research plan, public webinar**

- Draft research plan (including program logic model)
- Public webinar: January 27
- Public comments due: February 7
- [https://www.cpuc.ca.gov/-/media/cpuc-website/divisions/energy-division/documents/solar-in-disadvantaged-communities/sash-dac-sash-draft-research-plan-v3-011122\\_fordistribution.docx](https://www.cpuc.ca.gov/-/media/cpuc-website/divisions/energy-division/documents/solar-in-disadvantaged-communities/sash-dac-sash-draft-research-plan-v3-011122_fordistribution.docx)
- [https://www.cpuc.ca.gov/-/media/cpuc-website/divisions/energy-division/documents/solar-in-disadvantaged-communities/sash-dac-sash-eval-research-plan-comment-template\\_011122.xlsx](https://www.cpuc.ca.gov/-/media/cpuc-website/divisions/energy-division/documents/solar-in-disadvantaged-communities/sash-dac-sash-eval-research-plan-comment-template_011122.xlsx)
- Final research plan: March 2



# Task 4: Program Material Review

## In-progress

- Requested program documents from PA / GRID
- Document review in January and February



# Task 4: Program Material Review

## Material to Review

- Program organizational and management structure
- Program information systems, including the various PA workflow management system
- Existing PA database for applicable information
- Training events and tracking information
- ME&O efforts and plans and a list of partnering organizations
- Accounting and disbursement methods, including contractor payment/compensation processes
- Data processing and record retention
- Program costs



# Task 5: Conduct Research

**Step 1**

Primary Research

**Step 2**

Secondary Research

**Step 3**

Analysis



# Primary Research

## Customer surveys (web and phone) will cover:

- Environmental/social benefits
- Program marketing and enrollment effectiveness
- Awareness / activity in other related programs
- Effectiveness in addressing participation barriers
- Customer satisfaction





# Primary Research

## Initial Sample Allocation for Customer Surveys (update based on program data)

|                                  | DAC-SASH  | DAC-SASH | SASH 1.0 | SASH 2.0 | Total  |
|----------------------------------|---|----------|----------|----------|--------|
| <b>Participants</b>              | Projected number of participants through 2021                     | 1,329    | 5,264    | 4,458    | 11,051 |
|                                  | Target Completes: Capped based on assumption of 10% response rate | 133      | 100      | 150      | 383    |
| <b>Eligible Non-Participants</b> | Aware of Program  | 100      |          | 100      | 200    |
|                                  | Unaware of Program  | 100      |          | 100      | 200    |
|                                  | Total Number of Target Survey Completes                           | 333      | 100      | 350      | 783    |



# Primary Research

## Interviews with PA and Stakeholders

- GRID – 8 regional offices (8)
- IOUs (3)
- M&O Partners (CBOs, 5)
- CPUC Tribal Liaison (1)
- Solar Companies (TPO partner, Sunrun and others)
- Trainee attendees who completed installations
- Trainee attendees who did not complete an installation





# Primary Research

## Example stakeholder topics:

- Use of IOU customer data
- Promotion of other programs
- Effectiveness in addressing barriers
- Incentives (DAC-SASH only)
- Geographic ability (DAC-SASH only)
- Feasibility of 'open contractor' model (DAC-SASH only)





# Primary Research

## Web Survey with Trainees

- Training value in career progress;
- Job outcomes;
- Experience with installations;
- Interactions with GRID; and
- Geographic specific training differences





# Primary Research

## Web Survey with Trainees

| Trainee Type   | Unique Participants |                                       | Target Web Survey Completions |      |
|--|---------------------|---------------------------------------|-------------------------------|------|
|  | DAC-SASH            | SASH                                  | DAC-SASH                      | SASH |
| Team Leader  | 3                   | 2,700 trainees since 2019             | 1                             | 100  |
| Interns  | 3                   |                                       | 1                             |      |
| SolarCorps Fellow  | 51                  |                                       | 5                             |      |
| Job Training Student   | 297                 |                                       | 30                            |      |
| Installation Basics Training Participant   | 73                  |                                       | 7                             |      |
| Design and Construction Intern   | Unknown             |                                       | Unknown                       |      |
| Trainee that has completed work under a subcontractor through the Subcontractor Partnership Installation Program | 4                   | 267 (may be included in number above) | 1                             |      |



# Primary Research

## In-Person Field Visits

- On-site solar installations (installers, trainees, and customers)
- Trainings (trainers and trainees)
- Marketing and Outreach events (M&O orgs and perspective participants)

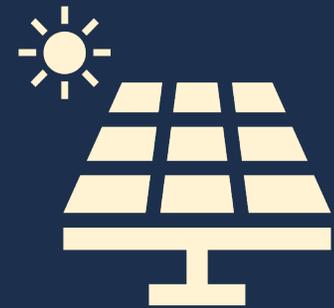




# Primary Research

## On-Site PV System Verification Visits

- PV module model/manufacturer
- Inverter model/manufacturer
- Array size
- Tilt and azimuth
- Performance degradation (shading, soiling, etc.)





# Secondary Data & Analysis

| Metric Category  | Secondary Data    |                          |                          |
|--|-------------------|--------------------------|--------------------------|
|  | Program Documents | PA Program Tracking Data | IOU CIS and Billing Data |
| Program administration                                 | S                 | S                        |                          |
| Program marketing                                      | S                 |                          |                          |
| Customer participation                                 | S                 | S                        | S                        |
| PV system performance (impacts and cost-effectiveness) | S                 | P                        |                          |
| Customer bill impacts                                  |                   |                          | P                        |
| Environmental benefits                                 | S                 | P                        |                          |
| Workforce development and job training                 | S                 | S                        |                          |

Geographic and population (e.g., Census) data; IOU CARE and NEM flags

Estimates of market adoptions and eligible population (based on IOU data and Census/ RASS)

Optional PV system metered data; secondary data for cost benefit assessment

Secondary data on environmental benefits

Optional modeling of job impacts



# Task 6: Monthly Reporting

- Regular check-in meetings and project status reporting to Energy Division
- Internal Evergreen team calls





# Task 7: Draft and Final Reports

**Separate reports (one for SASH; one for DAC-SASH)**

- Executive summary
- Introduction
- Methodology
- Analysis findings and recommendations
- Appendices



# Task 8: Public Webinar

**Draft Report findings to be presented to stakeholders**



**Process and Load Impact  
Evaluation of Single-Family  
Affordable Solar Housing and  
Disadvantaged Communities  
Single-Family Affordable  
Solar Housing  
Programs**



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Evergreen Economics

- Meeting summary memo
- Comments addressed in Final Report





# Discussion / Questions

