PUBLIC UTILITIES COMMISSION
505 VAN NESS AVENUE
SAN FRANCISCO, CA 94102-3298

SCG Advice Letter 5902

January 12, 2022

Joseph Mock
Director, Regulatory Affairs
Southern California Gas Company
555 W. Fifth Street, GT14D6
Los Angeles, CA 90013-1011

Subject: Disposition approving SCG Advice Letter 5902 on the Energy Savings Assistance (ESA) Program Pilot Plus and Pilot Deep Implementation Plan pursuant to Decision D.21-06-015.

Dear Mr. Mock,

The Southern California Gas Company (SCG) Advice Letter is approved effective December 24, 2021. Pursuant to CPUC Decision (D.)21-06-015 Ordering Paragraph (OP) 41. SCG filed Advice Letter (AL) 5902 seeking approval of the Energy Savings Assistance (ESA) Program Pilot Plus and Pilot Deep Implementation Plan. The SCG AL was timely filed on November 24, 2021.

I. Background

D.21-06-015 required the investor-owned utilities (IOUs) to allocate $104 million from the approved ESA budget to implement a deeper energy savings pilot program based on a 2020 Energy Division staff proposal. The pilot has a two-tiered approach, where the "Plus" tier would achieve between 5 and 15 percent energy savings per home, and the "Deep" tier would achieve between 15 to 50 percent energy savings per home, with higher average expenses per home. (This compares to the historical up to 5 percent energy savings per home, and $1,000 to $2,000 expenses per home). The IOUs and/or the implementers would design the program, including target customer segments, measures, and evaluation plan.

On November 24, 2021, SCG submitted the AL regarding ESA program Pilot Plus and Pilot Deep Implementation Plan as directed in OP 41 of D.21-06-015:

Decision 21-06-015, OP 41 states:

> "41. Pacific Gas and Electric Company, Southern California Edison Company, Southern California Gas Company and San Diego Gas & Electric Company must each file a Tier 2 advice letter no later than 90 days after the first pilot workshop detailing the Pilot Plus and Pilot Deep program implementation plan."

Decision 21-06-015 also includes Attachment 2, Guidance of the Energy Savings Assistance Program's Pilot Plus and Pilot Deep Program (Program Year 2021-2026), and includes the following instructions:

> Advice Letter Criteria: Each IOU shall file a Tier 2 advice letter by no later than 90 days after the first pilot workshop detailing the pilot implementation plan with the information below. Energy Division staff will review each advice letter and dispose of it accordingly.
>
> - Pilot Workshop Summary: The IOUs shall provide a summary of the workshop, including how workshop lessons were incorporated into their pilot implementation plan.
> - Pilot Budget: The IOUs shall provide an annual budget with detail for each of the categories listed above.
> - Customer Targeting: Based on the options listed above, the IOUs shall describe which customer segments it will target, and how it plans to target the groups for each of the Pilot Plus and Pilot Deep packages.
> - Pilot Measures: The IOUs shall propose a list of measures for each of the Pilot Plus and Pilot Deep packages, with the consideration that the IOUs will be able to add, modify, or remove measures through the monthly reports.
> - Pilot Program Design: The IOUs shall discuss how they plan to design and implement the pilot, per the potential options listed above.
> - Evaluation Plan: The IOUs shall include a high-level evaluation plan, with the consideration that a specific evaluation study scope will be determined in conjunction with the ESA / CARE Study Working Group.
> - Pilot Standards: The IOUs shall supplement their pilot proposal advice letters with the additional information below:
>   - Lessons already learned from previous research and pilots, and how these past and potentially ongoing lessons will relate to the currently proposed pilot;
>   - Gaps in understanding that will be filled by the proposed pilot, and the logic for the specific pilot study design proposed;
>   - Whether the IOU intends to deploy the pilot at a larger scale, and if so, how the metrics and data collected will enable the IOU to decide whether to recommend a wider roll-out;
>   - Whether there are opportunities for learning on other, related issues.

II. Party Comments and Reply Comments

No parties submitted comments or responses to the AL.

III. Discussion

After reviewing the AL with regards to the guidance criteria, staff determines that SCG's AL for the Pilot Plus and Pilot Deep implementation plan does meet the guidance criteria.

Staff further requests SCG adhere to the following in their pilot program design, solicitation, and implementation processes:

- Follow the solicitation process directives of D.21-06-015, and the requests from the January 7, 2022 letter from Energy Division Management to the IOUs on their ESA solicitation processes (provided to the A.19-11-003 service list).
- Provide periodic updates on program implementation progress via the monthly and annual reporting, and, as requested, the ESA working group meetings, including:
    - Achievement towards deeper energy savings, including the up to 50 percent energy savings per home program goal.
    - If and how program components can be incorporated into the main ESA program
- Follow D.21-06-015, Attachment 2, guidance on pilot program administrative costs (no more than 10 percent to be spent on "General Administration").
- Follow D.21-06-015's intent to ensure the majority of program spending is used for customer in-home measures and other benefits.

Energy Division approves the SCG AL, effective December 24, 2021.

Please contact Kapil Kulkarni of the Energy Division at kapil.kulkarni@cpuc.ca.gov if you have any questions.

Sincerely,

Simon Baker
Interim Deputy Executive Director for Energy & Climate Policy
California Public Utilities Division

cc: Service List A.19-11-003 et. al.
Pete Skala, Energy Division
Jennifer Kalafut, Energy Division
Alison LaBonte, Energy Division

Joseph Mock
Director
Regulatory Affairs

555 W. Fifth Street, GT14D6
Los Angeles, CA 90013-1011
Tel: 213.244.3718
Fax: 213.244.4957
JMock@socalgas.com

November 24, 2021

Advice No. 5902
(U 904 G)

Public Utilities Commission of the State of California

Subject: Southern California Gas Company Advice Letter Pursuant to Decision (D.) 21-06-015 for the Energy Savings Assistance Program Pilot Plus and Pilot Deep Implementation Plan

Southern California Gas Company (SoCalGas) hereby submits for approval with the California Public Utilities Commission (Commission) this Tier 2 Advice Letter detailing its Energy Savings Assistance (ESA) Program Pilot Plus and Pilot Deep implementation plan[1] in accordance with OP 41 of D.21-06-015 (or Decision).

Background

D.21-06-015 approves the Energy Division's ESA program redesign concept on a pilot basis; the ESA Pilot Plus and Pilot Deep. It is the Commission's expectation that the ESA Pilot Plus and Pilot Deep treatments will require a greater investment per customer household and will yield deeper energy savings with targets between 5 percent to 50 percent.[2]

Attachment 2 of D.21-06-015 sets forth the guiding principles of the Pilot Plus and Pilot Deep which include:

1. Deeper Energy Savings.
   - Achieves between an estimated 5 percent and 15 percent savings through the Pilot Plus measure package.
   - Achieves between an estimated 15 percent and 50 percent savings through the Pilot Deep measure package.

[1] Ordering Paragraph (OP) 41 of the Decision directs the Investor-Owned Utilities (IOU or IOUs) to submit a Tier 2 Advice Letter no later than 90 days after the first pilot workshop detailing the ESA Pilot Plus and Pilot Deep program implementation plan. The IOUs conducted the first pilot workshop on September 27, 2021.
[2] D.21-06-015, Attachment 2, Section 1.

2. Equity – While the focus of the program may be towards single-family, owner occupied homes, the IOUs shall consider how to increase program participation opportunities to renters and whether landlord co-investment is reasonable, given the rent restrictions and landlord co-pays for the multifamily whole building programs, as described in Section 7.9.
3. Quality – Focus on capturing meaningful, deeper savings for low-income households. This means spending more on fewer households, and dramatically increasing the impact of the treatment.
4. Customer-centric – A seamless low-income program delivery for the recipient with as many services provided in as few visits as possible, and greater customer satisfaction.
5. Optimization – Reduction in program administration, duplicative costs, and burdens to ratepayers. Maximize total funding to go towards program measures that save energy and/or reduce ratepayer collection.

DISCUSSION

Approved Budget

On June 7, 2021, the Commission issued D.21-06-015 authorizing the IOUs' ESA Programs and budgets for the 2021-2026 program cycle. Among other things, the Commission adopts the Energy Division's ESA Program redesign concept, the ESA Pilot Plus and Pilot Deep, as a pilot with the implementation to begin July 2022, subject to the Advice Letter approval by the Energy Division. The IOUs budget for the ESA Pilot Plus and Pilot Deep is approximately $103.5 million for the 2022-2026 cycle, of which SoCalGas' allocation is approximately $32.5 million for the cycle. The Decision directs the approved budget shall fund assessment and measure installations, independent evaluation, inspections, marketing and outreach, regulatory compliance, and general administration.[3] Southern California Edison Company (SCE) and SoCalGas will share certain expenditures equally (i.e., 50%-50% sharing) for items such as home mitigation, direct implementation, and customer outreach. In addition, the Decision sets forth fund shifting provisions for the ESA Pilot Plus and Pilot Deep by allowing the IOUs to shift funds to the next year or borrow from a future program year within the cycle.[4]

Cost Effectiveness

D.21-06-015 does not set a cost effectiveness threshold for this pilot, however it does direct the IOUs to track cost effectiveness of the measure treatments.

Customer Targeting and Protections

D.21-06-015 directs the IOUs to target those customers that are deemed the neediest and have the ability and opportunity to achieve the specified percent savings per household as identified under the guiding principles.

[3] D.21-06-015, Attachment 2, Section 3.
[4] D.21-06-015, Section 10.5.8.2. at 429.

Proposed Measures

D.21-06-015 directs the ESA Pilot Plus and Pilot Deep to complement and build upon the IOUs "Basic and Plus" measures described in Attachment 3 of Decision and filed in joint IOU compliance Advice Letter submittal.[5]

D.21-06-015 "reaffirmed the original Staff Proposal measure suggestions as a starting point for workshop discussion and pilot inclusion. The Pilot Plus package will offer certain equipment and appliance replacements and load shifting technologies, including electrification measures, in addition to any IOU basic package measures not already installed, that will reduce annual energy usage by 5 to 15 percent. The Pilot Deep package will offer the more advanced, and likely more expensive measures that will achieve a 15 to 50 percent reduction in annual energy usage, in addition to any Basic and Plus package measures not already installed."[6] Given that this is a Joint-Pilot between SoCalGas and SCE, the decision was made not to offer electrification measures within the Joint-Pilot Program. As a part of the Joint-Pilot Program customer outreach process, potential pilot participants will be asked if they are interested in electrification. If the customer is interested, they will be referred to SCE's Building Electrification Single Family Pilot, where they will receive marketing materials and detailed information on electrification.

D.21-06-015 also "reaffirmed that the minor home repair allowance per household to facilitate measure package installation; additionally, pest or mold mitigation may be included if needed to facilitate the installation of efficiency measures or create a safe working environment for contractors."[7]

Lastly, D.21-06-015 provided "a potential list of measures for the two packages, Pilot Plus and Pilot Deep, as a starting point with additional measures discussed at the workshop and in this advice letter."[8]

Pilot Program Design

D.21-06-015 allows the IOUs to consider a variety of program design options for the Pilot Plus and Pilot Deep. SCE and SoCalGas have decided to design and implement the pilot in our respective service territories. This joint approach will provide customers with comprehensive electric and gas energy efficiency services to maximize energy savings, provide for a customer-focused service delivery, and leverage each respective utility's program resources to increase program effectiveness to minimize duplication. SCE and SoCalGas have a long history of working together to deliver ESA Program services effectively to their shared customers. This pilot will be an expansion of those efforts. A full list of measures along with additional implementation details is included in the attached Implementation Plan. Subject to Energy Division staff approval of the Advice Letters, a Request for Proposals (RFPs) will be issued for Implementor, Inspector, and Evaluator. Per the Decision, the Pilot Plus and Pilot Deep program must be launched by the beginning of the third quarter of 2022.

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[5] Joint IOU compliance Advice Letter submitted September 1, 2021.
[6] D.21-06-015, Attachment 2, Section 6.
[7] *Id.*
[8] *Id.*

Advice Letter Criteria

In D.21-06-015, the Commission provided the criteria under which the Energy Division will review and dispose of the IOUs' Tier 2 Advice Letter.[9] The Advice Letter must meet the following criteria:

1. Pilot Workshop Summary: The IOUs shall provide a summary of the workshop, including how workshop lessons were incorporated into their pilot implementation plan.
2. Pilot Budget: The IOUs shall provide an annual budget with detail for each of the categories listed above.
3. Customer Targeting: Based on the options listed above, the IOUs shall describe which customer segments it will target, and how it plans to target the groups for each of the Pilot Plus and Pilot Deep packages.
4. Pilot Measures: The IOUs shall propose a list of measures for each of the Pilot Plus and Pilot Deep packages, with the consideration that the IOUs will be able to add, modify, or remove measures through the monthly reports.
5. Pilot Program Design: The IOUs shall discuss how they plan to design and implement the pilot, per the potential options listed above.
6. Evaluation Plan: The IOUs shall include a high-level evaluation plan, with the consideration that a specific evaluation study scope will be determined in conjunction with the ESA / CARE Study Working Group.
7. Pilot Standards: The IOUs shall supplement their pilot proposal Advice Letters with the additional information below:
   - Lessons already learned from previous research and pilots, and how these past and potentially ongoing lessons will relate to the currently proposed pilot;
   - Gaps in understanding that will be filled by the proposed pilot, and the logic for the specific pilot study design proposed;
   - Whether the IOU intends to deploy the pilot at a larger scale, and if so, how the metrics and data collected will enable the IOU to decide whether to recommend a wider roll-out; and
   - Whether there are opportunities for learning on other, related issues.

Accordingly, SoCalGas timely submits this Advice Letter and provides information consistent with the above listed criteria in its Appendix A.

Protests

Anyone may protest this Advice Letter to the Commission. The protest must state the grounds upon which it is based, including such items as financial and service impact, and should be submitted expeditiously. The protest must be made in writing and must be received within 20 days of the date of this Advice Letter, which is December 14, 2021. The address for mailing or delivering a protest to the Commission is given below.

[9] D.21-06-015 Attachment 2, Section 10.

CPUC Energy Division
Attention: Tariff Unit
505 Van Ness Avenue
San Francisco, CA 94102

A copy of the protest should also be sent via e-mail to the attention of the Energy Division Tariff Unit (EDTariffUnit@cpuc.ca.gov). Due to the COVID-19 pandemic, SoCalGas is currently unable to receive protests or comments to this Advice Letter via U.S. mail or fax. Please submit protests or comments to this Advice Letter via e-mail to the addresses shown below on the same date it is mailed or e-mailed to the Commission.

Attn: Grisel Juarez Velazquez
Sr. Regulatory Tariff Administrator
555 West Fifth Street, GT14D6
Los Angeles, CA 90013-1011
Facsimile No.: (213) 244-4957
E-mail: GJuarezVelazquez@socalgas.com
E-mail: Tariffs@socalgas.com

Effective Date

SoCalGas asserts this submittal is subject to Energy Division disposition and should be classified as Tier 2 (effective after staff approval) pursuant to General Order (GO) 96-B. SoCalGas respectfully requests that this submittal become effective December 24, 2021, which is 30 calendar days after the date submitted.

Notice

A copy of this Advice Letter is being sent to SoCalGas' GO 96-B service list and the Commission's service list in A.19-11-003. Address change requests to the GO 96-B service list should be directed via e-mail to Tariffs@socalgas.com or call 213-244-2837. For changes to all other service lists, please contact the Commission's Process Office at 415-703-2021 or via e-mail at Process_office@cpuc.ca.gov.

/s/ Joseph Mock
Joseph Mock
Director – Regulatory Affairs

Attachments

California Public Utilities Commission

ADVICE LETTER SUMMARY

ENERGY UTILITY

MUST BE COMPLETED BY UTILITY (Attach additional pages as needed)

Company name/CPUC Utility No.:

Utility type:

☐ ELC ☐ GAS ☐ WATER

☐ PLC ☐ HEAT

Contact Person:
Phone #:
E-mail:
E-mail Disposition Notice to:

EXPLANATION OF UTILITY TYPE

ELC = Electric GAS = Gas WATER = Water
PLC = Pipeline HEAT = Heat

(Date Submitted / Received Stamp by CPUC)

Advice Letter (AL) #:

Tier Designation:

Subject of AL:

Keywords (choose from CPUC listing):

AL Type: ☐ Monthly ☐ Quarterly ☐ Annual ☐ One-Time ☐ Other:

If AL submitted in compliance with a Commission order, indicate relevant Decision/Resolution #:

Does AL replace a withdrawn or rejected AL? If so, identify the prior AL:

Summarize differences between the AL and the prior withdrawn or rejected AL:

Confidential treatment requested? ☐ Yes ☐ No

If yes, specification of confidential information:
Confidential information will be made available to appropriate parties who execute a nondisclosure agreement. Name and contact information to request nondisclosure agreement/ access to confidential information:

Resolution required? ☐ Yes ☐ No

Requested effective date:

No. of tariff sheets:

Estimated system annual revenue effect (%):

Estimated system average rate effect (%):

When rates are affected by AL, include attachment in AL showing average rate effects on customer classes (residential, small commercial, large C/I, agricultural, lighting).

Tariff schedules affected:

Service affected and changes proposed[1]:

Pending advice letters that revise the same tariff sheets:

[1]Discuss in AL if more space is needed.

Protests and all other correspondence regarding this AL are due no later than 20 days after the date of this submittal, unless otherwise authorized by the Commission, and shall be sent to:

CPUC, Energy Division Attention: Tariff Unit 505 Van Ness Avenue San Francisco, CA 94102 Email: EDTariffUnit@cpuc.ca.gov	Name: Title: Utility Name: Address: City: State: Zip: Telephone (xxx) xxx-xxxx: Facsimile (xxx) xxx-xxxx: Email:
	Name: Title: Utility Name: Address: City: State: Zip: Telephone (xxx) xxx-xxxx: Facsimile (xxx) xxx-xxxx: Email:

APPENDIX A

Advice No. 5902

Southern California Edison (SCE) Company
and Southern California Gas Company (SoCalGas)
Energy Savings Assistance (ESA) Program
Joint-Pilot Implementation Plan (PIP)

Southern California Edison (SCE) Company and Southern California Gas Company (SoCalGas)

Energy Savings Assistance (ESA) Program

Joint-Pilot

Implementation Plan (PIP)

Final

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Background

On June 3, 2021, the California Public Utilities Commission (CPUC) distributed its Decision (D.) D.21-06-015 for Pacific Gas and Electric Company (PG&E), Southern California Edison Company (SCE), Southern California Gas Company (SoCalGas), and San Diego Gas & Electric Company (SDG&E), (collectively IOUs or Utilities) and Marin Clean Energy's applications for the 2021-2026 Energy Savings Assistance (ESA) Program and California Alternative Rates for Energy (CARE) Programs. D.21-06-015 authorized the California IOUs to implement the 2021-2026 low-income programs with the following budget:

TABLE 1. APPROVED 2021-2026 ESA PROGRAM AND PILOT PROGRAM BUDGET

	2021-2026 Total ESA Program Budget	2021-2026 Pilot Program Budget
SCE	$431,154,350	$19,424,318
SoCalGas	$680,899,486	$32,552,726
PG&E	$928,146,242	$43,913,036
SDG&E	$158,597,966	$7,633,415
Statewide	$2,198,798,044	$103,523,495

Within the above statewide ESA Program budget, the CPUC authorized funding to implement the ESA Program Pilot Program (aka Pilot Program), with sub-programs Pilot-Plus and Pilot-Deep (aka Pilot-Plus/Deep or Pilot) to serve income-qualified single-family and mobile home customers.

In Attachment 2[1] (i.e., Guidance of the Energy Savings Assistance Program's Pilot Program) of the D.21-06-015, the CPUC provided further detailed guidance and requirements for the Pilot Program's design, implementation, and solicitation. In addition, the CPUC mandated that IOUs host a statewide workshop to review their proposed Pilot Program designs within 120 days[2] of D.21-06-015 to seek stakeholder comments. IOUs are expected to file the finalized Pilot Program plan in a Tier 2 Advice Letter (AL) no later than 90 days[3] after the statewide workshop[4].

Guidance for ESA Program and Pilot Program Design

[1] CPUC D.21-06-015, Attachment-2, Pilot Guiding Principles.

CPUC Program Guidance_Rev1_Attac

[2] Ordering Paragraph (OP) 40.

[3] OP 41.

[4] The statewide workshop took place on September 27, 2021.

For the 2021-2026 ESA Program application, the CPUC issued its Guidance in D.19-06-022, instructing the IOUs to propose innovative program designs and other goals towards achieving deeper energy savings at the household level. In addition, in June 2020, CPUC staff made a whitepaper[5] available to elevate further the IOUs and stakeholders' discussions about program design.

D.21-06-015 allocated approximately $103.5 million to the IOUs to implement the Pilot Program statewide. The authorized Pilot Program will offer pilot measure packages to serve the IOUs' service territories. The expectation is that the Pilot Program treatment will require more significant investments and yield deeper energy savings for each treated household.

Furthermore, D.21-06-015 outlined the following list of guiding principles in the IOUs Pilot Program design (i.e., Attachment 2):

- **"Deeper Energy Savings**
  - Achieves between an estimated 5 to 15 percent savings through the Pilot Plus measure package.
  - Achieves between an estimated 15 to 50 percent savings through the Pilot Deep measure package.
- **Equity**
  - While the focus of the program may be on single-family, owner-occupied homes, IOUs shall consider how to increase program-participation opportunities to renters and whether landlord co-investment is reasonable, given the rent restrictions and landlord co-pays for the multifamily whole-building programs.
- **Quality**
  - Focus on capturing meaningful, deeper savings for low-income households. This means spending more on fewer households and dramatically increasing the impact of the treatments.
- **Customer-centric**
  - Seamless low-income program delivery for the participants, providing as many services and as few visits as possible to increase customer satisfaction.
- **Optimization**
  - Reduction in program administration, duplicative costs, and burdens to ratepayers. Maximize total funding directed towards program measures that save energy and/or reduce ratepayer collection."

D.21-06-015 also instructed the IOUs to prioritize targeted customers using the following segmentation (aka characteristics or needs) criteria[6].

TABLE 2. SEGMENTATION CRITERIA

By Financial	By Location	By Health Condition

[5] CPUC Staff Whitepaper, June 2020, page 3.

CPUC LI Pilot Proposal June 2020.Pl

[6] D.21-06-015, Section 9.2, page 408.

CARE	Disadvantaged Communities (DAC)	Medical Baseline Allowance (MBL)
Disconnected	Rural	Respiratory
Arrearages	Tribal	Disabled
High-Usage	Public Safety Power Shut-off (PSPS) Zone	
High Energy Burden	Wildfire Zone	
Socioeconomic Vulnerability Index (SEVI)	Climate Zone	
Affordability Ratio	California Air Resources Board (CARB) Communities	

SCE and SoCalGas to Jointly Implement the Pilot Program

D.21-06-015 Attachment 2 also provided for the IOUs to consider a variety of program designs, including regional implementation, particularly in the shared service territory for SCE and SoCalGas. After reviewing the pilot guiding principles outlined above, SCE and SoCalGas jointly decided to implement the pilot in their shared service territory. This joint approach will provide customers with comprehensive electric and gas energy efficiency services to 1) maximize energy savings, 2) provide for customer-focused service delivery to minimize customer visits, and 3) leverage each respective utility's program resources to increase program effectiveness to minimize duplication. SCE and SoCalGas have a long history of successfully working together to deliver ESA Program services effectively to their shared customers. This pilot will be an expansion of those efforts.

The Joint-Pilot Program

Overview

After carefully assessing both the required energy savings and intent of the Pilot Program, the Joint-IOUs selected a Whole-House approach, using Building Performance Institute (BPI) certified contractors for the Pilot Program implementation. These BPI professionals are trained to focus on "whole house as a system approach" to emphasize the interdependence of buildings and energy consumption. The Joint-Pilot Program will consist of two sub-programs: Pilot-Plus (5-15% savings goal) or Pilot-Deep (15-50% savings goal).

This Whole-House approach may not be necessary for the deemed savings program with lower expected savings (i.e., Pilot-Plus), but it is essential to achieve the higher energy savings goal (i.e., Pilot-Deep) of the Joint-Pilot.

This Whole House approach is similar to the Energy Upgrade California's (EUCA) Basic Home Upgrade (i.e., HUP or Basic Path) and Advanced Home Upgrade (i.e., AHUP or Advanced Path) Program, which employed the same "Whole House as a System" design for home energy efficiency improvement.

- Similar to the HUP program, Pilot-Plus can deliver 5-15% energy savings per participating household. In addition, using a deemed savings approach, the program can

use packaged measures to upgrade home performance, including other home mitigation efforts to improve home sealing and insulation.

- Like the AHUP program, Pilot-Deep can deliver 15-50% of energy savings per participating household. Of course, 50% energy savings is an aspirational goal for any home, short of adding a solar roof to generate energy to offset usage. However, the AHUP approach can help homes achieve deeper energy savings by using a test-in/out process supported by energy-modeling software to calculate energy savings.

- The key for the Joint-Pilot Program design is targeting high-usage[7] customers with high potential to achieve deep energy savings. Therefore, the Joint-Pilot design first embraces a test-in and energy modeling approach to identify targeted homes with high energy-saving potential, then directs the participants to the right program path.

To implement the AHUP, a more robust program design was required using BPI qualified contractors. In addition, extra program steps were essential for success: test-in/out, energy software-modeling, Quality Assurance, and Quality Control (i.e., QA/QC), contractor training, and oversight. However, these robust processes added both administrative burden and costs to the overall program implementation. The Joint-IOUs eventually terminated their EUCA Program due to insufficient cost-effectiveness.

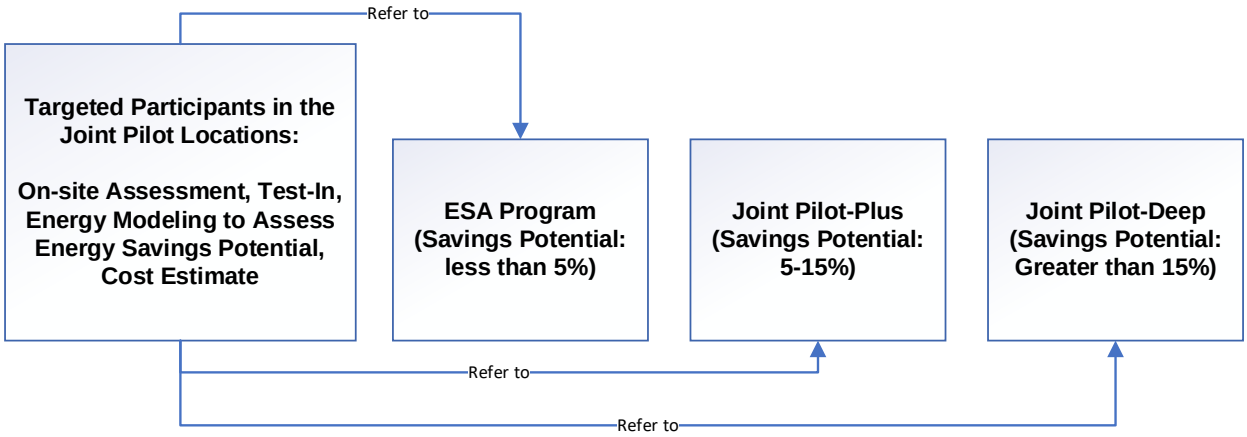
However, the EUCA Program's design is an excellent match to meet Joint-Pilot design objectives. Strict cost-effectiveness and minimum free-ridership are less of concern for the targeted low-income population. Therefore, the Joint-IOUs will modify the EUCA Program design to meet the Joint-Pilot Program's implementation needs. The Joint-IOUs have reviewed all relevant literature to capture the lessons learned to date and strive to leverage these lessons.

- Please refer to **Appendix B:** A Summary of Studies to Inform Pilot Program Design and Implementation.

The Joint-Pilot design allows eligible customers to benefit from a robust list of program services and measures, including all ESA Program measures. All targeted Joint-Pilot homes will start with the same test-in and energy modeling process to properly guide participants to the appropriate program path. This step will guide participants to the correct program path while allowing the Joint-Pilot to maximize potential energy savings one home at a time (see Figure 1 below). To meet Pilot-Deep's high energy savings objective, participants will follow a test-out and energy modeling update process to capture pre-and post-installation energy-saving data accurately.

[7] The Joint-Pilot Program targeting high-usage customers should not be confused with CARE HU customers, since the baseline for those are higher than the threshold IOUs set for the Pilot.

FIGURE 1. TARGETED PARTICIPANTS ENTER THE JOINT-PILOT THROUGH TEST-IN AND ENERGY MODELING



Joint-Pilot Program Alignment with Other ESA Program Offerings

Using summary Table 3 below, the Joint-IOUs will provide an overview of Joint-Pilot. Next, they will compare Joint-Pilot offerings with approved ESA Program (SCE: ESA Basic/Enhanced Program, SoCalGas: ESA Basic/Plus Program) offerings. Later in this section, the Joint-IOUs describe the Joint-Pilot's customer targeting and prioritizing process. Included in this section is a summary of the Joint-Pilot budget and cost-effectiveness analysis. Finally, the Joint-IOUs present the high-level Pilot Program's milestones and preliminary schedules.

The following bullet list displays a high-level summary of SCE and SoCalGas ESA Program elements in contrast with Joint-Pilot, serving single-family and mobile homes. For the Joint-Pilot PIP development, Joint-IOUs are using 2020 CARE program participant data. Here is a short list of critical differences for the Joint-Pilot:

- **Target High-Usage CARE Customers:** The Pilot Program will focus on matched dual-fuel high-usage customers defined as low-income CARE customers:
  - **Electric**: Customers reached 300% baseline and higher (i.e., 300%+),
  - **Gas**: Customers reached 200% baseline and higher (i.e., 200%+).

- **Restrict Geographically:** The Pilot Program will be restricted to specific geographic locations to make the implementation focused and cost-effective.

- **Prioritize Outreach based on Segmentation and Needs:** Outreach for each screen-in high-usage CARE customers in restricted geographic areas will be prioritized by additional segmentation and characteristics analyses.

- **Support by Robust Measures and Services:** The Joint-Pilot Program will use a robust list of program services and measures, including all ESA Program offerings within the Joint-Pilot Program.

- **Require Test-In to Direct Proper Program Path:** The Joint-Pilot Program will adopt an upfront test-in and energy-modeling process for all targeted participants. This initial

testing will provide a baseline for energy savings potential, thus directing the appropriate program path for treatment. The goal is to optimize the energy savings potential for gas and electric energy usage, leading the participants either to Joint Pilot-Plus (i.e., 5%-15%) or Joint Pilot-Deep (i.e., 15%-50%).

- **Support both Deemed and Calculated Energy Savings Claims based on Program Path:** Joint Pilot-Plus will use a deemed energy savings claim method. Joint Pilot-Deep will use a calculated energy savings method entirely. Pilot-Deep participants will also be subjected to a test-out and energy-modeling update process.

- **Support Investment Caps Per House:** Total joint investment is capped at $15,000 and $25,000 for Pilot-Plus and Pilot-Deep, respectively. To operationalize these investment caps, SCE and SoCalGas will pay for the electric and gas equipment and appliances accordingly but share the cost of home mitigation equally.

The following page contains a side-by-side summary comparison of the Joint-IOUs' ESA Program versus the Joint-Pilot Program's features and services. The planned Joint-Pilot Program's capabilities are considered preliminary and subject to change to allow ongoing process improvements and innovation. As a result, some program modifications and flexibility (i.e., screening criteria, geographic restrictions, program caps, etc.) would be required as the Joint-Pilot Program moves forward into the Request for Proposal (RFP), selection, and implementation phases to meet the reality of customer engagement and execution.

TABLE 3. HIGH-LEVEL JOINT-IOUS ESA PROGRAM ELEMENTS (SUBJECT TO CHANGE)

	SCE ESA Program		SoCalGas ESA Program		Joint-Pilot Program	
(Sub-Programs)	**Basic (T1)**	**Enhanced (T2)**	**Basic**	**Plus**	**Plus**	**Deep**
Energy Savings Range per Treatment	5%	5%-15%	5%	5%-15%	5%-15%	15%-50%
Customer Targets	Low Usage	High-Usage (300%+ baseline)	Low Usage	High-Usage (200%+ Baseline)	CARE High-Usage (Electric: 300%+ Baseline, Gas: 200%+ Baseline during winter months)	
Geographic Area	SCE Territory		SoCalGas Territory		Los Angeles, Riverside, and San Bernardino Counties	
Energy Savings Method	Deemed				Deemed	Calculated
Contractor and Installation	Qualified Contractor and Direct Install				BPI Certified Contractor and Direct Install	
Point of Program Entry	Standard ESA Program Process				Pre-Installation On-site Audit, Energy Usage Modeling, Blower-Door Test, and EM&V: Pre-Installation Customer Survey	
Inspection (QA/QC)	Standard ESA Program Process				HERS Rating: mandatory and sampling inspections	
Point of Program Exit	Standard ESA Program Process				Final Project File Review and Customer Exit Survey	Post-Installation review, Energy Usage modeling update, Blower Door test-out, and EM&V: Post-Installation Customer Survey
Sampling Design	No				Yes	
Joint Per Home Mitigation Cap	N/A				$3,000	$5,000
Joint Per Home Investment Caps (all inclusive)	N/A				$15,000	$25,000

Summary of Customer Targeting and Account Matching (Subject to Change)

The Joint-IOUs conducted a high-usage customer analysis using the 2020 CARE participant data focusing on Los Angeles, Riverside, and San Bernardino counties. This analysis yielded 5,504 matched dual-fuel high-electric and high-gas usage customers. After a random sample assignment, these accounts will be subject to further segmentation and characterization analyses to prioritize Joint-Pilot Program customer outreach and engagement.

This customer targeting and account matching analyses will be updated using 2021 usage accounts before the Joint-Pilot Program implementation. This matched-account screened-in sample size will be subject to Joint-Pilot program drop-outs and service refusals as a part of the implementation.

TABLE 4. TARGET CUSTOMER ANALYSIS AND ACCOUNT MATCHING RESULT

(Accounts)	SCE	SoCalGas
2020 Joint-IOUs CARE Accounts	805,241	939,510
Screened in High-usage CARE Accounts in the service territory: (SCE: 300%+ baseline, SoCalGas: 200%+ baseline[8])	133,110	46,634
Screened in High-Usage (CARE Accounts in Los Angeles, San Bernardino, and Riverside	103,878	37,273
Matched Dual-Fuel Joint Accounts	5,504	

Summary of Budget, Cost-Effectiveness, and Metrics for the Joint-Pilot (Subject to Change)

As instructed by the CPUC's Pilot Program Guidance, "no specific cost-effectiveness threshold is set for this pilot. However, the IOUs should track the cost-effectiveness of the pilot treatments, and the impact to the overall ESA program portfolio cost-effectiveness with the addition of the pilot implementation".

The Joint-IOUs are unable to provide cost-effectiveness analysis at this time due to the high level of uncertainty. However, once the CPUC approves this Joint-Pilot PIP, the Joint-IOUs will conduct an RFP process to seek the following: a Joint-Pilot implementer, a QA/QC vendor, and an independent Evaluation, Measurement & Verification (EM&V) vendor. The cost ramifications will become more apparent for the Joint-IOUs once the RFP process has been concluded.

[8] The SoCalGas CARE accounts were screened in as displaying "high usage" if they exhibited significant increased usage during the winter season (November 1 to April 30). SoCalGas customers utilize gas more during the winter season primarily because of increased water and space heating costs due to colder weather. For SCE, the CARE account customers were screened in using monthly usage data.

Below is a preliminary Joint-Pilot budget for 2021-2026 implementation.

TABLE 5. HIGH-LEVEL JOINT-PILOT BUDGET SUMMARY (SUBJECT TO CHANGE)

	SCE	SoCalGas	Joint-Pilot	
2022-2026 Cost Element	($)	($)	Total ($)	%
Direct Implementer	$1,553,945	$1,553,945	$3,107,890	6%
Direct Installation-Material	$6,410,025	$16,031,116	$22,441,141	43%
Performance Incentive	$4,079,107	$6,273,583	$10,352,689	19%
Home Audits and Test-In/Out	$1,748,188	$1,748,188	$3,496,376	7%
Home Mitigation/Home Remediation	$971,216	$971,216	$1,942,342	4%
WE&T Training	$194,243	$194,243	$388,486	1%
Inspections	$971,216	$971,216	$1,942,432	4%
Marketing and Outreach	$582,730	$582,730	$1,165,460	2%
EM&V Studies	$971,216	$971,216	$1,942,432	4%
General Administration	$1,942,432	$3,255,273	$5,197,591	10%
Total	$19,424,318	$32,552,726	$51,977,044	100%

For the Joint-Pilot Program metrics and program results reporting, the Joint-IOUs will follow generally accepted metrics and reporting requirements for the ESA Program.

TABLE 6. JOINT-PILOT PROGRAM MILESTONES (SUBJECT TO CHANGE)

Program Year	Project Milestones
2022	Pilot Program ramp-up
2023	Complete 700 homes
2024	Complete 700 homes
2025	Complete 800 homes
2026	Complete remaining homes and ramp-down

Based on the preliminary Joint-Pilot budget analysis, it is possible to serve approximately 2,200 homes in 2023, 2024, 2025. In 2026, the Joint-Pilot Program will complete the remaining projects and ramp down the program.

Summary Joint-Pilot Schedule and Milestones (Subject to Change)

Below is an initial milestone chart illustrating the progression of the Joint-Pilot.

FIGURE 2. MILESTONE CHART FOR JOINT-PILOT PROGRAM

	2021		2022				2023	2024	2025	2026
	Q3	Q4	Q1	Q2	Q3	Q4				
Joint-Pilot Implementation:										
Conduct Statewide Workshop										
Filing Joint Pilot Advice Letter										
Gain Joint Pilot Approval										
Prepare RFP documentation for implementer & QA/QC vendor selection										
Select & Award Joint Pilot program implementer										
Select & Award Joint Pilot program independent QA/QC vendor										
Initiate Joint Pilot program ramp-up										
Initiate Contractor onboarding and training										
Conduct Joint Pilot program kick-off										
Complete ~700 homes										
Complete ~700 homes										
Complete ~800 homes										
Complete remaining homes and initiate Joint Pilot program ramp-down										
Joint-Pilot EM&V:										
Prepare RFP documentation for EM&V vendor										
Select & Award Joint Pilot program EM&V vendor										
Joint Pilot Sampling Design										
Initiate Pre-installation and Post-installation customer survey design and implementation										
Initiate Joint Pilot program process evaluation										
Initiate Joint Pilot program 2023-2024 impact evaluation										
Initiate Joint Pilot program 2024-2025 impact evaluation										

The Joint-Pilot Description

Design Objectives, Strategies, and Goals

In this section, the Joint-IOUs will review the Joint-Pilot's Program objectives, strategies, and goals. The Joint-Pilot design is consistent with the CPUC Pilot guidance and requirements. As indicated earlier, SCE and SoCalGas decided to jointly implement this pilot in their shared service territory to provide customers with comprehensive electric and gas energy efficiency services.

Joint-Pilot Design Objectives

The Joint-Pilot Program's objectives are:

- **Objective 1: Achieve deeper energy savings**

  A traditional ESA Program can touch many households but provides smaller average energy savings per home treated. The overarching Joint-Pilot goal is to achieve deeper energy savings for all targeted and prioritized participants. Joint-Pilot targets high-usage, Low-Income customers with the most needs, then uses on-site audit, test-in, and energy software to model potential energy savings in order to guide the program path to either Joint Pilot-Plus or Pilot-Deep.

- **Objective 2: Support a robust list of services and measures**

  Using a “Whole House as a System” approach, qualified Joint-Pilot contractors will employ a complete list of services and measures to support direct install for targeted customers. In addition, Joint-Pilot will be able to help low-income customers take advantage of other clean-energy programs (i.e., Disadvantaged Communities-Single-family Solar Homes (DAC-SASH), Self-generation Incentive Program (SGIP) Dis-Advantaged Community (DAC) Rates, etc.).

  The support for fuel substitution is designed into the Joint-Pilot Program customer outreach process. All potential pilot participants will be asked if they are interested in electrification. If a customer is interested, they will be referred to SCE’s Building Electrification Single Family (BE SF) Retrofit Pilot Program, where they will receive marketing materials, electrification, and program participation information. In addition, SCE plans to offer some BE Pilot measures in its updated ESA Program at the Enhanced/Plus level.

- **Objective 3: Minimize customer interruptions**

  The delivery design will minimize interruptions, and the qualified Joint-Pilot contractor will support a direct-install model.

- **Objective 4: Joint-Pilot treatment actions are designed to ensure a safe working environment for participants and qualified contractors**

  The Joint-Pilot goal is to support home-mitigation efforts. These efforts will ensure a safe working environment for the qualified contractors and Joint-Pilot Program participants. These home-improvement actions may also improve homeowners’ concerns with Health, Comfort, and Safety (HCS).

- **Objective 5: Support contractor Workforce Education and Training (WE&T)**

  The Joint-Pilot is designed to support contractor training and QA/QC feedback. The goal of Joint-Pilot is to 1) educate all qualified contractors concerning energy modeling, deemed and calculated energy savings methods, and 2) to optimize dual-fuel measure mix to support deep energy savings. In addition, the Joint-Pilot QA/QC process will also generate a feedback loop for project installation improvements.

- **Objective 6: The Joint-Pilot must support evaluability**

  The Joint-Pilot will be designed to assess the savings impacts of both program interventions and the delivery process. Please refer to the EM&V section of the implementation plan for details.

Joint-Pilot Strategy and Goals

The Joint-Pilot program employs the following strategies:

- **Strategy A: To achieve deeper energy savings, start with a targeted high-energy-usage population, then use segmentation to prioritize and rank needs (responding to Joint-Pilot design objective 1)**

  Joint-Pilot participants are highly targeted (i.e., CARE and high-usage) and prioritized using population characteristics to flag customer and home needs.

  - The goal is to serve the targeted customers most in need in ranked order.

- **Strategy B: Use a "Whole House" approach to guide the appropriate program path based on energy savings potential (responding to Joint-Pilot design objectives 1 through 5)**

  To meet this goal, Joint-Pilot will leverage the "Whole House" program design approach by adopting a robust pre-installation and post-installation process, thereby ensuring deeper energy savings. All Joint-Pilot customers will have the same test-in at point-of-program-entry. Joint-Pilot will use pre-qualified contractors to perform direct installation services to minimize interruptions at the customer homes.

  - The goal is to achieve deeper energy savings by targeting and treating homes with high energy savings potential. The test-in and energy modeling software can realize this goal by establishing the proper program path.

- **Strategy C: Implement a robust QA/QC process to ensure quality installations (responding to Joint-Pilot design objectives 1 and 5)**

  As the Joint-IOUs have learned from their EUCA Program implementation, implementers must provide a robust QA/QC process to ensure quality installations and safety. The Joint-Pilot QA process is defined as a desktop review of project documentation and claimed energy savings. QC process is defined as an on-site audit, installation inspection, and a review of both test and modeling results of energy savings assumptions and calculations.

  - The Joint-Pilot goal is to ensure the quality of program savings and the quality of installation. This goal can be accomplished by implementing a robust QA/QC process. The independent QA/QC process is a part of the Joint RFP process.

- **Strategy D: Design a robust project tracking system (responding to Joint-Pilot design objectives 1 through 6)**

  The Joint-Pilot tracking system may be more nuanced than standard ESA Program tracking requirements, especially the test-in/out process. Joint-Pilot will document data-tracking needs before automating this process. The tracking system should be capable of identifying problems quickly enough to support timely resolutions.

  - The goal of the Joint-Pilot tracking system is to support a nuanced tracking process, including customer engagement, customer participation, contractor recruiting and qualification, a test-in/out process, and a QA/QC process to ensure

quality installations. Finally, the Joint-Pilot tracking system must support tracking project cycle-time and problem-resolution monitoring. The Joint-Pilot implementer will manage all required documentation using SCE's and SoCalGas' authorized system.

- **Strategy E: Solicit a Joint-Pilot implementer to manage qualified BPI-certified contractors (responding to Joint-Pilot design objectives 1 through 6)**

  Joint-IOUs will use an RFP process to solicit an appropriate Third Party (3P) implementer. The selected 3P implementer will manage and qualify BPI-qualified contractors to support all Pilot Program direct installations.

  - The goal is to recruit BPI-qualified contractors to perform direct installations while meeting program qualification and installation requirements. Therefore, the contractor management process will be a part of the Joint RFP solicitation requirement.

- **Strategy F: Support contractor workforce education and training (i.e., WE&T) by providing coaching, mentoring, and performance monitoring (responding to Joint-Pilot design objectives 1 through 6)**

  The required Joint-Pilot tracking and QA/QC inspection processes will support contractor training and professional growth.

  - Joint-Pilot aims to develop a contractor training process to support ongoing coaching, mentoring, and performance monitoring. The independent QA/QC process will also provide a data source for input. Contractor management is a part of the Joint RFP solicitation requirement.
  - The Joint-Pilot implementer will manage all required documentation using SCE's and SoCalGas' authorized system.

- **Strategy G: Support robust Joint EM&V efforts (responding to Joint-Pilot design objective 6)**

  Joint-Pilot is supported by a robust EM&V effort, including both process and impact evaluation activities.

  - A sound technical EM&V evaluation is required for this complex Joint-Pilot. The EM&V evaluation will assess outcomes and benefits of the Joint-Pilot using generally acceptable EM&V protocols. Refer to the Joint EM&V section for details.

- Please refer to **Appendix A** for Joint-Pilot Program Theory, Logic Model, and Delivery.
- Please refer to **Appendix I** for a list of questions and answers concerning the Joint-Pilot program design and implementation.

Geographic Restrictions and Implications (Subject to Change)

In this section, Joint-IOUs will describe the preliminary SCE and SoCalGas joint-account analyses for Los Angeles, Riverside, and San Bernardino counties as the Joint-Pilot geographic

locations. This geographic restriction aims to reduce the Joint-Pilot Program's implementation cost and to improve efficiency.

About Los Angeles, Riverside, and San Bernardino Counties[9]

Though the Joint Pilot has a limited budget, it intends to serve targeted customers effectively. Joint-IOUs will focus on the Los Angeles, San Bernardino, and Riverside counties due to the customers' high usage status, summer cooling and winter heating needs, and presence of older buildings (i.e., older homes). In the following paragraphs, Joint-IOUs provide a brief overview of these three counties:

Los Angeles County is the most populous county in the United States, with more than ten million inhabitants as of the 2020 census. It is also the most populous non–state-level government entity in the United States. Its population is greater than that of 41 individual U.S. states. Compared to other metropolitan areas, it has the 2nd largest economy globally, with a nominal GDP of more than $1.0 trillion. At 4,083 square miles and with 88 incorporated cities and many unincorporated areas, it is larger than the combined areas of Delaware and Rhode Island. The county is home to more than one-quarter of California residents and is one of the most ethnically diverse counties in the United States. Its county seat, Los Angeles, is also California's most populous city and the second-most populous city in the United States, with about four million residents.

Riverside County is located in the southern portion of California. As of the 2020 census, Riverside's population was 314,998. The roughly rectangular county covers 7,208 square miles (18,670 km^2) in Southern California, extending from the greater Los Angeles area to the Arizona border. The climate is mostly desert in the central and eastern portions but Mediterranean in the western part.

Between 2007 and 2011, many Los Angeles-area workers moved to Riverside for more affordable housing. Along with neighboring San Bernardino County, Riverside was one of the fastest-growing regions in the state before the recent changes in the regional economy. In addition, smaller but significant numbers of people have been moving into Southwest Riverside County from the San Diego metropolitan area.

San Bernardino County is located in the southern portion of California and is situated in the Inland Empire area. As of the 2020 U.S. Census, the population was 2,035,210, making it the fifth-most populous county in California and the county in the United States. With 20,105 square miles (52,070 km^2), San Bernardino County is the largest county in the United States. The county is close in size to the state of West Virginia.14th-most populous county in the United States. With 20,105 square miles (52,070 km^2), San Bernardino County is the largest county in the United States. The county is close in size to the state of West Virginia.

History of Temperature Extremes: Los Angeles, Riverside, and San Bernardino County

The Joint-IOUs studied five decades of monthly temperature ranges (i.e., monthly highs and lows) and the long-range temperature forecasts for selected California counties plus the state's desert region. This was done to provide background for anticipated demand.

[9] Los Angeles - Wikipedia, San Bernardino County, California - Wikipedia, and Riverside County, California - Wikipedia

The dramatic conclusion of this analysis is that climate change is impacting the state of California, though some regions are more severely affected than others.

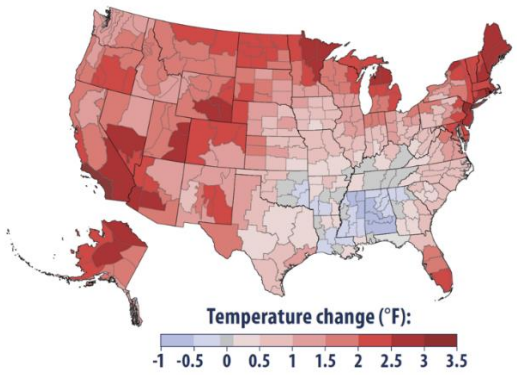
- Please refer to **Appendix D**: For Monthly Temperature Extremes by Decade, 1970-2019 (Degrees Fahrenheit for Orange, Riverside, San Bernardino Counties along with selected cities in Los Angeles County).

The Inland Desert Counties of Southern California Temperature Forecast

California's Inland Desert Region, which comprises large swaths of Riverside and San Bernardino Counties, is expected to become even hotter. Daily maximum temperatures are projected to increase by 5°-6° for 2006-2039, by 6°-10° for 2040-2069, and 8°-14° for 2070-2100 on average for the region, with ranges depending on future greenhouse gas emissions.[10] Twenty-first-century projections for low-temperature extremes are also expected to increase by 0°-1° for 2006-2039, 3°-4° for 2040-2069, and 4°-7° for 2070-2100.[11]

Warming extreme temperatures are consistent with EPA findings, as the map below[12] illustrates.

FIGURE 3. CLIMATE CHANGE INDICATORS IN THE UNITED STATES, SOURCE: EPA



Rising temperatures in the last century. Southern California has warmed more than the rest of the state. Source: EPA, Climate Change Indicators in the United States.

Customer Targeting and Account Matching Process (Subject to Change)

In this section, the Joint-IOUs will describe the multi-step customer targeting, account matching, and segmentation process. Furthermore, the Joint-IOUs may interchangeably refer to the CARE accounts as customers, accounts, households, and population.

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[10] Hopkins, Francesca. (University of California, Riverside). 2018. Inland Deserts Summary Report. California's Fourth Climate Change Assessment. Publication number: SUM-CCCA4-2018-008, p.14. Available at https://www.energy.ca.gov/sites/default/files/2019-11/Reg_Report-SUM-CCCA4-2018-008_InlandDeserts_ADA.pdf

[11] *Ibid*, p.15.

[12] United States Environmental Protection Agency, "What Climate Change Means for California", August, 2016, p.1. EPA 430-F-16-007. Available at https://www.epa.gov/sites/default/files/2016-09/documents/climate-change-ca.pdf.

The Joint-IOUs appreciate that 2020 CARE accounts files had 805,241 and 939,510 active accounts for SCE and SoCalGas, respectively. However, Athens Research identified about 1.3 million potentially eligible low-income households in the SCE and SoCalGas service area. Therefore, employing CARE and related databases identified only approximately 62% to 72% of qualified low-income accounts, respectively.

These CARE accounts can offer valuable usage and segmentation information for targeting and analyzing the accounts. Given the limited Joint-Pilot Program budget, Joint-IOUs will target the eligible sub-population having the most available data in the CARE database. Households targeted by the Joint-Pilot Program who do not qualify for participation (i.e., high-usage with low energy savings potential) will be referred to the ESA Programs for treatments and services.

Step-1: High-Usage Customer Targeting Analysis

As the IOUs have learned from prior program interventions, for customers to achieve a high level of energy savings, program intervention must start with customers using a lot of energy. Using this learned principle, SCE and SoCalGas separately conducted high-usage customer analyses, yielding the following results:

SCE Customer Targeting Based on CARE and High-Usage Status

SCE customer targeting used the 2020 CARE accounts to screen high-usage electric single family and mobile home customers reaching 300%+ baseline and higher. Within the SCE service territory, 133,110 or 16.5% of the SCE CARE accounts meet this 300%+ usage definition.

TABLE 7. SCE CUSTOMERS AT 300%+ BASELINE THREE TIMES OR MORE BY COUNTY[13]

SCE Usage as % of Baseline	Frequency	Los Angeles (N=341,147)	San Bernardino (N=171,228)	Riverside (N=101,052)	Central Valley (Kern, King's, Tulare) (N=73,124)	All Other Counties in Service Territory (N=118,690)	Total (N=805,241)
At Least 300% and Higher	Never	294,653	139,712	75,184	62,717	99,865	672,131
	Once (1X)	18,801	12,139	10,613	3,888	7,067	52,508
	Twice (2X)	9,419	6,389	5,653	2,280	3,711	27,452
	At Least Three Times (3X)	18,274	12,988	9,602	4,239	8,047	53,150
	Total @300%+	46,494	31,516	25,868	10,407	18,825	133,110
	As a %	13.6%	18.4%	25.6%	14.2%	15.8%	16.5%

[13] SCE: (1) Based on monthly bills for CY2020 single-family and mobile home customers on CARE or CARE-related service plans, active as of July 6, 2021. (2) There is no upper limit on usage as % of baseline in each usage threshold level. Customers crossing over 300% baselines are included in this analysis.

SoCalGas Customer Targeting Based on CARE and High-Usage Status

SoCalGas customer targeting used 2020 CARE accounts to screen high-usage single family and mobile-home gas customers reaching 200%+ baseline during winter-peak months (i.e., November through April). These winter peak months are critical since SoCalGas reaches its system peak in the service territory. Within the SoCalGas service territory, 46,634 or 5% of SoCalGas CARE accounts meet the 200%+ usage definition.

TABLE 8. SOCALGAS CUSTOMERS AT 200%+ BASELINE ONE TIMES OR MORE, BY COUNTY, 2020 WINTER MONTHS (I.E., NOV THROUGH APRIL)

SoCalGas Usage as % of Baseline	Frequency	Los Angeles (N=409,665)	San Bernardino (N=122,504)	Riverside (N=165,160)	Central Valley (Kern, King's, Tulare) (N=89,203)	All Other Counties in Service Territory (N=152,978)	Total (N=939,510)
At Least 200% and Higher	Never	386,754	115,703	157,599	84,826	147,994	892,876
	Once (1X)	11,285	3,582	4,603	1,908	2,554	23,932
	Twice (2X)	4,759	1,268	1,367	1,188	1,101	9,683
	At Least Three Times (3X)	6,867	1,951	1,591	1,281	1,329	13,019
	Total @200%+	22,911	6,801	7,561	4,377	4,984	46,634
	As a %	5.6%	5.6%	4.6%	4.9%	3.3%	5.0%

Again, the SoCalGas CARE accounts were screened as displaying "high usage" if they exhibited significantly increased usage during the winter season (November 1 to April 30). SoCalGas customers utilize gas more during the winter season primarily because of increased water and space heating costs due to colder weather.

Step-2: Overlay Pilot Geographic Locations to Improve Focus

In this step, SCE and SoCalGas overlaid geographic restrictions on Joint-Pilot locations to reduce implementation costs and boost efficiency. For the Joint-Pilot implementation, Joint-IOUs will focus on Los Angeles, San Bernardino, and Riverside counties.

- For SCE, the targeted Pilot Program population, meeting the high-usage definition of 300%+ usage definition, is approximately 12.9% of SCE CARE accounts.
- For SoCalGas, the targeted Pilot Program population, meeting the high-usage definition of 200%+ usage definition, is nearly 4% of total SoCalGas CARE accounts.

TABLE 9. CUSTOMER TARGETING DISPOSITION

(CARE Accounts)	Targeted Pilot Accounts: Los Angeles, San Bernardino, Riverside Counties (A)	Total Targeted Accounts in Service Territory (B)	Total Accounts in Service Territory (C)	Pilot Targeted Accounts as a Percent of Total Targets (A)/(B)	Targeted Pilot Accounts as a Percent of Total CARE Accounts (A)/(C)
SCE @ 300%+ Baseline	103,878	133,110	805,241	78.0%	12.9%
SoCalGas @ 200%+ Baseline	37,273	46,634	939,510	79.9%	4.0%

The following two figures display, for reference, SCE and SoCalGas service territories.

FIGURE 4. SCE TERRITORY

FIGURE 5. SOCALGAS TERRITORY

Step-3: SCE and SoCalGas Account Matching to Create Dual-Fuel Accounts

In this step, SCE and SoCalGas conducted a joint analysis to match the screen-in high-usage accounts within the Joint-Pilot Program region. This account-matching analysis yielded 5,504 dual-fuel high-usage accounts. These 5,504 accounts represent 5.3% and 14.8% of targeted Joint-Pilot accounts in the Joint-Pilot region for SCE and SoCalGas, respectively.

TABLE 10. DUAL-FUEL ACCOUNT MATCHING AND DISPOSITION

(2020 Accounts)	Targeted Pilot Accounts: Los Angeles, San Bernardino, Riverside Counties	Total Targeted Accounts in Service Territory (SCE@300%+, SoCalGas@200%+)	Total CARE Accounts in the Service Territory
SCE @ 300%+	103,878	133,110	805,241
SoCalGas @ 200%+	37,273	46,634	939,510
Matched Dual-Fuel Accounts	5,504[14]	5,504	5,504

[14] SoCalGas conducted the initial dual-fuel account matching analysis, yielded 5,505 accounts. Upon additional review, the Joint-IOUs noticed that SoCalGas included a group living facility with multiple gas meters and accounts (i.e., 2 high-usage accounts). During the customer segmentation and flag analysis,

As a percent of Total	SCE=5.3% SoCalGas=14.8%	SCE=4.1% SoCalGas=11.8%	SCE=0.7% SoCalGas=0.6%

Step-4: Use Customer Segmentation and Characterization to Set Outreach Priority

In this step, SCE and SoCalGas jointly scored and combined the matched dual-fuel accounts with the assigned weights and Segmentation Flags. Since CARE accounts and high-usage status are a part of the screened-in criteria, these two items are set aside for this scoring process. Four segmentation characteristics are assigned a weight of two, while the rest of the segmentation characteristics are assigned a weight of one. The segmentation characteristics with a weight of two are consistent with Joint-IOUs' program theory of making a difference for the program participants. The rest of the segmentation characteristics are reflective of the participants' needs and characteristics. A total combined score of thirteen is possible. The result of this scoring by account will be used to prioritize customer outreach. A customer with a higher segmentation (i.e., flag counts) score may receive earlier program contact and outreach.

By using this scoring method, the Joint-IOUs recognize the following points:

- The segmentation items under consideration are captured in the SCE and SoCalGas customer database. This data may not be perfect or complete, but they can serve as the best available proxies for this analysis. For example, some data (i.e., "Disabled") are collected from prior program interactions and self-reports, which may not be accurate or complete, but this is still the best available data.
- The segmentation items with a weight of two are customer characteristics for which program intervention can make a difference. For example, accounts classified as vintage homes (i.e., 30 years or older), extreme climate zones (i.e., extreme hot or extreme cold), medical baseline, and critical care can benefit from participating in the Joint-Pilot Program's offers.
- A total score of thirteen is possible. A ranked combined score can help the Joint-IOUs prioritize the sequence of customer outreach and engagement.
- Due to expected program drop-outs and service refusals, the Joint-Pilot Program would be expected to touch all 5,504 accounts before reaching its goals.

the Joint-IOUs made a decision to use matched addresses, resulting in 5,504 matched high-usage dual-fuel accounts.

TABLE 11. SCE AND SOCALGAS SEGMENTATION FLAGS TO PRIORITIZE THE TARGETED ACCOUNTS

By Financial:	SCE	SoCalGas	Dual-Fuel Joint Account Combined Flag Counts (Weight: 1 or 2 Flags)
CARE	X	X	Initial Screen-in Criteria, set aside for the segmentation flag analysis
High-Usage	X	X	Same as Above
Disconnected (3/1/2010 to 3/31/2020)	X	X	1
By Location:			
DAC Residence	X	X	1
Tribal	X	X	1
High Fire Risk Area Residence	X	N/A	1
Housing Vintage (30+ years)	X	X	2
Extreme Climate Zones (2, 3)	N/A	X	2
Extreme Climate Zones (13, 14, 15)	X	N/A	2
By Health Condition:			
Medical Baseline or Critical Care	X	X	2
Disabled	X	X	1
Total Possible Flag Count			**13**

Table 12 below summarizes the segmentation characterization using the flag-counting approach described above. For the fifty-eight accounts with zero flags, these accounts are screened in based on high-usage and CARE status only. The rest of these dual-fuel accounts have up to ten flags out of thirteen possible.

By looking deeper, the flag-count scores are primarily driven by housing vintage (i.e., 30 years or older) and extreme climate zones (i.e., extreme hot and cold). Although “High Fire Risk Area” has an assigned weight of one, nearly half or 47.8% of the screened-in SCE targets reside in this classification.

For the Joint-Pilot Program customer outreach and engagement, the initial focus must be on the highest flag counts (i.e., customers with the greatest needs). As the tables below illustrate, approximately a quarter of the 5,504 accounts score six flags and more. Nearly 53% of the 5,504 accounts scored three to five flags. The rest of the screened in dual-fuel accounts scored two or fewer flags (i.e., 22.5% of 5,504 accounts).

It is important to remember that the combined Joint-IOUs' Pilot Program budget can serve approximately 2,200 homes. So, to complete 2,200 homes, the Joint-Pilot implementer must start with a targeted list of about 5,000+ accounts, assuming a combination of willingness to participate (i.e., service refusal) and project drop-out rate of 50%. It is also important to stress the importance of random-sample design, given the diverse usage profile of these targeted Joint-Pilot customers, needed to support later impact evaluation assessment.

TABLE 12. COMBINED SCORE FOR MATCHED DUAL-FUEL ACCOUNTS

COMBINED SCORE (By Flag-Count)	# Of Accounts	% Of Accounts	Cluster
0	58	1.1%	22.5%
1	534	9.7%	
2	646	11.7%	
3	1,470	26.7%	52.9%
4	898	16.3%	
5	548	9.9%	
6	692	12.6%	24.6%
7	447	8.1%	
8	154	2.8%	
9	48	0.9%	
10	9	0.2%	
Total	5,504	100.0	100%

TABLE 13. SUMMARY OF CUSTOMER TARGETING AND DISPOSITION

	SCE	SoCalGas
2020 Joint-IOUs CARE Accounts	805,241	939,510
Screened in High-Usage CARE Accounts in the service territory: (SCE: 300%+ baseline, SoCalGas: 200%+ baseline)	133,110	46,634
Screened in High-Usage (CARE Accounts in Los Angeles, San Bernardino, and Riverside	103,878	37,273
Matched Dual-Fuel Joint Accounts	5,504	
High-priority with 6 or more flags	1,350 (24.6%)	
Medium-priority with 3-5 flags	2,916 (52.9%	
Low-priority with less than 3 flags	1,238 (22.5%)	
Total: Screened in Targeted Accounts in the Pilot Region	5,504 (100%)	

As indicated earlier, flag scores do not screen-in or screen-out targeted customers. Instead, a flag score reflects a combination of customer needs and what the utility might influence through program intervention. Given the limited program resources, the Joint-Pilot Program will provide urgent customer outreach and engagement for accounts with higher flag scores.

- For the SCE and SoCalGas operational definition of the segmentation and flags, please refer to **Appendix F**.

Joint-Pilot Customer Targeting and Other Ramifications

The above target customer analysis is based on the Joint-IOUs' 2020 CARE account records. Before the program implementation, the Joint-IOUs will update the existing customer targeting analysis using 2021 customer data. In addition, the following items must be considered:

- **Senate Bill (SB) 756:** This approved legislation will redefine "low-income customers" as persons and families whose household income is at or below 250% of the federal poverty level, effective July 1, 2022. This means that the Joint-IOUs will include the 2021 FERA (Family Electric Rate Assistance) Program accounts to the 2021 CARE Program accounts to support the Joint-Pilot Program customer analyses update.

- **Update Customer Targeting Analyses Before Implementation:** The above customer targeting analyses are for illustration only. The Joint-Pilot Program will need to update these analyses using customer account data from 2021.

- **Randomized Sampling Design:** Before implementation and sampling design considerations, Joint-IOUs will randomly assign all screened-in eligible and prioritized customers into three implementation lists for 2023, 2024, and 2025. Details on sampling design, stratification, and randomization will be resolved before Pilot Program customer outreach and recruiting. This sampling design step will help balance the possible quasi-experimental comparison groups supporting subsequent impact evaluation.

Joint-Pilot Matched Account Characterization (Subject to Change)

Matched Dual-Fuel Accounts: Electric Account Characterization

As indicated earlier, customers with the most flags will have higher priority for Pilot Program outreach. These segmentation flags do not screen-in or screen-out targeted customers. Instead, these flags establish priority for outreach.

TABLE 14. ELECTRIC ACCOUNT CHARACTERIZATION (MATCHED DUAL-FUEL ACCOUNTS) BY COUNTY

CHARACTERISTIC	CATEGORIES	COUNTY							
		LOS ANGELES		SAN BERNARDINO		RIVERSIDE		TOTAL	
		#	%	#	%	#	%	#	%
USAGE OF AT LEAST 300% OF BASELINE IN CY2020	*1x*	969	29.8%	247	28.7%	335	24.1%	1,551	28.2%
	2x	581	17.9%	130	15.1%	255	18.3%	966	17.6%
	AT LEAST 3x	1,704	52.4%	483	56.2%	800	57.6%	2,987	54.3%
HOT CLIMATE ZONE	*NO*	1,522	46.8%	792	92.1%	1,221	87.8%	3,535	64.2%
	YES (CZ 13, 14, & 15)	1,732	53.2%	68	7.9%	169	12.2%	1,969	35.8%
DISADVANTAGED COMMUNITY	*NO*	2,744	84.3%	603	70.1%	1,207	86.8%	4,554	82.7%
	DISADVANTAGED COMMUNITY	510	15.7%	257	29.9%	183	13.2%	950	17.3%
MEDICAL BASELINE or CRITICAL CARE	*NO*	3,187	97.9%	842	97.9%	1,349	97.1%	5,378	97.7%
	MEDICAL BASELINE or CRITICAL CARE	67	2.1%	18	2.1%	41	2.9%	126	2.3%
DISABLED	*NO*	2,945	90.5%	792	92.1%	1,264	90.9%	5,001	90.9%
	YES	309	9.5%	68	7.9%	126	9.1%	503	9.1%
TRIBAL or INDIAN	*NO*	3,058	94.0%	831	96.6%	1,342	96.5%	5,231	95.0%
	RECEIVED TRIBAL/TANF and/or BUREAU INDIAN AFFAIRS INCOME	196	6.0%	29	3.4%	48	3.5%	273	5.0%
HIGH FIRE RISK AREA	*NO*	2,200	67.6%	296	34.4%	377	27.1%	2,873	52.2%
	YES	1,054	32.4%	564	65.6%	1,013	72.9%	2,631	47.8%
INSTALLATION OF AT LEAST 30 YEARS	*NO*	792	24.3%	234	27.2%	733	52.7%	1,759	32.0%
	AT LEAST 30 YEARS	2,462	75.7%	626	72.8%	657	47.3%	3,745	68.0%
AT LEAST ONE DISCONNECTION 1MAR2020 to 31MAR2021	*NO*	2,868	88.1%	768	89.3%	1,213	87.3%	4,849	88.1%
	AT LEAST ONE DISCONNECTION	386	11.9%	92	10.7%	177	12.7%	655	11.9%
TOTAL		3,254	100.0%	860	100.0%	1,390	100.0%	5,504	100.0%

From the electrical account perspective, the screen-in dual-fuel Joint-Pilot Program target customers have the following characteristics:

- More than half (54.3%) of the accounts reached usage of at least 300% of baseline at least three times in CY 2020.
- A majority (68.0%) of these accounts reside in homes of at least 30 years old.
- These accounts typically **have not**—
    - Lived-in hot climate zones (CZ 13, 14, 15),
    - Resided in Disadvantaged Communities,
    - Enrolled in medical baseline or critical care rates,
    - Been classified as disabled,
    - Received assistance from some tribal public fund or the Bureau of Indian Affairs,
    - Experienced service disconnection from 3/1/2020 to 3/31/2021.

    By reviewing the data summarized in Table 15 below, we can see a big difference in electric mean usage for accounts reaching 300% baseline once (1X@300%), compared to those reaching twice (2X@300%), or three or more times (3X@300%+) in 2020. The 3X@300%+ electric mean usage is about twice the mean usage for 1X@300% accounts. This information will be important when considering the random-sample design to support implementation.

    In addition, higher mean annual usage (kWh) is observed among:

    - Customers with either medical baseline or critical care status,
    - Customers classified as disabled,
    - Customers who live outside of Disadvantaged Communities,
    - Customers who do not receive assistance from some public tribal fund or the Bureau of Indian Affairs, except for Los Angeles County,
    - Customers who live in homes less than 30 years old but use more electricity.

TABLE 15. ELECTRIC MEAN USAGE (DUAL-FUEL MATCHED ACCOUNTS) BY COUNTY

CHARACTERISTIC	CATEGORIES	COUNTY							
		LOS ANGELES		SAN BERNARDINO		RIVERSIDE		TOTAL	
		Mean (kWh)	Count	Mean (kWh)	Count	Mean (kWh)	Count	Mean (kWh)	Count
USAGE OF AT LEAST 300% OF BASELINE IN CY2020	*1x*	952.30	969	1,004.73	247	1,108.39	335	994.36	1,551
	2x	1,081.58	581	1,177.50	130	1,311.56	255	1,155.20	966
	AT LEAST 3x	1,466.37	1,704	1,538.92	483	1,685.94	800	1,536.90	2,987
HOT CLIMATE ZONE	*NO*	1,272.87	1,522	1,343.25	792	1,424.33	1,221	1,340.95	3,535
	YES (CZ 13, 14, & 15)	1,219.72	1,732	1,186.54	68	1,866.28	169	1,274.07	1,969
DISADVANTAGED COMMUNITY	*NO*	1,265.24	2,744	1,357.93	603	1,487.66	1,207	1,336.46	4,554
	DISADVANTAGED COMMUNITY	1,133.41	510	1,267.36	257	1,414.80	183	1,223.85	950
MEDICAL BASELINE or CRITICAL CARE	*NO*	1,237.77	3,187	1,322.07	842	1,458.62	1,349	1,306.36	5,378
	MEDICAL BASELINE or CRITICAL	1,568.47	67	1,742.26	18	2,117.79	41	1,772.04	126
DISABLED	*NO*	1,233.60	2,945	1,328.75	792	1,471.70	1,264	1,308.85	5,001
	YES	1,349.23	309	1,355.49	68	1,541.93	126	1,398.34	503
TRIBAL or INDIAN	*NO*	1,243.96	3,058	1,332.21	831	1,477.51	1,342	1,317.90	5,231
	RECEIVED TRIBAL/TANF and/or BUREAU INDIAN AFFAIRS INCOME	1,254.21	196	1,292.35	29	1,493.65	48	1,300.36	273
HIGH FIRE RISK AREA	*NO*	1,209.04	2,200	1,371.04	296	1,552.02	377	1,270.73	2,873
	YES	1,318.76	1,054	1,309.78	564	1,450.54	1,013	1,367.57	2,631
INSTALLATION OF AT LEAST 30 YEARS	*NO*	1,316.56	792	1,450.02	234	1,522.73	733	1,420.23	1,759
	AT LEAST 30 YEARS	1,221.42	2,462	1,286.32	626	1,428.23	657	1,268.55	3,745
AT LEAST ONE DISCONNECTION 1MAR2020 to 31MAR2021	*NO*	1,242.99	2,868	1,315.03	768	1,478.10	1,213	1,313.21	4,849
	AT LEAST ONE DISCONNECTION	1,256.40	386	1,463.01	92	1,477.83	177	1,345.26	655
TOTAL		1,244.58	3,254	1,330.86	860	1,478.06	1,390	1,317.03	5,504

Matched Dual-Fuel Accounts: Gas Account Characterization

As indicated by Table 16 below, the mean usage of targeted SoCalGas Pilot Program customers does not seem to be much higher than for ESA Program targeted customers.

Table 16 uses 2020 CARE data to compare usage profiles of Pilot targets and other ESA Program target customers. Some of these accounts have twelve billing records, while others do not. For SoCalGas, high flag-count customers do not use more gas than lower flag-count customers for Pilot-Program targets. For ESA Program targets (outside of the Los Angeles, San Bernardino and Riverside Counties), customers with 2-flag and 7-flag counts shared a similar mean usage profile. The rest of these accounts (i.e., 3-6 flag counts) have slightly lower mean usage.

TABLE 16. GAS ACCOUNT CHARACTERIZATION (MATCHED DUAL-FUEL ACCOUNTS) BY COUNTY

CHARACTERISTIC	CATEGORIES	COUNTY							
		LOS ANGELES		SAN BERNARDINO		RIVERSIDE		TOTAL	
		#	%	#	%	#	%	#	%
USAGE OF AT LEAST 200% OF BASELINE IN WINTER MONTHS 2020	1x	1417	43.5%	489	56.9%	804	57.8%	2,710	49.2%
	2x	747	22.9%	149	17.3%	267	19.2%	1,163	21.1%
	AT LEAST 3x	1,092	33.5%	221	25.7%	319	22.9%	1,632	29.6%
COLD CLIMATE ZONE	NO	1,519	46.7%	768	89.4%	1,280	92.1%	3,567	64.8%
	YES	1,737	53.3%	91	10.6%	110	7.9%	1,938	35.2%
DISADVANTAGED COMMUNITY	NO	2,681	82.3%	634	73.8%	1,162	83.6%	4,477	81.3%
	YES	575	17.7%	225	26.2%	228	16.4%	1,028	18.7%
MEDICAL BASELINE	NO	3,207	98.5%	853	99.3%	1,372	98.7%	5,432	98.7%
	YES	49	1.5%	6	0.7%	18	1.3%	73	1.3%
DISABLED	NO	3,048	93.6%	814	94.8%	1,321	95.0%	5,183	94.2%
	YES	208	6.4%	45	5.2%	69	5.0%	322	5.8%
TRIBAL	NO	3,256	100.0%	859	100.0%	1,367	98.3%	5,482	99.6%
	YES	0	0.0%	0	0.0%	23	1.7%	23	0.4%
INSTALLATION OF AT LEAST 30 YEARS	NO	742	22.8%	227	26.4%	726	52.2%	1,695	30.8%
	YES	2,514	77.2%	632	73.6%	664	47.8%	3,810	69.2%
AT LEAST ONE DISCONNECTION 1MAR2020 to 31MAR2021	NO	3,159	97.0%	829	96.5%	838	60.3%	4,826	87.7%
	YES	97	3.0%	30	3.5%	21	1.5%	148	2.7%
TOTAL		3,256	100.0%	859	100.0%	1,390	100.0%	5,505	100.0%

- More than a quarter (29.6%) of the accounts reached usage of at least 200% of baseline at least three times in CY 2020.
- A majority (69.2%) of these accounts reside in homes of at least 30 years old.
- These accounts typically **have not**—
    - Lived in cold climate zones (CZ 2, 3),
    - Resided in the Disadvantaged Communities,
    - Enrolled in medical baseline or critical care rates,
    - Been classified as disabled,
    - Received assistance from some tribal public fund or the Bureau of Indian Affairs,
    - Experienced at least one disconnection from 3/1/2020 to 3/31/2021.

    By reviewing the data summarized in Table 17, the Joint-IOUs can observe significant differences in 2020 gas mean usage for accounts reaching 200% baseline once (1X@200%), twice (2X@200%), or three or more times (3X@200%+). For example, 3X@200%+ gas mean usage is 37% higher than the mean usage for the 1X@200% accounts. Thus, for the 23 accounts in Riverside classified as Tribal communities, mean usage is nearly twice as high as others. This is essential information for downstream sampling design.

    In addition, slightly higher mean annual usage (CCF) is observed among:

    - Customers with either medical baseline or critical care status, and
    - Customers living outside of Disadvantaged Communities.

TABLE 17. GAS MEAN USAGE (DUAL-FUEL MATCHED ACCOUNTS) BY COUNTY

CHARACTERISTIC	CATEGORIES	COUNTY							
		LOS ANGELES		SAN BERNARDINO		RIVERSIDE		TOTAL	
		Mean (CCF)	Count	Mean (CCF)	Count	Mean (CCF)	Count	Mean (CCF)	Count
USAGE OF AT LEAST 200% OF BASELINE IN WINTER MONTHS 2020 (Nov thru April)	1x	4.26	1417	4.15	489	4.39	804	4.27	2,710
	2x	4.80	747	4.80	149	5.34	267	4.92	1,163
	AT LEAST 3x	5.69	1,092	5.71	221	6.63	319	5.87	1,632
COLD CLIMATE ZONE	NO	4.92	1,519	4.61	768	5.15	1,280	4.93	3,567
	YES	4.81	1,737	5.14	91	4.30	110	4.80	1,938
DISADVANTAGED COMMUNITY	NO	4.93	2,681	4.68	634	5.21	1,162	4.97	4,477
	YES	4.54	575	4.62	225	4.43	228	4.53	1,028
MEDICAL BASELINE	NO	4.86	3,207	4.65	853	5.08	1,372	4.88	5,432
	YES	4.86	49	6.24	6	5.04	18	5.02	73
DISABLED	NO	4.87	3,048	4.67	814	5.10	1,321	4.90	5,183
	YES	4.68	208	4.58	45	4.75	69	4.68	322
TRIBAL	NO	4.86	3,256	4.66	859	5.03	1,367	4.87	5,482
	YES	N/A	0	N/A	0	8.30	23	8.30	23
INSTALLATION OF AT LEAST 30 YEARS	NO	4.84	742	4.72	227	4.97	726	4.88	1,695
	YES	4.87	2,514	4.64	632	5.21	664	4.89	3,810
AT LEAST ONE DISCONNECTION 1MAR2020 to 31MAR2021	NO	4.86	3,159	4.66	1360	5.09	838	4.89	5,357
	YES	4.91	97	4.72	30	4.89	21	4.88	148
TOTAL		4.85	3,256	4.83	859	5.23	1,390	4.97	5,505

Program Participation Criteria

Joint-Pilot Program participants are selected by customer segmentation, prioritization, and accounting matching process. As described earlier, Joint-IOUs plan to limit the Pilot implementation to Los Angeles, San Bernardino, and Riverside counties to ensure greater cost-effectiveness.

Participants in the Joint-Pilot Program must meet the following criteria:

1. Joint-Pilot dual-fuel participants must meet pre-established customer targeting criteria. The Joint-Pilot Program implementer will be given a list of randomly assigned targeted customers to initiate outreach activities for 2023, 2024, and 2025.

2. Joint-Pilot participants must be willing to sign participation agreements allowing the Pilot implementer to perform necessary test-in/out and energy modeling for selecting the program participation path:
    - All Joint-Pilot Program participants must:
        - support income qualification verification, consistent with the ESA Program process and procedure.
        - support pre-installation test-in and energy-software modeling,
        - endorse the program-path guidance from the qualified contractors, and
        - support the required QA/QC process.
    - Pilot-Deep participants only must:
        - support post-installation test-out and energy-software modeling updates.

3. Joint-Pilot Program participants must allow the Joint-Pilot implementer to perform home mitigation, appliance installation, and replacement as specified by the program.

4. All homes participating in the Joint-Pilot cannot exceed the per-home treatment caps outlined below:

TABLE 18. HOME MITIGATION AND INVESTMENT CAP PER PROJECT

Investment Cap	Joint-Pilot-Plus	Joint-Pilot-Deep
Home Mitigation (Maximum per Home)	$3,000	$5,000
Total Home Investment (Maximum per Home)	$15,000	$25,000

5. Every Joint-Pilot Program participant must support all customer surveys and evaluation activities.

Measure List and Home Mitigation Schedule (Subject to Change)

In this section, the Joint-IOUs present the proposed Joint-Pilot electric and gas Measure List and Home Mitigation Schedules.

TABLE 19. JOINT-PILOT ELECTRIC MEASURE LIST AND HOME MITIGATION SCHEDULE

Electric (SCE)		ESA Program		Joint-Pilot Program	
Measure Category	**Measures**	**Basic (T-1)**	**Enhanced (T-2)**	**Plus**	**Deep**
Energy Education	Energy education	X	X	X	X
Lighting	LED Lamps	X	X	X	X
Control	Tier 2 Smart Power Strips	X	X	X	X
Control	Smart thermostats	X	X	X	X
Appliance	Refrigerators	X	X	X	X
Appliance	Dishwashers		X	X	X
HVAC	HVAC System Replacement (Heat Pump, AC; E2E)		X	X	X
HVAC	Room AC Replacement		X	X	X
HVAC	Evaporative cooler installation		X	X	X
HVAC	Portable AC		X	X	X
HVAC	HVAC Tune-Up/Maintenance (4 kinds)		X	X	X
Lighting	LED Fixtures		X	X	X
Appliance	Clothes Washer		X	X	X
Appliance	Freezers		X	X	X
Hot Water Conservation	Tank and Pipe Insulation		X	X	X
HVAC	Efficient fan controllers		X	X	X
Appliance	Pool pumps		X	X	X
Building Envelope	Basic Weatherization (weatherstripping, caulking)		X	X	X
Building Envelope	Attic insulation (two kinds)		X	X	X
Hot Water Conservation	Thermostatic shower valves		X	X	X
Control	Home Energy Monitor and Other controls			X	X

Building Envelope	Air Sealing, Duct Sealing			X	X
Building Envelope	Repair/Replace duct work				X
Building Envelope	High-Performance Cool Roofs or Cool Surfaces				X
Building Envelope	Advanced Insulation, including Walls, Floor/Slab, Roof, Attic				X
Building Envelope	Efficient Windows and Insulated Doors				X
Building Envelope	Additional Building Shell Upgrades				X
Home Mitigation	Prescriptive Duct Sealing				X
Home Mitigation	Packaged Terminal A/C				X
Home Mitigation	Whole House Fan				X

List of measure may not be exhausted due to regulatory process.

Electric Home Mitigation Schedule (SCE)			
Red = New measures proposed in Low-Income Applications			
Green = New measures not proposed in Low-Income Applications			
Heating, Ventilation & Air Conditioning (HVAC)	**Barrier**	**Mitigation**	**Mitigation Cost (Subject to change without notice)**
Central AC Replacement	Duct system is in disrepair	Repair Ducts	$1,000 - $2,000
Duct Test and Seal	N/A	N/A	N/A
Prescriptive Duct Sealing	If duct is in disrepair	Repair/replace duct system	$1,000 - $2,000
Smart Connected Thermostat	Customer doesn't understand how to use it	Enhanced education, custom leave-behind	$0
Room AC Replacement	Window frame too weak/unsafe to mount new RAC	Repair/replace window frame	$200 - $400
Packaged Terminal AC	Unsound wall mounting area	Repair mounting wall frame	$200 - $400
Ductless Minisplit AC	N/A	N/A	N/A
Whole House Fan	Insufficient attic ventilation	Install additional attic vents	$300 - $1,200
Efficient Fan Controller	System incompatible or redundant function implemented with SCT	N/A (Do not install)	N/A

Maintenance			
HVAC Maintenance	System in major disrepair	N/A (Do not replace; Load building)	N/A
Evaporative cooler maintenance	Cooler pan/chassis rusted beyond repair	Replace cooler	$1,200 - $1,500
Enclosure			
Envelope/Air Sealing Measures (if AC)	Inadequate CVA (Gas issue)	Correct CVA-Not typically correctable	N/A
Attic Insulation (if AC)	Knob & tube wiring in the attic	Replace wiring	Can rewire only the attic/ not recommended
Domestic Hot Water			
Faucet Aerators	Faucet leaking	Repair/replace faucet.	$5 - $100
Low-Flow Showerhead	Shower leaking	Repair/replace shower fixtures.	$5 - $300
Water Heater Repair/Replacement	Inadequate CVA/high water pressure/in MH WH on a wooden platform	CVA: not usually correctable/water pressure - install pressure regulator/build new wooden platform	CVA: N/A Water pressure: install pressure regulator $300; Wooden platform $200 - $300
Heat Pump Water Heater	Inadequate electric panel or wiring.	Upgrade the panel or wiring.	$3,000 for Plus $5,000 for Deep
Water Heater Blanket	Water heater leak/No T/P valve on water heater.	Repair leak/Install TP valve.	$100 - $3,000
Water Heater Pipe Insulation	Water heater leak	Repair leak	$100 - $3,000
Thermostatic Shower Valve	High water pressure	Install pressure regulator	Regulator $200 - $300
Appliances			
Refrigerator replacement	Outlet not grounded	Licensed electrician grounds outlet	$110
Freezer replacement	Outlet not grounded	Licensed electrician grounds outlet	$110
High-Efficiency Clothes Washer	High water pressure	Install pressure regulator	$100
Lighting			
Exterior Hard wired LED fixture	N/A	N/A	N/A
LED A-Lamps	N/A	N/A	N/A
LED Reflector Bulbs	N/A	N/A	N/A

Miscellaneous			
Pool Pump Replacement	Existing pipes too small	None. Generally, requires excavation. Do not replace.	N/A
Tier 2 Advanced Power Strip	Outlet not grounded	Licensed electrician grounds outlet	$100

List of measure may not be exhausted due to regulatory process.

TABLE 20. JOINT-PILOT GAS MEASURE LIST AND HOME MITIGATION SCHEDULE

Gas (SoCalGas)		**ESA Program**		**Joint-Pilot Program**	
Measure Category	**Measures**	**Basic**	**Plus**	**Plus**	**Deep**
Domestic Hot Water	Faucet Aerators	X	X	X	X
Domestic Hot Water	Low-Flow Showerhead	X	X	X	X
Domestic Hot Water	Thermostatic Shower Valve	X	X	X	X
Domestic Hot Water	Thermostatic Tub Spout/Diverter	X	X	X	X
Enclosure	Minor Home Repairs	X	X	X	X
Domestic Hot Water	Water Heater Blanket		X	X	X
Domestic Hot Water	Water Heater Pipe Insulation		X	X	X
Appliance	High Efficiency Clothes Washer		X	X	X
Maintenance	Furnace Clean and Tune		X	X	X
Maintenance	CO & Smoke Alarms		X	X	X
Maintenance	Range Hood		X	X	X
Maintenance	Comprehensive Home Health and Safety Check-up		X	X	X
Enclosure	Envelop/Air Sealing Measures		X	X	X
HVAC	Gas Furnace Repair/Replace		X	X	X
HVAC	Smart Thermostat		X	X	X
HVAC	Prescriptive Duct Sealing		X	X	X

HVAC	HEFAU Early Replacement		X	X	X
HVAC	HEFAU On Burnout		X	X	X
Enclosure	Attic Insulation		X	X	X
Domestic Hot Water	Water Heater Repair/Replacement		X	X	X
Domestic Hot Water	Solar Water Heating		X		X
HVAC	HE Wall Furnace Early Replace		X		X
HVAC	HE Wall Furnace on Burnout		X		X
Home Mitigation, Domestic Hot Water	Water Heater Repair/Replace w/ Tankless WH				X
Home Mitigation, Domestic Hot Water	Water Heater Repair/Replace w/ Solar Water Heating with Storage Backup				X
Home Mitigation, Domestic Hot Water	Water Heater Repair/Replace w/ Solar Water Heating with Tankless Backup				X

List of measure may not be exhausted due to regulatory process.

Gas Home Mitigation Schedule (SoCalGas)			
Red = New measures proposed in Low-Income Applications			
Green = New measures not proposed in Low-Income Applications			
Heating, Ventilation & Air Conditioning (HVAC)	**Barrier**	**Mitigation**	**Mitigation Cost (subject to change without notice)**
Gas Furnace Repair/Replace	Inadequate CVA	No mitigation	N/A
HE-FAU Repair/Replace	Inadequate CVA or duct system is in disrepair	Repair ducts	$1,000 - $2,000
HE-FAU Early Replacement	Inadequate CVA or duct system is in disrepair	Repair ducts	$1,000 - $2000
HE-FAU On Burnout	Inadequate CVA or duct system is in disrepair	Repair ducts	$1000 - $2,000
HE Wall Furnace Early Replace	Inadequate CVA	No mitigation	N/A

HE Wall Furnace on Burnout	Inadequate CVA	No mitigation	N/A
Forced Air Unit Standing Pilot Light Conversion	N/A	N/A	N/A
Duct Sealing	N/A	N/A	N/A
Prescriptive Duct Sealing	If duct is in disrepair	Repair or replace duct system	$1,000 - $2,000
Smart Thermostat	Customer doesn't understand how to use it	Additional education, simply Smart Tstat product EcoBee	EcoBee same or less expensive
Maintenance			
Furnace Clean & Tune	Renter: Not qualified if the furnace is in-operable (i.e., don't offer furnace repair to the renter)	Offer furnace repair to renters	No additional costs
CO & Smoke Alarms	N/A	N/A	N/A
Comprehensive Home Health and Safety Checkup	N/A	N/A	N/A
Range Hood	N/A	N/A	N/A
Enclosure			
Envelop/Air Sealing Measures	Inadequate CVA	Correct CVA-Not typically correctable	N/A
Attic Insulation	Knob and tube wiring in the attic	Replace wiring in the attic	Can rewire only the attic, not recommended
Domestic Hot Water			
Faucet Aerators	Faucet leaking	Repair/replace faucet.	$5 - $100
Low-Flow Showerhead	Shower leaking	Repair/replace shower fixtures.	$5 - $300
Water Heater Repair/Replacement	inadequate CVA/high water pressure/in MH WH on a wooden platform	CVA: Not usually correctable/water pressure - install pressure regulator/build new wooden platform	CVA: N/A Water pressure: install pressure regulator $300; Wooden platform $200-$300
Water Heater Blanket	Water heater leak, No T/P valve on water heater.	Repair leak/Install TP valve.	$100 - $3,000
Water Heater Pipe Insulation –	Water heater leak	Repair leak.	$100 - $3,000
Thermostatic Shower Valve	High water pressure	Install pressure regulator	$200 - $300
Thermostatic Tub Spout/Diverter	High water pressure	Install pressure regulator	$200 - $300

Solar Water Heating	Roof issues	Roof repair	$500 - $5,000
Water Heater Repair/Replace w/ Tankless WH	Water pressure - solve with pressure regulator $300	Regulator	$200 - $5,000
Water Heater Repair/Replace w/ Solar Water Heating with Storage Backup	Water pressure: solve with pressure regulator $300; If the roof needs amending up to $10000	Regulator: $200 to $300: if the roof needs repairing up to $5,000	$200 - $5,000
Water Heater Repair/Replace w/ Solar Water Heating with Tankless Backup	Water pressure - solve with pressure regulator $300; If the roof needs amending up to $10000	Regulator-$200 to $300: if the roof needs repairing up to $5,000	$200 - $5,000
Appliances			
High-Efficiency Clothes Washer	High water pressure/Ungrounded outlet	Install pressure regulator/Ground outlet	Regulator-$200 to $300, Ground outlet-$200 to $400

List of measure may not be exhausted due to regulatory process.

Joint-Pilot Administration

In the following section, Joint-IOUs describe the required Joint-Pilot Program administration, remediation for sub-standard homes, project resource prioritization, program tracking, and reporting. These elements will be incorporated into the upcoming RFP process once the CPUC approves the proposed Joint-Pilot Program.

Below is a role description of the Joint-Pilot team. This team will have access to other cross-functional team members as required.

TABLE 21. JOINT-PILOT PROGRAM ROLES AND ACTIVITIES

Role	Activities
Joint Program Management Team (i.e., SCE and SoCalGas Program Managers), and Other cross-functional team members (i.e., marketing, outreach, regulatory, engineering, etc.)	Responsible for the overall project management, budget, schedule, and reporting. The Joint Program team will work closely with Joint-Pilot implementers and the QA/QC vendor. The Joint Program Oversight team will work with the SCE and SoCalGas marketing communication and other analytical teams to develop outreach, customer contact material, and high-usage alert communications This team will have access to other cross-functional team members such as marketing, outreach, regulatory, reporting, engineering, etc.
Joint-Pilot Implementer	The role of the Joint-Pilot implementer is described below in detail.
Qualified BPI Contractor/s	The Joint-Pilot implementer can perform the installation work or outsource it to qualified contractors.
Independent QA/QC Vendor	The QA/QC vendor will report to the Joint Program Management Team and work closely with the Joint-Pilot implementer.
Independent EM&V Evaluator	Refer to the EM&V section of the Joint-Pilot PIP.

Joint-Pilot Implementer and Qualified Contractors

D.21-06-015 allows IOUs to manage Pilot Programs in collaboration with statewide IOUs. For Joint-Pilot Program implementation, Joint-IOUs will solicit and establish contractual agreements for the following functions:

(1) Conduct RFPs to select: (a) Joint-Pilot implementer, (b) independent QA/QC vendor, and (c) EM&V vendor:

a. Joint-Pilot Program implementers will perform the following tasks:
   - Develop Joint-Pilot processes and procedures, including:
     - Monitoring contractors to perform customer verification, on-site audit, test-in/out, and use of energy-modeling software as required to establish the program path,
     - Managing high-quality installations and project completions, and
     - Interfacing with the QA/QC vendor to support verification and inspections.

- Update project documentation to support a project tracking system and online project folders, including:
    - Performing Joint-Pilot customer engagement and project tracking,
    - Project problem alerting and resolution, including project cycle-time reporting,
    - Generating different reports to meet project milestones: (per home basis)
        - Pre-onsite assessment report,
        - Post-onsite audit, test-in, energy modeling results,
        - Recommend program path for participating homes,
        - Pre-installation readiness assessment,
        - Installation progress report,
        - Post-installation, project wrap-up (i.e., Pilot-plus), and test-out with energy modeling update (i.e., Pilot-deep),
        - Post-installation care,
    - Reported energy savings (deemed and calculated),
    - The Joint-Pilot implementer will manage all required documentation using SCE and SoCalGas' authorized system.

- Manage contractor recruiting, qualification, coaching, training, and mentoring:
    - The Joint-Pilot will support BPI-certified contractors who will:
        - Conduct detailed whole-home energy audits, test-in, and energy modeling to estimate energy savings potential and document problems.
        - Identify necessary solutions according to the ranked priority and per-home budget requirements.
        - Follow recognized building standards established by building science experts.

- The following WE&T program activities will support the qualified BPI contractors:
    - Contractor recruiting and management,
    - Recruiting qualified BPI-certified contractors to perform Joint-Pilot activities,
    - Conducting qualified contractor's program on-ramp training,
    - Conducting training for EE principles, energy software modeling, and energy savings calculation,
    - Providing training for customer engagement process and project documentation requirements, and
    - Designing training to respond to Q/A and Q/C findings for process improvement.

It is essential to understand that a selected Pilot implementer can also be a qualified BPI contractor. The Pilot implementer will have the authority to hire additional qualified contractors to perform direct-install services for the Joint-Pilot. When a targeted customer is directed to the standard ESA Program service, the Pilot Program Implementer (and subcontractors) will need to serve. This will help

streamline the process for the customer to minimize visits and increase customer satisfaction.

- Please refer to **Appendix G:** WE&T Ordering Paragraph.

b. Independent QA/QC vendors will perform the following tasks:
    - Quality Assurance: Conducting a desktop project documentation review to verify results and Pilot Program path,
    - Quality Control: Conducting on-site verification, inspection, infrared photography, assessment of energy modeling results, and other test-out processes, especially for Pilot-Deep homes,
    - Communicating the corrective actions to the appropriate parties to ensure the quality of project installations and energy savings.

c. EM&V vendor/s will perform the following tasks:
    - Conducting sampling design and pre- and post-installation survey design and implementation,
    - Conducting evaluability and process evaluations,
    - Conducting impact evaluations.

The Joint-IOUs will work with successful bidders to create one master coordination plan and require all vendors to adhere to that plan. In addition, each contracted party will provide Joint-IOUs with detailed project plans. Finally, Joint-IOUs will create one master project plan for monitoring the overall progress of the Pilot Program.

Other Joint-Pilot Program Administration Concerns

In addition to developing RFP and solicitation requirements, Joint-IOUs will work with the selected Joint-Pilot implementer to establish program rules for home remediation, project resource prioritization, Pilot Program reporting, and tracking activities.

Remediation of Substandard Homes

The Joint-Pilot provides resources for home mitigation efforts to improve a structure's thermal integrity and either bring the property up to code or correct safety hazards. Pilot-Plus and Pilot-Deep homes are restricted by home mitigation investment caps as indicated. Please refer to Table 19 and List of measure may not be exhausted due to regulatory process.

Table 20 above for specific Home Mitigation Schedules.

Pilot Project Resource Prioritization

Joint-IOUs understand that safety-related issues must be corrected before any weatherization and appliance work can be performed. Therefore, Joint-IOUs will require the Pilot implementer to submit a Pre-On-Site home assessment report.

The Pre-On-Site home assessment report should include the following: (on a per-home basis)

- A report on the general character of the home and household historical energy usage data,

- Pre-inspection audit findings and estimated repair costs ranked by safety priority and cost,
- An assessment of permitting requirements, and
- An assessment of overall project needs relative to per-home investment caps.

Joint-IOUs will require the Joint-Pilot implementer to provide regular reporting on the number of homes eliminated from the Pilot Program due to substandard housing concerns. Joint-IOUs will also need the Joint-Pilot implementer to report the number of targeted homes referred to the ESA Program for treatment.

Joint-Pilot Reporting and Tracking Requirements

Minimum reporting requirements exist for the following three parties:

1. Pilot Program implementer,
2. Independent QA/QC vendor,
3. Independent EM&V vendor.

Pilot Program Implementer

For general Pilot Program reporting and tracking, the implementer will administer the following activities and reporting:

1. Create an engagement process using the Joint-IOUs' targeted and prioritized customer list for outreach, including implementing Customer Participation Agreements.

2. Contractor qualification, recruiting, and management process:
    - Qualified contractor requirements:
        - Create a pool of Pilot Program qualified contractors with BPI certification,
        - Each qualified contractor must be licensed by the State of California Contractors State License Board (CSLB): B (General), C-4 (Boiler, Hot Water Heating, and Steam Fitting), C-36 (Plumbing), and have an active C-20 (HVAC) license.
        - The Joint-IOUs and Joint-Pilot implementer may request documentation from the contractor proving that they have and maintain the minimum insurance requirements mandated by the CSLB. If a contractor's license expires or becomes suspended during the program, the Joint-Pilot implementer will deactivate their eligibility standing until their license becomes active again.
    - Qualified contractor management process:
        - Create a contractor training, coaching, mentoring process to monitor contractor performance,
        - Manage project test-in and test-out processes to guide appropriate program practices, and
        - Develop reporting requirements for initial project assessment reporting, especially for sub-standard homes.

3. Design a building safety protocol to ensure general safety for all customers, contractors, and other market actors.

4. Create an online project folder system to include the following documentation (per home/project basis):
    - **Pre-on-site assessment report** to provide basic information and home characterization,
    - **Post-on-site audit report** includes refined home characterization, test-in, energy modeling analysis, and a recommendation for the appropriate program path. This report should also include income verification.
    - **Pre-installation report** to summarize the project scope, permit requirements, and other necessary home mitigation to ensure project safety for all concerned,
    - **Installation progress report** and pending items,
    - **Installation completion report** for Pilot-Plus. For Pilot-Deep, the report will include a test-out and energy modeling update,
    - **Post-installation corrective action report** for both Pilot-plus and Pilot-deep as a result of the QA/QC findings.
    - **Project completion notification documentation**, and
    - **Project notifications for actions such as project termination, drop-out, or referral.**

5. Design and implement a tracking system to support program tracking and results reporting:
    - Provide a disposition of all targeted customers on the outreach list supplied by the Joint-IOUs, including drop-outs and referrals to the ESA Program,
    - Work closely with the qualified contractor to track the permitting and inspection process and approval to meet local city requirements,
    - Manage Pilot Program project status and energy reporting for deemed or calculated projects, including energy savings estimates,
    - Report project progress, problem alerting, and resolution using results from the verification, Q/A, and Q/C processes,
    - On a sampling basis, collect pre-installation infrared photos of existing home insulation and thermal shells, and
    - Provide inputs to contractor performance monitoring through QA/QC activities. These results may trigger additional training, coaching, and mentoring actions.
    - The following weekly reporting items should be considered for the tracking system:
        - The number of targeted customer outreaches performed,
        - The number of customers engaged and assigned to eligible contractor/s,
        - The number of outstanding permit applications, inspections, and approvals with the local authority,
        - The number of customers who completed each of the major project milestones.
    - The number of projects having completed test-in and energy modeling, then assigned to the appropriate program path based on pre-installation energy saving potential (i.e., below 5%, 5-15%, 16-25%, 26-35%, 36-49%, more than 50%),
        - Referred to ESA Program: (sub-programs)
            - SCE: Tier-1 and SoCalGas: Basic, or

        - SCE: Tier-2 and SoCalGas: Plus,
    - Assigned to Joint-Pilot: (sub-programs)
        - Pilot-Plus, or
        - Pilot-Deep,
- The number of initial sub-standard home project assessments and recommendations for resolution,
- The number of Pilot projects started with home mitigation and installation activities, including measures and service installation dates and quantity,
- The number of Pilot projects completed with home mitigation and installation activities, including measures and service installation dates and quantity,
- Update Energy Savings and Measure List:
    - Pilot-Plus: report deemed savings from installed measures and home-mitigation activities,
    - Pilot-Deep: conduct test-out, update energy modeling results, and report installed measures and home-mitigation activities.
- The Joint-Pilot implementer will manage all required documentation using SCE's and SoCalGas' authorized systems. For more nuanced data tracking, a prospective bidder may not need to build a tracking system if they can demonstrate such capabilities. The Joint-IOUs will provide more instruction in the RFP.

6. Monitor and Ensure close out of permits. Collect and store proof of permit closure documentation to ensure statutory compliance.

Independent Pilot Program QA/QC Implementer

The purpose of the independent QA/QC function is to ensure quality Pilot project results. A qualified QA/QC vendor must also be an accredited Home Energy Rating System (HERS) Rater. A certified HERS Rater is a person trained and certified by an accredited Home Energy Rating Provider to inspect and evaluate a home's energy features, prepare a home energy rating, and make recommendations for improvements that will save the homeowner energy and money.

The independent Pilot Program QA/QC implementer will report the following:

- Validation of the customers' eligibility and prior participation history,
- Validation of desktop reviews pre-installation or post-installation,
- Confirmation of on-site verification and inspection by reviewing infrared photos to identify areas requiring additional insulation or air sealing,
- All corrective actions, which should be updated in the project folder,
- A record of how QA/QC activities affected reported energy saving claims,
- Contractor performance using QA/QC as the basis for the information, with sensitivity to confidentiality.
- Initiation of QA/QC activities on either mandatory or sampling basis, per contractor:
    - Report results, by contractor, by conducting mandatory QA/QC,
    - Report results, by contractor, by conducting sampling Q/A and Q/C,

- Report summary results for contractor performance, including corrective actions, while respecting confidentiality.
- Verify and validate permit documentation collected by Implementer

Pilot Program EM&V Vendor

Independent EM&V activities should use accepted statewide and public reporting processes to promote transparency and information sharing.

Joint-Pilot Customer Journey

Joint-Pilot participants' customer journey will include touchpoints initiated by the Joint-IOUs, Pilot Implementer, qualified contractor, independent QA/QC vendor, and EM&V vendor. Joint-IOUs will conduct marketing activities discussed in the Marketing section below to engage customers before Joint-Pilot commencement. The Joint-Pilot implementer may also be a qualified contractor offering direct-install services as a part of the customer journey.

The Joint-IOUs expect the Joint-Pilot implementer to create an online project folder for each participant, including project terminations and drop-outs. Thus, the Joint-Pilot customer journey consists of multiple stages:

1. Customer outreach,
2. Customer engagement,
3. Onsite audit, test-in, energy modeling,
4. Pre-installation readiness and Installation,
5. Post-installation QA/QC
6. Post-care.

- Please refer to **Appendix C** for Joint-IOUs Customer Journey Map.

The section below focuses on the Joint-Pilot Customer Journey. The Joint-IOUs have outlined the touchpoints and expected actions for the Joint-IOUs, Joint-Pilot implementers, qualified contractors, and the independent QA/QC vendor.

Customer Outreach

A customer's program journey begins with written direct-mail communication from the associated Joint-IOU notifying the customer of the upcoming Joint-Pilot. In addition, mail (direct or email) contact aims to educate targeted participants with a high-level overview of the Joint-Pilot Program, the role of the Pilot implementer, and the general Pilot process.

Roles	Actions
Customer	• Receive Joint-Pilot Program communication, eligibility requirements, and Energy Efficiency education.
Other Touchpoints:	
Qualified Contractor	• Open customer project folder, • Collect historical customer energy usage and project characterization data.
Joint-Pilot implementer	• Schedule, facilitate, conflict resolution, and report, • Prepare Joint-Pilot customer communication and mailing.
Joint-IOUs	• Monitor progress and report.

Customer Engagement

During the customer engagement stage, both the Joint-Pilot implementer and the qualified contractor will gather customer data such as current energy costs, willingness to participate, barriers to participation, and household size as a part of the Pre-On-Site Assessment Report. Additionally, customers will be informed of Joint-Pilot eligibility requirements and the third-party implementer's role. Customers will be advised that their Joint-Pilot Program path will not be defined until after the test-in process. The goal during the customer engagement is to obtain signed Customer Participation Agreements.

Roles	Actions
Customer	• Execute Customer Participation Agreement.
Other Touchpoints:	
Qualified Contractor	• Prepare Pre-on-site assessment report, including a readiness evaluation, • Complete customer income verification (similar to the ESA program income verification efforts), • Assess permitting and inspection requirements and processes. • Support EM&V vendor to collect data for pre-installation customer surveys.
Joint-Pilot Implementer	• Schedule, facilitate, conflict resolution, and report.
EM&V Vendor	• Complete pre-installation customer survey.
Joint-IOUs	• Monitor project progress and report.

On-site Audit, Test-in, and Energy Modeling Assessment

An on-site audit is conducted after executing the Customer Participation Agreement. The first on-site audit will include test-in, energy modeling, and other assessments such as permit

requirements and home mitigation efforts. This on-site audit report will provide critical inputs to the participant's program path to either Pilot-Plus or Pilot-Deep, depending on the size of the energy savings potential. If a targeted customer does not meet the Joint-Pilot Program's deep energy savings requirement, the customer will be enrolled in the ESA Program.

Roles	Actions
Customer	• Receive Joint-Pilot Program's Enrollment Notification, with program path decision, **or** • Receive Joint-Pilot Program's Rejection Notification, including referral to ESA Program.
Other Touchpoints:	
Qualified Contractor	• Complete on-site audit with test-in and energy modeling results, • Document Recommended program path for the customer project, • Prepare update to the Customer readiness assessment report, • Continue permitting and safety assessment and processes.
Joint-Pilot Implementer	• Schedule, facilitate, conflict resolution, and report.
Joint-IOUs	• Monitor project progress and report.

Pre-Installation Readiness and Installation

Joint-IOUs will follow up with customers by sending a welcome packet to all enrolled Joint-Pilot participants. This enrollment package will inform the customer's program path and get the customer ready for home mitigation and installation. The purpose of the home mitigation is to bring the property up to code before installing equipment and appliances. If a targeted customer does not meet the deep energy savings requirement, the customer will be enrolled in the ESA Program.

The Pre-installation Readiness check also includes home mitigation and safety project actions that must be completed before equipment and appliance installation. This readiness step consists of an assessment of required permits and other necessary activities.

After verifying installation readiness, the Pilot implementer will schedule a date and time for any pre-work (i.e., home mitigation actions) required, then install the appliances/equipment. The goal of this pre-installation is to ensure the readiness of the dwelling to support equipment and appliance installation as planned.

When ready, the qualified contractor will install all equipment and appliances to meet permitting requirements.

- For Pilot-plus participants, report energy savings claim and update the project folder.
- For Pilot-Deep participants, schedule and complete test-out and energy modeling update for calculated energy saving, report the energy savings claim, and update the project folder.

Roles	Actions
Customer	• Receive Pilot Program communication and education, • Receive project scope and readiness communication, • Receive equipment and appliance warranty and follow-up care information.
Other Touchpoints:	
Qualified Contractor	• Complete the customer readiness assessment process, • Complete the permitting and safety process, • Complete quality installation as planned, • (Pilot-Plus) Update project folder, including deemed energy savings reporting • (Pilot-Deep) Complete test-out, update energy modeling and update project folder with calculated energy savings.
Joint Pilot Implementer	• Schedule, facilitate, conflict resolution, and report.
Joint-IOUs	• Monitor project progress and report.

Post-installation QA/QC

After completing the project installation, a post-installation QA/QC inspection will verify the installation of all work completed. If the inspection results in a failure, the Post-Installation Inspector will notify the Joint-IOUs, the Pilot implementer, and the participant to inform them that additional work will be required in the Pilot implementation process.

Upon passing the post-installation QA/QC inspection by the independent QA/QC inspector, the customer will be provided with a summary of work, including home mitigation work completed, appliances installed, appliance warranties, and additional training.

Roles	Actions
Customer	• Receive inspection notification (if selected): ○ Depending on the inspection results, the customer may receive notification for additional project actions, or the customer may receive notification for inspection completion.
Other Touchpoints:	
QA/QC Vendor	• Follow sampling rule for QA/QC selection, • QA: Perform desktop review of the program folder and project documentation, including energy savings reporting, • QC: Work with Joint-Pilot implementer to schedule an on-site inspection, perform a desktop review followed by an on-site inspection, provide inspection findings and corrective action documentation, • The inspection process continues for sample-in projects until the inspection report yields no findings.

Qualified Contractor	• Receive inspection report with findings, initiate corrective actions. The project will continue until all inspection issues are resolved, after which the project folder is closed, • Receive inspection report with no findings, then close the project folder, • Support EM&V vendor to collect data for post-installation customer surveys.
Joint-Pilot Implementer	• Schedule, facilitate conflict resolution, and report, • Conduct qualified contractor training as necessary to improve project output and outcome, • Monitor qualified contractor's project performance on a per-contractor basis.
EM&V Vendor	• Complete post-installation survey.
Joint-IOUs	• Monitor QA/QC inspection reports and resolutions.

Post Care

The Joint-IOUs plan to track Joint-Pilot participants' energy usage, conduct energy analysis and engage with pilot participants through 2026. In addition, Joint-IOUs will provide pilot participants tips on how to reduce their energy usage. For example, if a participant's energy analysis indicates greater consumption than anticipated, the customer will receive a high-usage alert detailing analysis of their energy usage to help reduce household energy consumption.

Joint-IOUs will also share customer energy reports with the Joint-Pilot implementer to facilitate consultation with participants about their energy consumption. The goal of the engagement is to understand the drivers of increased consumption. In addition, the Joint-Pilot implementer will use this opportunity to further educate the customer on using their appliances and equipment to achieve overall energy efficiency.

Roles	Actions
Customer	• Receive regular energy efficiency communication.
Other Touchpoints:	
Joint-Pilot Implementer	• Schedule, facilitate, conflict resolution, and report • Conduct Pilot customer follow-up as necessary, • Product high-usage customer alert for mailing.
Joint-IOUs	• Monitor customer usage and share data with the Joint-Pilot Implementer.

Customer Complaint and Resolution

The Joint-Pilot implementer will manage customer concerns and complaints throughout the customer journey. The Joint-Pilot implementer will be required to include a customer complaint and escalation process in their RFP response. One of the Joint-Pilot implementer's ongoing tasks is to create an accessible, low-effort, no-surprise experience for the customer by showing empathy and consistently streamlining operations.

Roles	Actions
Customer	• File project complaint with the Joint-Pilot implementer.
Other Touchpoints:	
Qualified Contractor	• The Joint-Pilot implementer to notify the qualified contractor of the open customer complaint
Joint-Pilot Implementer	• Open a customer complaint case, • Investigate customer complaints and escalation to develop a resolution to resolve the case, • Close the customer complaint case, when resolved, • Conduct Pilot customer follow-up as necessary, • Schedule, facilitate, conflict resolution, and report.
Joint-IOUs	• Monitor customer complaints and resolutions.

Joint-Pilot Marketing Education and Outreach

Leveraging Available ESA Program Material

The Joint IOUs will work with the Joint-Pilot implementer to employ marketing plans for Income Qualified Programs (IQP) to educate Pilot Program participants about eligibility requirements:

- Energy Savings Assistance Program (ESA Program),
- California Alternate Rates for Energy (CARE),
- Family Electric Rate Assistance (FERA),
- Energy Assistance Fund (EAF),
- Gas Assistance Fund (GAF), and
- All available bill assistance programs such as Arrearage Management Plan (AMP), Percentage of Income Payment Plan (PIPP, when approved), and other available payment plans.

In addition, the Joint-Pilot implementer will work with the low-income Program Managers (i.e., gas and electric PMs) to define program marketing materials for targeted Joint-Pilot geographic locations.

Joint-Pilot Marketing Plan

The primary goal of the marketing plan for the Joint-Pilot is to build targeted customers' awareness and confidence in participation. Marketing activities will include information about available dual-fuel equipment and appliances, Joint-IOUs' Low-Income, energy efficiency, and energy conservation program benefits.

The Joint-Pilot implementer and the Joint-IOUs will develop a marketing plan that may include the following components as online, emails, and other resources:

- Joint-Pilot Program-specific Fact Sheets and Flyers,
- Welcome Kit for Joint-Pilot Program participants,
- Direct and digital communications to support the Customer Journey,
- High-usage alert communication with problem-solving support,
- Marketing briefs to provide detailed program benefits,
- Digital communication at sce.com and socalgas.com, and

- Call-center training to answer customer inquiries.

Multi-lingual Material and Focus

All Joint-Pilot marketing materials will be available in Spanish and English to address the diversity in the Joint-Pilot locations. Moreover, Joint-IOUs may include a Spanish-speaking Pilot Program representative if necessary.

Leveraging Existing Programs to Support the Joint-Pilot

Joint-Pilot participants may not be aware of the number of existing programs and discount rates available to help reduce their overall energy bills. Therefore, Joint-IOUs will work with the Joint-Pilot implementer and qualified contractors to educate participants on applicable programs and rates. As a result, targeted Joint-Pilot participants can take advantage of these existing gas and electric programs and rates.

Rate Discount Programs

Targeted Joint-Pilot participants are already enrolled in the CARE program and are considered high-usage customers. Therefore, the Joint-IOUs will work with participants to develop Energy Cost Analyses. Part of this effort is to help sign up customers for available savings-oriented programs and rates. Through this effort, Joint-IOUs will inform and educate customers about the following programs:

- All-Electric Baseline,
- Disadvantaged Communities-Green Tariff (DAC-GT), and
- Community Solar-Green Tariff (CS-GT).

ESA Program

The Joint-Pilot will refer unqualified or dropped-out customers to the ESA Program if the targeted homes can't meet the high energy savings goal. The selected Joint-Pilot implementer may also be a qualified ESA Program implementer.

WE&T

The Joint-Pilot implementer will offer the qualified contractors a variety of education and training to improve project outputs and outcomes. Through the RFP process, the Joint-Pilot implementer will design a Contractor Management Process. The scope of this process may include recruitment of BPI-certified contractors, topic-specific training, coaching, and mentoring using feedback from the Pilot project QA/QC on a per-qualified contractor basis.

Pilot Program RFP and Other Requirements

The Joint-IOUs will issue RFPs seeking a program implementer to administer the Joint-Pilot as outlined above. Joint-IOUs will also address bulk purchasing and appliance warranty concerns as a part of the RFP.

RFP Process and Open Bidding

The Joint-IOUs propose open and competitive bidding for a third-party implementer, meeting all accepted statewide solicitation requirements. While Joint-IOUs have already provided a substantial portion of high-level program design, they welcome innovative approaches to streamline program design and reduce administration costs. Therefore, all bidders should feel free to submit their best implementation approaches while meeting the Joint-Pilot Program's desired outputs and outcomes. In addition, the Joint-IOUs will strive to quantify participants' Health, Comfort, and Safety benefits as a part of the EM&V process.

The Joint-IOUs propose compensating the third-party implementer using a performance-based approach based on the quality and reliability of energy savings. Joint-IOUs will provide more details in the RFP.

The Joint-IOUs propose not to use an independent evaluator or peer review group to participate in the RFP process. Instead, they will conduct open and competitive bidding for three Joint-Pilot Program components:

- Joint-Pilot implementer,
- Independent QA/QC vendor,
- Independent EM&V vendor.

The Joint-IOUs recommend focusing on pursuing deeper energy saving using a precisely targeted approach. Since the "Whole House" approach is not new in California, Joint-IOUs will seek recommendations on how creative methods can reduce implementation costs while maintaining high-quality program outputs and outcomes during the RFP process.

Statewide Collaboration

The Joint-IOUs propose regional program implementation while actively participating in statewide coordination to maintain consistency. The Joint-IOUs recommend that other IOUs implement innovative approaches and try new methods to reach deeper energy savings and lower implementation costs. Lessons learned from the various Pilot Programs' implementations can inform future statewide program design and collaboration efforts. In addition, Joint-IOUs will report the Joint-Pilot Program process at the Quarterly ESA Program Working Group Meetings.

Permits and Inspections

A qualified contractor is responsible for obtaining the proper building permits for each project before the commencement of work. In addition, a qualified contractor will ensure that all installations meet applicable code requirements and schedule inspections for any work to be completed as part of the project. Documentation of the Pre-On-Site Assessment Report and permits will be submitted to the Joint-Pilot implementer before work is scheduled to begin. It is the responsibility of the qualified Contractor to ensure this is completed for all homes. The contract between the qualified contractor and the Joint-Pilot implementer may include provisions for incentives or penalties for compliance (e.g., an incentive for 100% compliance or a financial penalty for errors documented in audits.)

Leveraging Bulk Purchasing Agreement

Joint-IOUs will use best practices to select qualified contractors and suppliers to the Joint-

Pilot implementation, including a review of the bulk purchasing agreement to cost reduction opportunities. The Joint-IOUs will require the Joint-Pilot implementer to identify potential distributors that can source program appliances in the RFP. These actions can increase the sources of home equipment and appliances, leading to possible cost reductions.

Appliance Warranty

The Joint-Pilot Program will provide appliance and equipment warranty coverage consistent with the information provided in the latest California Installation Standards (IS) Manual.

- Please refer to **Appendix E**: ESA Program's California Installation Standards (IS) Manual.

Pilot Program Risk Management and Mitigation

Although Joint-IOUs intend to follow the implementation processes outlined in this Joint-Pilot Implementation Plan, the Joint-IOUs recognize the potential implementation risks addressed below.

Customers in Arrears

Customers behind their electric and gas bills may be reluctant to enroll in the Joint-Pilot due to concerns that Joint-IOUs will disconnect delinquent customers for non-payment. The Joint-IOUs will educate such customers on the various payment and assistance options such as Low-Income Home Energy Assistance Program (LIHEAP), EAF, GAF, AMP, and other payment plans to stay current on their bills.

Project Schedule Delay

It is not uncommon for projects involving building renovations to be delayed due to variables beyond the contractor's control. (e.g., unavailable materials). To mitigate such impacts on the timeline, the Joint-IOUs intend to maintain an ongoing communication plan and provide regular status updates to all parties involved. This awareness will allow parties to deal with issues and concerns promptly to minimize customer interruption.

Safety Compliance

Safety is the number-one concern for Joint-Pilot projects. For gas and electric applications, the Joint-IOUs, Joint-Pilot implementer, and qualified contractors will strictly enforce safety guidelines while performing their work. The entire Joint-Pilot implementation team will need to follow basic safety tenets at all points along the customer journey.

General safety topics and other specific topics depending on the tasks will be discussed and reviewed with all personnel working in the Joint-Pilot, starting with the initial Customer Engagement and Pre-On-site Assessment and On-site-Audit with Test-in. Any safety issues (e.g., bare wires, gas leak, etc.) will be immediately reported to the Joint-Pilot implementer, qualified contractors, and Joint-IOUs. All problems must be tracked in the issue log and the customer's project folder. The Joint-Pilot implementer's responsibility is to ensure that all project

personnel, qualified contractors, and customers are adequately informed and aware of safety concerns. All qualified contractors need to have a current ISN subscription with an acceptable grade.

All hazardous materials and waste discovered before or after project construction will be appropriately characterized before off-site disposal. This includes spent materials with asbestos (e.g., pipe wrap), oil, gasoline, or paint-related materials. If these materials are discovered, sampling and an EPA identification number may be required. In addition, if contaminated soil is found, then soil sampling, analysis, and disposal will be required.

In addition to requiring that all qualified contractors have BPI certification, valid licenses, insurance, and bonding, the Joint-IOUs will mandate all vendors to provide a safety plan for review. Joint-IOUs must approve the safety plan before a vendor starts work. Joint-IOUs will provide approved vendors with the Environmental Health and Safety (EHS) Handbook for Contractors, which conveys general guidance on safe practices in the field and instructions on reporting safety violations. Depending on the services to be conducted, a qualified contractor may be required to provide additional documentation, such as proof of the ability to dispose of hazardous materials safely and legally. Joint-IOUs will have a checklist of safety requirements for each vendor and require each vendor to submit reports identifying safety issues, mitigation actions, and process modifications to prevent recurrence of these concerns.

Qualified Contractor Coordination

Implementation of the Joint-Pilot requires multiple parties and customer touchpoints. These touchpoints vary from targeted customer outreach that informs, educates, and enrolls pilot participants to a range of project activities. The Joint-IOUs realize there is a potential to overwhelm customers with numerous visits from multiple parties. Therefore, to reduce the risk of miscommunication, Joint-IOUs will require all bidders in the solicitation process to submit the following project management elements with a diagram of interactions:

- A communication plan for coordinating with all contractors implementing the pilot locations,
- Scheduling and coordination processes,
- Project-tracking process and project-milestone reports,
- A template for weekly, monthly, and quarterly reports detailing jobs in progress, completed, time to completion, coordination schedules, missed dates, customer complaints, the resolution to the complaint, etc.,
- In addition, the Joint-Pilot implementer will be required to submit:
    - Documentation for the contractor-management process including recruiting BPI-certified contractors, initial test-in and energy modeling, criteria to direct the customers to the appropriate program path, and other requirements to install program measures, home mitigation efforts, post-installation clean-up, test-out, and project reporting, and
    - A flowchart illustrating the project implementation milestones, processes, and procedures for the qualified contractors.

Joint-Pilot Participant Energy Education

Joint-Pilot participants can experience increased energy usage (i.e., gas or electric) due to the increased usage of their new equipment and appliances. Therefore, the Joint-IOUs will educate Joint-Pilot participants on their total energy use, appliance functionality, and energy

consumption to mitigate potential customer surprise or confusion during the appliance and equipment in-home demonstration.

Joint-IOUs will also monitor each Pilot participant's energy consumption, conduct energy analyses, and share results with the Joint-Pilot implementer and qualified contractor during follow-up sessions. In addition, Joint-IOUs will communicate with customers early in the process and provide continuing education throughout the Joint-Pilot's duration to help them make informed decisions about their energy usage.

Customer Participation Agreement and Supplemental Tenant Protection Agreement

The Joint-Pilot Program targets single-family and mobile homes occupants. Renters may occupy these households. Due to Joint-Pilot Program participation, tenant-occupied homes might risk unintended harm (e.g., rent increases or eviction). Joint-IOUs propose a Tenant Protection Agreement to supplement the Customer Participation Agreement between owner and tenant to mitigate this risk. The Tenant Protection Agreement, a supplement to the Customer Participation Agreement, specifies tenant protections, including owners' consent not to increase rents beyond a specific annual amount or evict tenants due to pilot participation.

Joint-IOUs will execute the Participation Agreement and supplemental Tenant Protection Agreement at the time of enrollment. The Joint-Pilot implementer will obtain the Participation Agreements, monitoring, data collection, and other reporting documents. The Joint-IOUs will use the Participation Agreement and the supplemental Tenant Protection Agreement to mitigate tenant risk.

Customer/Participant Satisfaction Monitoring

Adapting to new appliances while learning the details of the Joint-Pilot can be overwhelming and lead to customer (i.e., participant) dissatisfaction. To ensure a high level of customer satisfaction, the Joint-Pilot implementer will maintain communications with each participant to understand and address their needs at each step. Participants will be educated on pilot processes, appliance functionality, and energy consumption to help them enroll in the Joint-Pilot. Additionally, the Joint-Pilot implementer and qualified contractor will manage customer expectations about their overall energy bill savings and educate them on how to monitor their appliances' energy usage to maximize savings. Finally, the Joint-Pilot implementer will monitor customers' initial energy usage and enroll all participants in the appropriate gas and electric tariff as permissible.

Joint-Pilot Program Evaluation, Measurement & Verification (EM&V) Plan

The Pilot program is expected to achieve substantial household energy savings and bill impacts, meaningful health, comfort, and safety benefits to Pilot participants, along with long-term benefits such as non-energy benefits and cost-effectiveness.

The evaluation plan includes data collection and analysis to understand the overall impact and effectiveness of the services provided by the Joint Pilot. The Joint-IOUs will select evaluators to perform Impact Evaluation and Process Evaluation of the Pilot. These serve three critical

objectives: “accountability of the impacts, risk management, and continuous improvement.”[15] Therefore, components of the EM&V plan will be implemented coincident with the program’s implementation. To strengthen the credibility of the program savings calculation and transparency in the data management process, coordination between evaluation and implementation is necessary early in the Pilot implementation process. This approach can mitigate the challenges of collecting data retroactively, addressing missing data, limitation to identifying necessary variable(s), numerous biases from customer recall, etc. Here, the recommended EM&V activities are intended to 1) provide a comprehensive view of the Joint-Pilot impacts, 2) address internal and external threats to validity, and 3) investigate causality using multiple approaches. In this regard, the following touchpoints will be included in the implementation plan that will require the EM&V third-party evaluator’s support and coordination with implementors:

- Assist Pilot program sampling design to ensure that participants in years 1, 2, and 3 are appropriately balanced to avoid potential biases when used as a comparison group.
- Determine the data requirements and document the sampling plan.
- Collect on-site data for the study, evaluation, and assessment purposes.
- Develop survey (and interview) instruments and questions.

The customer and contractor surveys should gather information on the following areas:

- Existing fuel types
- Existing primary use measures and their operation issues
- Perceptions of health, safety, and comfort
- Barriers to participate in the Pilot or any energy savings programs
- Participant perceptions of energy and bill savings
- Energy savings potential of the participated household pre-audit
- Barriers or issues that contractors anticipate when installing measures in homes

Time schedule and details in the frameworks are subject to change during contracting and implementation, based on available budget and Pilot progress.

Impact Evaluation

The successful evaluation of the program begins in the design stage of the program. The key objective of the Impact Evaluation is to analyze energy savings and cost-effectiveness that is attributable to the Pilot program’s goals and objectives. The plan is to start developing a baseline for the evaluation efforts early on, to ensure a vigorous, accurate savings estimate, and to avoid barriers that have been identified in past ESA evaluations. The evaluator(s) will make sure to identify analytical evaluation methods early to preserve consistent data collection for valuable recommendations as part of the deliverables.

The table below outlines the Impact Evaluation framework.

[15] ACEEE (2017). *“Evaluation, Measurement, and Verification”*

TABLE 22. SUMMARY IMPACT EVALUATION FRAMEWORK

Objective	Recommended Methods	Possible Research Question	Metric
1. Determine Pilot's energy savings per household and cost-effectiveness	1. Normalized Metered Energy Consumption (NMEC) approach with a control group, Differences-in-Differences. 2. Billing/Savings Analysis. 3. Pre- and post-installation survey development and analysis.	1. Are planned savings estimates by software model accurate? 2. Do on-site audits correctly identify households with deep savings potential? 3. What factors contribute to higher or lower savings than estimated? 4. Is the Pilot cost-effective? 5.Is the sample enough to detect a statistically meaningful savings effect?	1. Pre- and post-installation energy consumption/bill 2. Baseline conditions. 3. Estimated usage/bill change in therm, kWh/kW 4. Cost-Effectiveness Test Results 5. GHG
2. Provide insight into the participant's experience to inform consumption analysis.	1. Pre-installation survey. 2. Post-installation survey. 3. Combine survey with consumption analysis.	1. How do participants describe their experience? 2. What energy savings behaviors do participants practice pre- and post-installation?	1. Participant survey results. 2. Positive and negative change from pre- to post-installation.

Process Evaluation

The key objective of the Process Evaluation is to ensure that Pilot program activities are consistent and produce the intended outcomes to help the program better achieve its goals and objectives. The initial process evaluation will be designed to provide early feedback for streamlining the Joint-Pilot delivery. Tasks will start with a review of Joint-Pilot documents, such as the logic model, outreach and marketing, protocols for installation, manuals, subcontractor agreements, etc. Interviews with Joint-Pilot staff will follow this review to develop a more comprehensive understanding of the pilot delivery and inform the development of participant and contractor surveys described below.

The table below describes the Process Evaluation framework.

TABLE 23. SUMMARY OF PROCESS EVALUATION FRAMEWORK

Objective	Recommended Method	Possible Research Question	Metric

1. Assess the effectiveness of the program process to provide early feedback to implementers for needed improvements	1. Implementation Process Review 2. Audit Review 3. Performance Review 4. Participant/Contractor Surveys	1. What processes are effective and what are not? 2. How well does the audit serve the implementation? 3. What contractors' installation practices and communication with customers are beneficial and what are not? 4. Do participants/ contractors see any processes as not needed?	1. Processes/ implementation documents 2. Audit tool 3. Contractor performance 4. Pilot reporting data 5. Survey results
2. Provide insight into the participant's experience and barriers to inform outreach and education.	1. Pre-installation survey 2. Post-installation survey	1. What were the reasons to participate in the Pilot? 2. What are fuel types, existing measures/equipment used as primary in the household? 3. What makes the experience too difficult to participate?	1. Participant survey results 2. Positive and negative change from pre- to post-installation
3. Assess impacts related to customers' health, comfort, and safety (HCS) and other non-energy benefits	1. Qualitative 2. Quantitative	1. What are the non-energy benefits resulting from the installation? 2. What provides the greatest impacts to these benefits?	1. Health improvement 2. Changes in comfort 3. Safety factors
4. Identify data needs and accuracy to assess performance, impact evaluation to recommend an effective evaluation approach	1. Evaluability Assessment 2. Data management and accuracy verification. 3. Case Studies	1. Is planned data collection sufficient? Is there a need for all data collected? 2. What other data is needed? 3. What case examples to prove or disprove the effectiveness and objectives of the pilot? 4. Does the proper data collected and verified? 5. Was the data collection monitored regularly? 6. What is the process to address missing information?	1. Pilot data collected 2. Full cases of Pilot participants
5. Provide a logic model, program theory, and metrics	1. Pre-installation survey 2. Post-installation survey	1. What are the outcomes of the Pilot based on its objectives? 2. What are the expected short-term and long-term outcomes? 3. What are the connections between Pilot program activities and outcomes?	1. Participant survey results 2. Contractor survey results 3. Pilot reporting data

The feasible options for the study design are described in Appendix H. Audit review and data collection topics (Customer and Contractor surveys, Case Studies) are also recommended in Appendix H. The research design should be finalized before pilot delivery begins.

EM&V Budget

The Joint-IOUs' EM&V budget is expected to cover anticipated evaluation costs included in the scope of work outlined in the request for proposals (RFPs). The Joint-IOUs will manage solicitation efforts to select evaluator(s) for the proposed Impact Evaluation and Process Evaluation. Study and evaluation scopes in the RFPs will be determined by the available budget and recommended approaches. Research design, methodology, analysis, and schedule will be included in the draft research plan provided by the evaluators after the purchase order award.

Appendix A. Pilot Program Theory, Logic Model and Delivery Approach

As described below, Joint-IOUs will discuss the Pilot Program's intervention theory, researchable questions, logic model, and delivery approach.

Pilot Program Theory

Joint-Pilot Program theory should be consistent with the identified Joint-Pilot Program objectives and strategies[16]. The goal is to pursue deeper energy savings by investing more in targeted homes (i.e., investment caps per home). The Joint-Pilot is designed to focus on targeted homes with higher energy savings potential by using test-in and energy-modeling efforts that guide the proper Pilot Program path, using either a deemed- or calculated-savings approach. A comprehensive QA/QC process is designed to reinforce the quality of energy savings and installation using a "Whole House as a System" policy. The program is designed to embrace BPI-certified contractors, including a comprehensive contractor training and management system.

The Joint-IOUs expect the following Joint-Pilot Program outcomes: (1) deeper energy savings compared to the existing ESA Program, (2) improved contractors' performance, and (3) improved participants' health, comfort, and safety.

Program Researchable Questions

The Pilot Program is designed to invest more and reach deeper energy savings while targeting a highly prioritized low-income population. Below is a list of possible questions that may be examined as part of the Joint-Pilot Program evaluation:

- To what extent is the proposed "Whole House" delivery approach effectively delivering deeper and more reliable energy savings than the standard ESA Program? What are other program design options?
- Using BPI-certified contractors will cost more for program implementation. Do BPI-certified contractors increase the reliability and depth of energy savings, given the extra expenses? Is this a cost-effective program design? Is there a more practical approach to achieving the same result?
- Can the combination of an on-site audit, test-in, and energy-modeling software facilitate the appropriate program path (i.e., Pilot-Plus versus Pilot-Deep) for targeted homes?
- To what extent does the independent QA/QC implementation deliver more reliable energy savings relative to the added implementation cost?
- Does the Joint-Pilot Program provide greater "Health, Comfort and Safety" benefits than the Joint-IOUs' ESA Program?

[16] Program Theory in Evaluation: Challenges and Opportunities, by Rogers, Hacsi, Petrosino, Huebner, 2000

- Is the Joint-Pilot Program's data tracking designed and implemented to support a robust evaluation of the Program's outcomes? Are additional data needed to assess the Joint-Pilot Program's effectiveness reliably? Is the Joint-Pilot Program evaluable?

Program Logic Model[17]

As described below, the Joint-Pilot Program's logic model illustrates the program's activities, outputs, and outcomes (short-term, intermediate, and long-term results). Implicit in the logic model are the causal effects of program activities leading to program outputs and outcomes.

- Key Joint-Pilot Program **activities** include the following:
  - Select Joint-Pilot implementer, QA/QC vendor, and EM&V vendor.
  - Joint-Pilot implementation activities:
    - Develop Joint-Pilot implementation process and procedure development,
    - Perform Joint-Pilot project test-ins/outs, software modeling and direct participants to the proper program path,
    - Track contractor outreach, recruiting, and project installations,
    - Conduct Joint-Pilot reporting and monitoring,
    - Conduct Joint-Pilot contractor management and training,
    - Recruit and manage qualified contractor/s,
    - Conduct qualified contractor training, coaching, and mentoring,
    - Perform Joint-Pilot customer targeting, screening, and customer engagement,
    - Conduct Joint-Pilot independent QA/QC activities, and
    - Conduct Joint-Pilot EM&V activities.

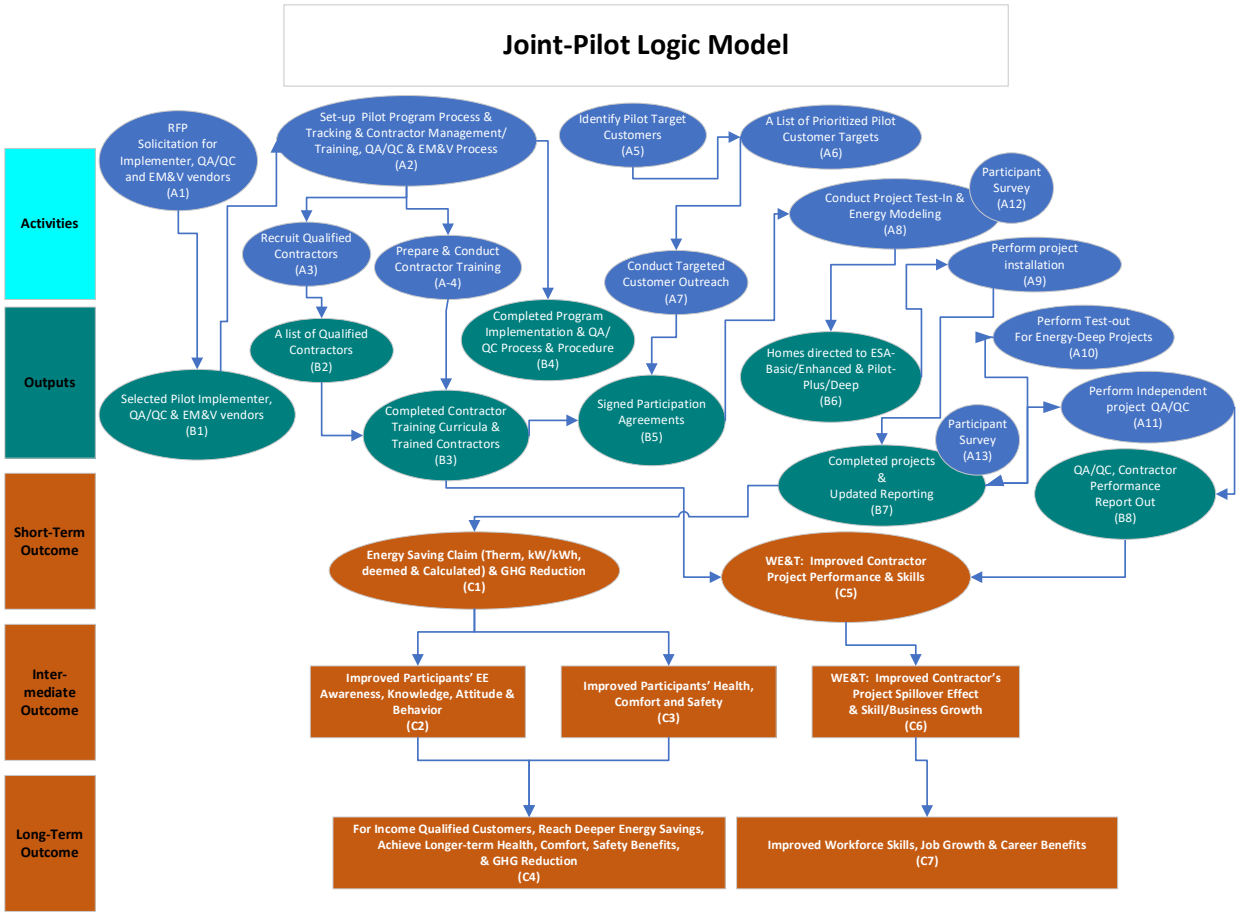
- These program activities will result in the following **outputs**:
  - From a selected program implementer:
    - A list of qualified program contractors,
    - Signed customer participation agreements,
    - Completed Pilot projects test-in and modeling, leading to the appropriate program path,
    - Completed project installations,
    - Completed projects test-out and modeling update for Pilot-Deep only,
    - Completed contractor training, coaching, mentoring activities (i.e., WE&T activities), and
    - Updated Pilot project data, tracking system, and reporting.
  - From a selected independent QA/QC vendor, contractor performance reporting,
  - From a selected independent EM&V vendor and associated activities and outputs.

- The above Joint-Pilot Program outputs will lead to short-term, intermediate-term, and long-term **outcomes**:
  - Joint-Pilot participants' benefits may include:
    - Improved participants' energy savings,
    - Reduced GHG because of energy savings,
    - Improved participants' health, comfort, and safety,

[17] Logic Modeling Methods in Program Evaluation, by Joy Frechtling, 2007. The Logic Model Guidebook, by Knowlton and Phillips, 2009.

- Improved participants' EE awareness, knowledge, and attitude,
- WE&T: Qualified contractors may improve job skills and EE knowledge, leading to project spillover effects and additional business growth.

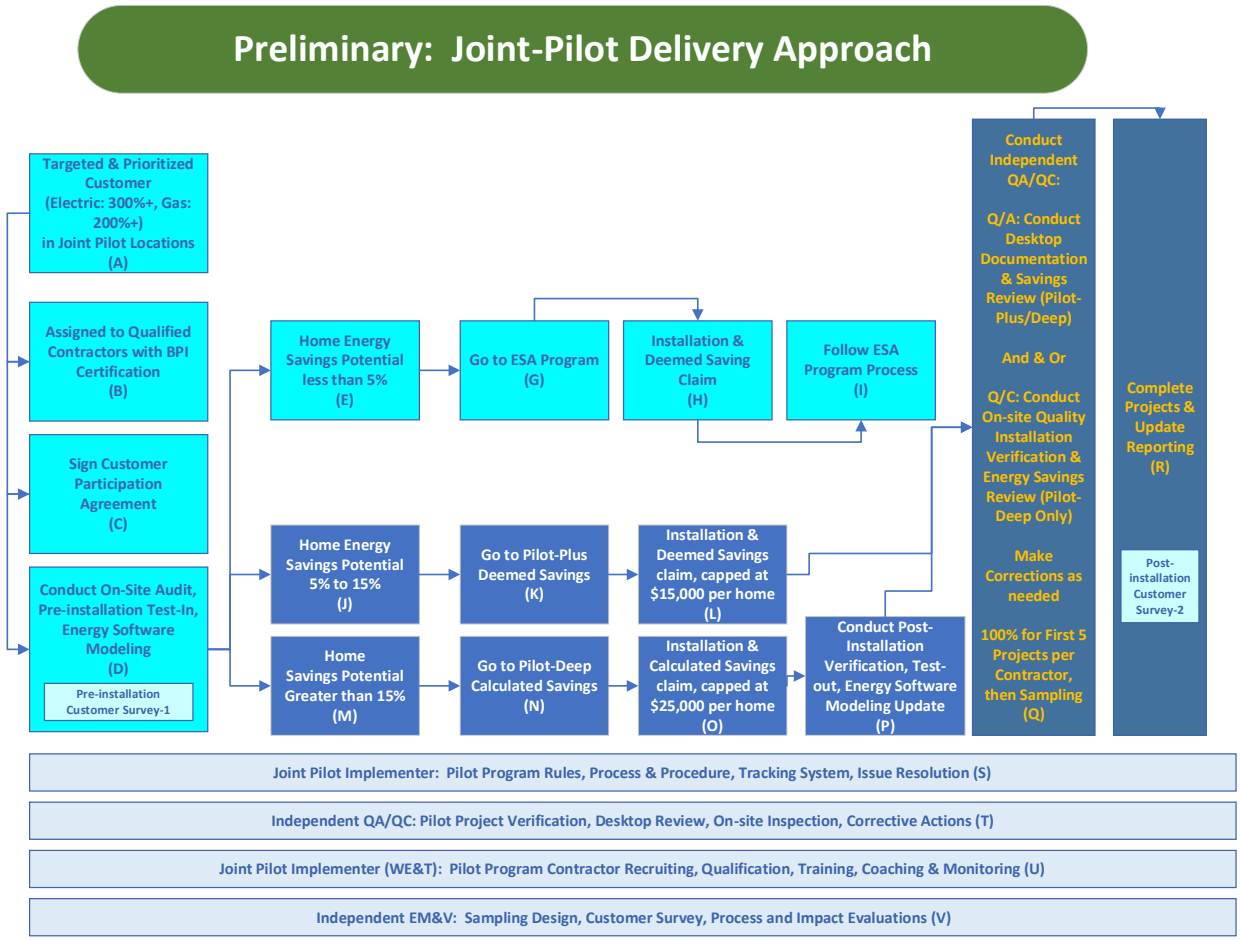
FIGURE 6. JOINT-PILOT PROGRAM LOGIC MODEL



Program Delivery Approach

The selected Joint-Pilot implementer will support the Joint-Pilot Program delivery approach described below. In addition, Joint-IOUs will be open to additional innovative suggestions during the RFP process to streamline the Pilot Program process. In the following paragraphs, the Joint-IOUs present the Pilot Program delivery approach one block at a time.

FIGURE 7. JOINT-PILOT PROGRAM DELIVERY APPROACH



It is understood that the Joint-Pilot has two sub-programs: Pilot-Plus (5-15% savings goal) and Pilot-Deep (15-50% savings goal). Therefore, in this Joint-Pilot PIP, we will refer to both sub-programs as Pilot-Plus, Pilot-Deep, or the Joint-Pilot Program.

Block A: The Joint-Pilot will start with a list of targeted and prioritized customers with high-usage and segmentation flags reflecting critical needs. These targeted customers will be restricted to selected geographic locations. This geographic restriction intends to make the pilot implementation focused and cost-effective for qualified contractors.

Block B: The selected Joint-Pilot implementer will need to recruit, manage, and train a portfolio of BPI-certified contractors.

- This contractor recruiting, management, and training task will be further refined during the RFP process. All qualified contractors will perform direct installation services as specified by the program path.
- The list of targeted customers will be made available to qualified contractors to initiate the Joint-Pilot outreach.

- As a result of Joint-Pilot requirements such as test-in/out and the use of energy modeling software, qualified contractors must be BPI-certified.

Block C: A signed "Participating Agreement" is required for all Pilot Program customers. There is also a supplemental "Tenant Protection Agreement" for consideration.

Block D: With the signed Participating Agreement, a qualified program contractor can initiate an on-site audit, energy software modeling, and blower door test. The energy-modeling result will assign participants to the proper program path. For example, participants with homes having lower savings potential will be directed to the ESA Program for support. Those with homes having high saving potential can be directed to either Pilot-Plus (J) or Pilot-Deep (M).

Blocks E, G, H, I: Some Pilot participants can drop out of the program due to initial test-in results. These customers will be referred to the ESA Program path using standard ESA Program processing steps to complete program treatments.

Blocks J, K, L: A deemed-savings approach will be used after completing the test-in process for Pilot-Plus participants. These homes will be eligible to use a robust list of measures and services. Pilot-Plus dwellings are not required to complete a test-out process and are subjected to a joint per-home investment cap.

Blocks M, N, O, P: A calculated savings approach will be used for Pilot-Deep homes. Comparing results from test-in/out and energy modeling analyses will provide energy savings calculations for these projects. In addition, these homes will be supported by a robust list of measures and services and subjected to a joint per-home investment cap.

Block Q: For completed Joint-Pilot projects, the Joint-Pilot process includes an independent Quality Control (Q/A) and Quality Assurance (Q/C) process. The per-home QA/QC process will enact corrective actions for project and contractor performance tracking.

- **Q/A (Quality Assurance):** Q/A is defined as an engineering desktop review of all program documentation. Independent Joint-Pilot Program engineers may ask for project documentation updates and corrections as needed. Therefore, it is vital to track these activities on a contractor basis and at the Joint-Pilot Program level. It is also essential to monitor this process's cycle time (i.e., duration to or from) before documents are finally accepted for each implementation step.
- **Q/C (Quality Control):** Joint-Pilot homes may be subject to both Q/A and Q/C inspections. The Q/A activity is described above. The Q/C activities include on-site inspections to review quality installation, energy savings estimates, remediation, and corrective actions. For example, requiring infrared photos of installation pre and post will provide a contrast of the quality of the insulation work. In addition, infrared documentation is the only way to determine where insulation or sealing may be missing and whether the approach to installing the insulation makes sense (such as using the correct definition of the thermal envelope).
- **Contractor Performance Monitoring:** This is an output from the Q/A and Q/C activities. Certain contractors may need coaching, training, and mentoring support. In addition, persistent sub-standard contractor performance may lead to termination from the Joint-Pilot Program.

Block R: This block covers the Joint-Pilot tracking system and reporting. The Joint-Pilot budget will support a limited number of treated homes only. Developing a new program tracking system can be costly, and the Pilot Program will have a very different process than the standard ESA Program tracking process. The Joint-IOUs will provide additional instruction in the RFP.

Block S: This block represents overall general Joint-Pilot Program implementation tasks, including Joint-Pilot Program rules, processes and procedures, project tracking, and a project-results reporting system.

Block T: This block represents the independent QA/QC function. Qualified contractor performance reporting is generated from the project QA/QC activities.

Block U: This block includes contractor recruiting, qualification, training, coaching, and mentoring. Results from the project QA/QC should be incorporated into overall training efforts. In addition, based on EUCA Program implementation experience, qualified contractors will need training in both gas and electric EE principles, energy modeling software, and energy savings calculations. Finally, the Joint-Pilot implementors may wish to conduct intensive contractor training to improve project output and outcome using feedback from project installations and inspections.

Block V: This is an ongoing EM&V effort for the Joint-Pilot Program. The EM&V effort may start with an RFP and selection process followed by EM&V project management tasks, including sampling design, pre-, and post-installation survey design and implementation, process evaluation, and impact evaluation.

Appendix B. A Summary of Studies to Inform Pilot Program Design and Implementation

The following summarized literature review includes studies from both within and outside of California. The review covers process evaluations (seven studies), impact evaluations (nine studies), and other relevant studies (three studies). Special attention is paid to all Energy Upgrade California (EUCA) Program impact and process evaluations. This is especially important since the proposed Joint-Pilot Program shares a similar program design with the EUCA Program.

Notably, the Joint-IOUs urge caution in taking EUCA Program studies and recommendations too literally. California EUCA Programs were energy efficiency (EE) implementations rather than low-income program designs. Some of the lessons learned do not apply to the low-income Pilot Program due to fundamental differences in program targets, segments, and population characteristics. For example, EUCA Program customers preferred the more costly EUCA Advanced Program path, which required substantial personal investment. The key objective for EUCA customers was “improving comfort” rather than saving energy. Some of the EUCA-Advanced HUP customers were characterized as higher-income earners capable of making these investments independently. By contrast, the Joint-IOUs’ ESA Program and CARE Program participants are eligible low-income qualified customers (i.e., at 200% federal poverty level) who would be offered ESA Program services at no charge. The Pilot Program’s targeted population consists of pre-screened, high-usage customers meeting specific segmentation criteria. As a result, the Pilot Program’s outreach will target customers' most critical needs.

Lessons Learned from Process Evaluations

- EUCA Programs are designed to target a very different customer segment than the upcoming ESA Joint-Pilot Program. However, recommendations for contractor management remain relevant.

- Program start-up will take time, and the Joint-IOUs will need to accommodate a steep learning curve for all concerned, despite prior EE EUCA Program Whole House experience (most of the program staff are no longer available or retired).

- QA/QC efforts are essential and will yield corrective actions. However, these same efforts will also lead to extended project lead times. Therefore, a careful balance between the two outcomes is necessary.

- Participants must pay attention to project and house safety concerns. Therefore, contractor training and certification are essential, especially regarding project and house safety.

- Contractor management and tracking are essential to the Pilot Program’s success.

- For the EUCA Program, customers preferred Advanced over Basic HUP. However, for the Pilot projects, the preference may not be the same since the services are pre-screened based on energy-savings potential. This means that the Pilot Program must

carefully employ on-site audit, test-in, and energy-modeling software to guide the program path based on the potential for deeper energy savings.

- Program-tracking data are essential and will require careful design to handle complexity.

- Excessive EUCA Program paperwork discouraged some contractors from accepting projects. The Pilot Program should be sensitive to unreasonable administrative burdens. Also, late payments can create disincentives for certain program contractors.

Lessons Learned from Impact Evaluations

- For EM&V activities, please consider the following recommendations:
    - Use a control or comparison group whenever possible.
    - Control sample size and analyze the power of detection up front to allow a robust pilot impact evaluation.
    - Understand that data cleaning is essential.
    - Understand that unreasonable attrition of a program's population could cause biases in the findings.
    - Consider assessing gross realization rates by contractor.
    - Control for weather change and its impact on energy usage.
    - Conduct frequent billing analyses to detect problems.
    - Verify that the Pilot Program engages trade allies and contractors as intended.

- For the California, 2015-2017 impact evaluation, LED and CFL lighting generated substantial portfolio savings. However, in the future, these lighting measures are likely to be eliminated. Consequently, other EE measures will need to realize more energy savings to compensate for the absence of lighting measures.

- There are inherent inconsistencies between energy-modeling software and the results from impact evaluation. Generally, evaluated results are lower than claimed by a significant amount (i.e., 30%+ lower). As a result, the EUCA Program team took various actions to close the gap between EnergyPro and other software packages.

- The California "2015 Home Upgrade Program (HUP) Impact Evaluation" findings are consistent with the other process and impact evaluations. Their consistently low realization rates for the Basic HUP and Advanced HUP programs measure "claimed energy savings" versus "evaluated energy savings." This low realization rate suggests the following programmatic concerns:
    - Software such as "EnergyPro" and "Quest" consistently overestimate energy savings by well over 30-50%.
    - Issues within the QA/QC process may render problems not detectable if not captured by the program's tracking system. At the same time, a complicated QA/QC process would slow program implementation and frustrate all concerned.
    - The selected evaluation method may also contribute to this persistent low program realization rate. However, by 2016-2017, impact evaluators made strides to improve study methodologies.

- Despite using EnergyPro to estimate energy savings pre-and post-installation and a robust QA/QC process, Advanced HUP projects yielded gross realization rates ranging from 12.8% to 63.5%. Numerous factors caused the low realization rates, given the complexity of the programs' design and challenging evaluation efforts.

- There is an analogy between water heating and home heating. In "Impact Evaluation of Water Heating Measures - Residential Sector - Program Year 2019", insulation of water pipes did not make sense as a standalone project but contributed to overall energy savings. This finding argues for including adequate household insulation as part of any household heating electrification program.

- The Low-income Pilot Program may face conflicts between customer prioritization (i.e., high-usage customers with the greatest needs such as DAC, Tribal, HTR, medical baseline, etc.) vs. the desire not to withhold service. A fair and adequate sampling approach may serve customers with the greatest needs without delay.

Other Lessons Learned

- The Low-Income Needs Assessment (LINA) report provides an extensive characterization of LI programs. It also offers insights into participants' health, comfort, and safety (HCS). This LINA study also assessed customers' energy burden and hardships when relying on alternative fuels (propane, wood, etc.) for their primary energy source (commonly referred to as alt-fuels). Customers living in areas with less reliable electricity service also experience added energy burden. Thus, the LINA report is a good starting place when considering how the Pilot Program measures HCS benefits.

- When reviewing the California EUCA Program process and impact evaluation, one understands the importance of contractor training and required technical competence to participate in the program and obtain satisfactory energy saving outcomes.

- The Southern California Edison 2009-2011 LIEE segmentation study is insightful. It recommends that Joint-IOUs should view low-income customers in distinctive segments. For example, the 2011 LIEE segmentation study suggested the following customer segments (page-10/11).

TABLE 24. LOW-INCOME CUSTOMER SEGMENTS

Segment	Name (Lower Energy Usage)	Percent of Pop.
1	Low Use, Low Touch	21%
2	Young Inland Conservers	17%
3	Older Coastal Conservers	16%
4	Struggling Modest Renters	14%
Segment	**Name (Higher Energy Usage)**	**Percent of Pop.**
5	Larger, Older Households	14%
6	High Use Newer Homeowners	9%
7	High Usage, Most Problems	5%
8	Less Involved Younger Homeowners	5%

Bibliography of the Literature Review

(1) http://www.calmac.org/publications/2015-2017_ESA_Impact_Evaluation_-_FINAL_-_CALMAC_Posting.pdf
(2) http://www.calmac.org/publications/CPUC_Group_A_Report_Water_Heating_PY_2019_Final_CALMAC.pdf
(3) http://www.calmac.org/publications/CPUC_GroupA_Res_PY2017_HUP_toCALMAC.pdf
(4) http://www.calmac.org/publications/RES_5.1_HUP_FINAL_REPORT_ATR_08-15-17.pdf
(5) http://www.calmac.org/publications/CPUC_WO46_Final_Report.pdf
(6) http://www.calmac.org/publications/LIEE_FINAL_2009_Impact_Eval_Report.pdf
(7) http://www.calmac.org/publications/LIEEReport2002Final6-21.pdf
(8) https://ilsag.s3.amazonaws.com/ComEd-IEPD-Pilot-CY2019-Impact-Evaluation-Report-2020-04-14-Final.pdf
(9) https://www.nyserda.ny.gov/-/media/Files/Publications/PPSER/Program-Evaluation/2020-Retrofit-Billing-Analysis-Final-Report.pdf
(10) http://www.calmac.org/publications/EUC_Home_Upgrade_Process_Evaluation_Report_Draft_2016.08.24_(CLEAN).pdf
(11) http://www.calmac.org/publications/PGE_Whole_House_Report_COMBINED_MARKETING_REPORT_FINAL1.pdf
(12) http://www.calmac.org/publications/2010-2012_PG&E_Whole_House_Retrofit_Program_Phase_II_Process_Evaluation_Study_Volume_1.pdf
(13) http://www.calmac.org/publications/2010-12_PG&E_and_SCE_Whole_House_Retrofit_Program_Process_Evaluation_Study.pdf
(14) https://ilsag.s3.amazonaws.com/ComEd-CY2019-IE-Single-Family-Retrofits-Process-Evaluation-Results-2020-06-04.pdf
(15) https://ilsag.s3.amazonaws.com/AIC-IPA_PY9_Moderate_Income_Kits_Report_FINAL_2017-12-12.pdf
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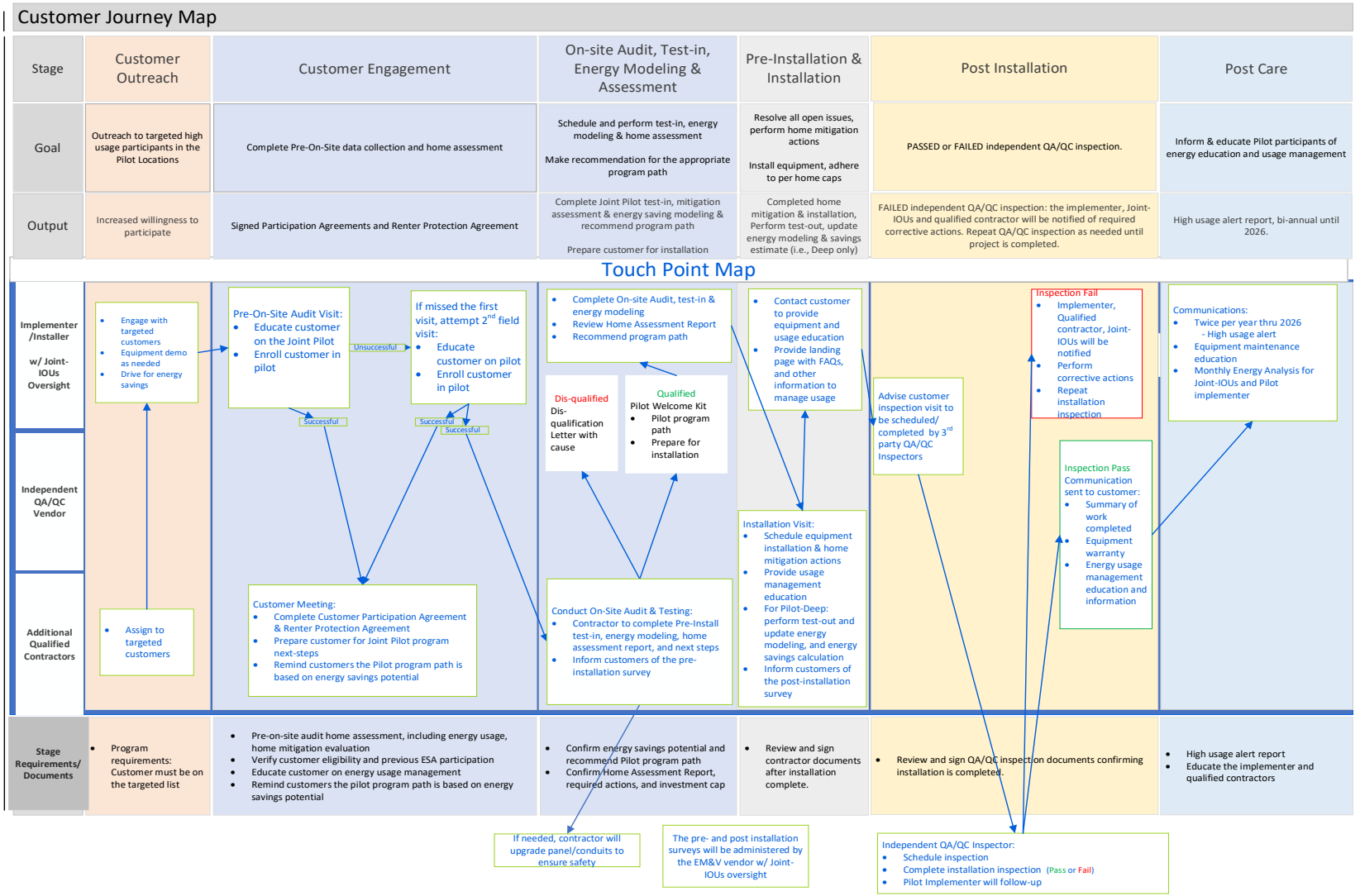
(18) http://www.calmac.org/publications/CPUC_WET_Contractor_Training_Market_Characterization_FINAL.docx
(19) http://www.calmac.org/publications/SCE_LIEE_Segmentation_Report.pdf

Appendix C. Customer Journey Map



Appendix D. Monthly Temperature Extremes by Decade for Selected California Cities and Counties, 1970-2019

Publicly available data from the US National Oceanic & Atmospheric Administration (NOAA), specifically from selected weather stations, were used to construct the following tables. History for Orange, Riverside, and San Bernardino counties covered five decades, whereas the information for key cities in Los Angeles County extended only to the 2000s. As a result, the analysis is bifurcated.

Following the table, you will find a series of charts and analyses of the specific regions that were covered.

Source Table

Monthly Temperature Extremes by Decade--for Orange, Riverside, San Bernardino, and Los Angeles Counties (degrees Fahrenheit)
Data Source: US National Oceanic & Atmospheric Administration (NOAA), "Global Summary of the Month" at https://www.ncdc.noaa.gov/cdo-web/search

Los Angeles County: Claremont (NOAA station ID: GHCND:USR0000CCLA); Whittier Hills (NOAA station ID: GHCND:USR0000CWHH); Santa Monica Municipal Airport (NOAA station ID: GHCND: USW00093197)
Orange County=SANTA ANA FIRE STATION, CA US (NOAA station ID: GHCND: USC00047888)
Riverside County: through October 2016=RIVERSIDE FIRE STATION 3, CA US (NOAA station ID: GHCND: USC00047470); starting November 2016=RIVERSIDE MUNICIPAL AIRPORT, CA US (NOAA station ID: GHCND: USW00003171)
San Bernardino County: through April 2015=REDLANDS, CA US (NOAA station ID: GHCND: USC00047306); starting May 2015=ONTARIO INTERNATIONAL AIRPORT, CA US (NOAA station ID: GHCND: USW00003102)

For each month, Maximums and Minimums are decade averages of the extreme maximums or the extreme minimums that occurred during that month.

TABLE 25. MONTHLY TEMPERATURE EXTREMES BY DECADE

2010-2019

Maximums	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
LA County: Claremont	80	80	87	90	92	97	101	102	104	97	90	80
LA County: Whittier	85	83	88	90	91	93	99	100	104	100	93	81
LA County: Santa Monica	83	79	84	83	79	81	85	86	94	93	91	79
Orange	85	85	89	91	90	91	94	96	101	99	94	82
Riverside	84	83	91	94	96	104	106	106	106	100	93	83
San Bernardino	81	82	89	94	96	103	106	106	106	98	91	81
Minimums	**Jan**	**Feb**	**Mar**	**Apr**	**May**	**Jun**	**Jul**	**Aug**	**Sep**	**Oct**	**Nov**	**Dec**
LA County: Claremont	34	34	37	39	43	49	53	53	51	47	39	33
LA County: Whittier	42	40	43	45	47	53	56	57	56	53	46	41
LA County: Santa Monica	41	42	45	48	52	56	60	60	57	54	46	40
Orange	41	40	45	48	52	58	61	62	58	54	44	40
Riverside	34	35	40	44	48	56	58	58	55	49	40	34
San Bernardino	33	33	39	42	46	54	58	58	54	48	38	32

2000-2009

Maximums	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
LA County: Claremont	82	82	86	92	96	96	101	101	104	96	87	81
LA County: Whittier	85	85	87	91	95	94	98	99	103	95	88	83
LA County: Santa Monica	83	81	82	83	82	77	83	83	90	87	84	78
Orange	87	87	88	93	92	90	93	95	100	93	88	81
Riverside	85	83	87	89	102	100	105	105	108	97	89	82
San Bernardino	83	83	89	95	101	102	106	106	106	99	89	82
Minimums	**Jan**	**Feb**	**Mar**	**Apr**	**May**	**Jun**	**Jul**	**Aug**	**Sep**	**Oct**	**Nov**	**Dec**
LA County: Claremont	34	34	36	38	44	48	54	54	51	44	38	34
LA County: Whittier	41	42	42	44	49	52	56	57	55	51	46	41
LA County: Santa Monica	40	41	44	46	52	56	59	59	56	51	44	40
Orange	38	40	42	45	51	54	58	59	56	50	43	38
Riverside	32	37	37	41	48	54	59	59	54	46	35	33
San Bernardino	32	33	36	39	45	51	54	56	52	44	35	32

1990-1999

Maximums	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Orange	82	83	83	88	87	89	91	96	97	95	88	81
Riverside	84	83	86	93	95	102	105	107	104	101	91	83
San Bernardino	82	82	84	91	95	102	105	106	103	99	88	81
Minimums	**Jan**	**Feb**	**Mar**	**Apr**	**May**	**Jun**	**Jul**	**Aug**	**Sep**	**Oct**	**Nov**	**Dec**
Orange	40	41	42	45	51	54	58	58	58	51	43	36
Riverside	33	36	37	42	48	52	58	58	54	42	37	32
San Bernardino	33	36	36	42	46	50	56	55	53	45	37	32

1980-1989

Maximums	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Orange	83	85	85	91	86	91	96	95	97	94	87	81
Riverside	81	86	87	96	97	101	106	105	106	99	90	82
San Bernardino	81	85	86	96	98	101	106	106	106	99	90	83
Minimums	**Jan**	**Feb**	**Mar**	**Apr**	**May**	**Jun**	**Jul**	**Aug**	**Sep**	**Oct**	**Nov**	**Dec**
Orange	36	38	42	45	49	55	59	60	56	51	42	37
Riverside	32	32	36	40	46	51	56	55	52	45	35	31
San Bernardino	31	31	36	39	45	51	55	54	51	43	35	30

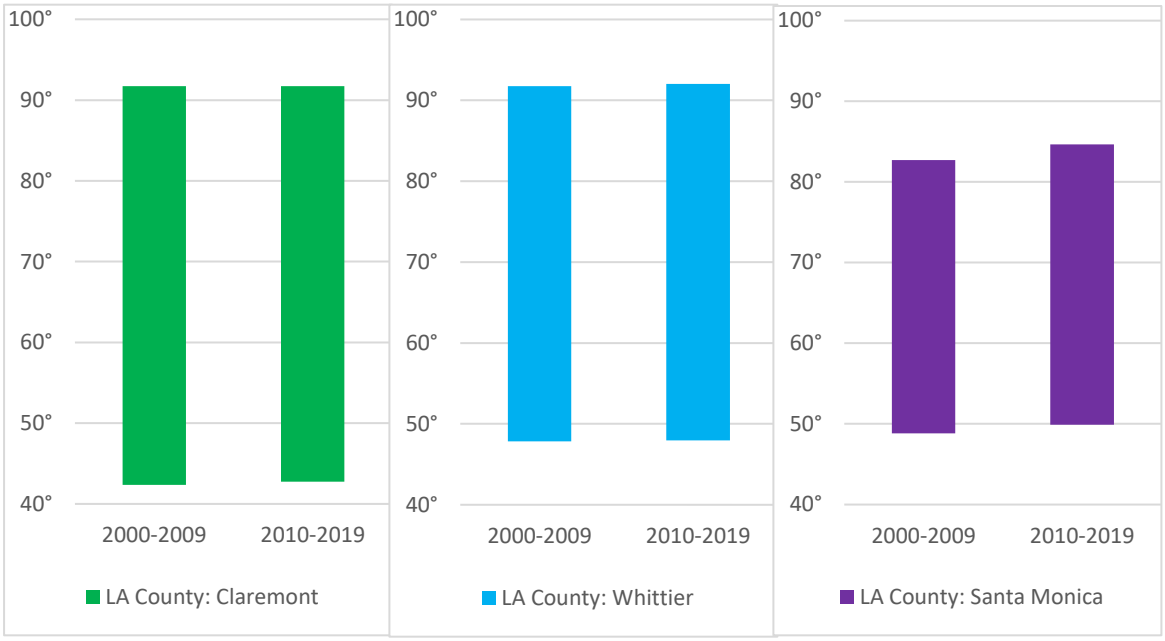
1970-1979

Maximums	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Orange	81	82	83	83	91	92	94	92	100	93	86	81
Riverside	80	83	86	88	99	103	105	104	103	98	89	80
San Bernardino	79	83	85	89	100	105	107	105	104	99	88	80
Minimums	**Jan**	**Feb**	**Mar**	**Apr**	**May**	**Jun**	**Jul**	**Aug**	**Sep**	**Oct**	**Nov**	**Dec**
Orange	36	38	40	42	47	53	58	58	55	47	42	37
Riverside	28	32	35	37	44	51	55	54	50	41	34	31
San Bernardino	28	32	34	36	42	49	53	53	49	41	33	28

Selected Cities in Los Angeles County

As mentioned above, data for Claremont, Whittier, and Santa Monica, all cities in Los Angeles County, extend back only two decades. Consequently, the cities' temperature changes appear modest compared to the other California counties covered by this analysis.

CHART 1. AVERAGE OF EXTREME MAXIMUM AND MINIMUM TEMPERATURES BY DECADE



The only significant change the Joint IOUs see in the above charts is a slight increase in both maxima and minima extreme temperatures for Santa Monica over the two decades. One possible explanation for this, along with the smaller gap between maxima and minima, could be Santa Monica's proximity to the ocean, whose temperature tends to moderate coastal zones and has been rising over the last few decades.

When we look at monthly detail, we find a similar pattern.

Claremont

For Claremont, the Joint IOUs see very little change in the monthly pattern of temperatures over the last two decades.

CHART 2. EXTREME MAXIMUM TEMPERATURES BY MONTH FOR CLAREMONT

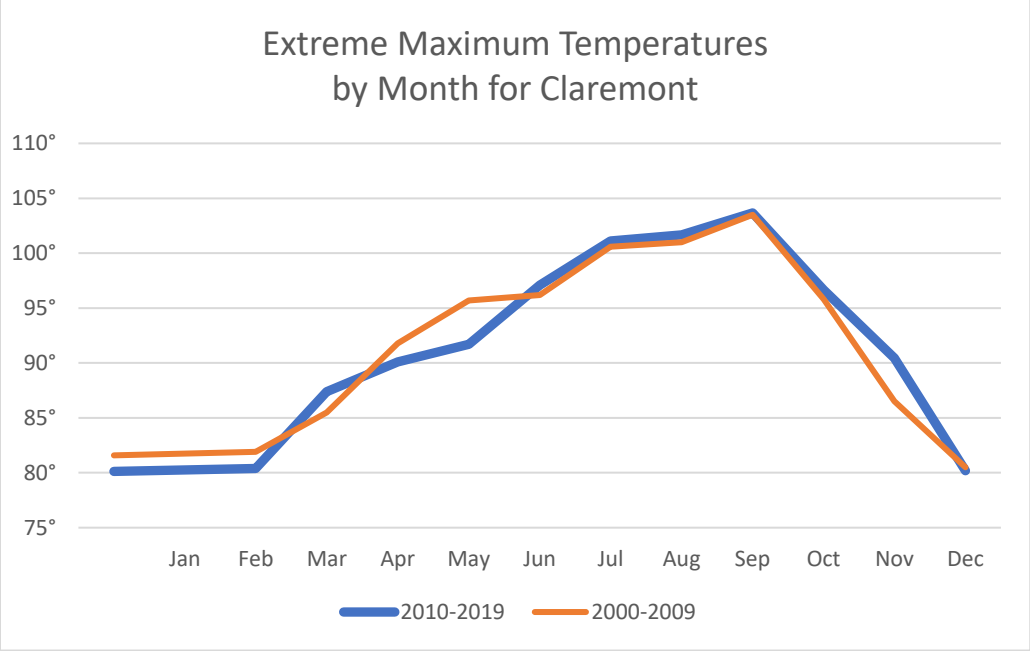
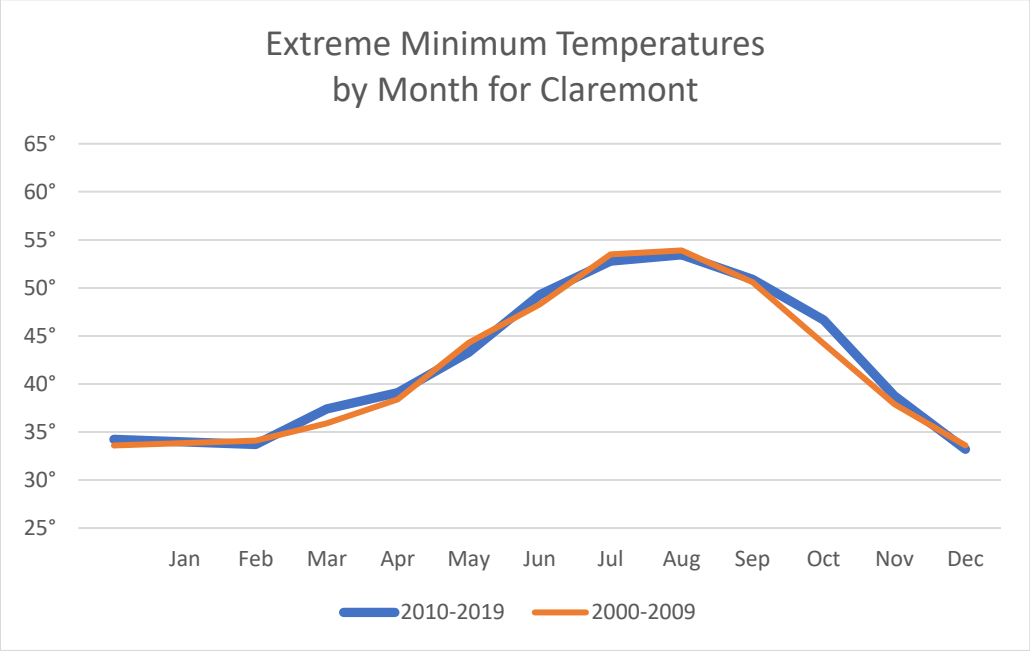


CHART 3. EXTREME MINIMUM TEMPERATURES BY MONTH FOR CLAREMONT



Whittier

Whittier exhibits a similar pattern, except for the five-degree increase in average extreme maximum temperatures in October and November.

CHART 4. EXTREME MAXIMUM TEMPERATURES BY MONTH FOR WHITTIER

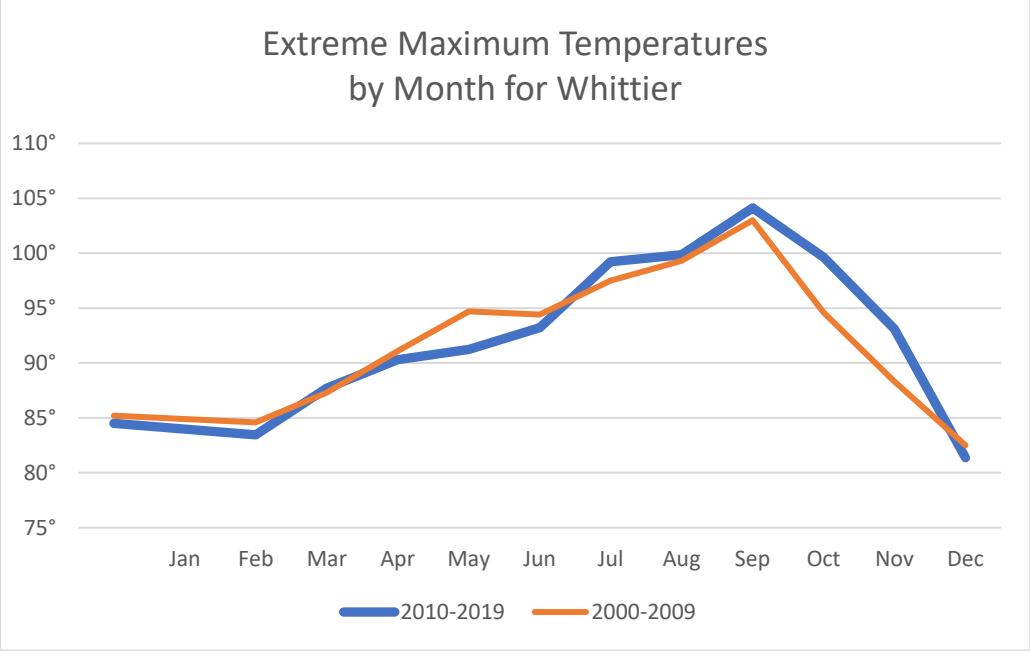
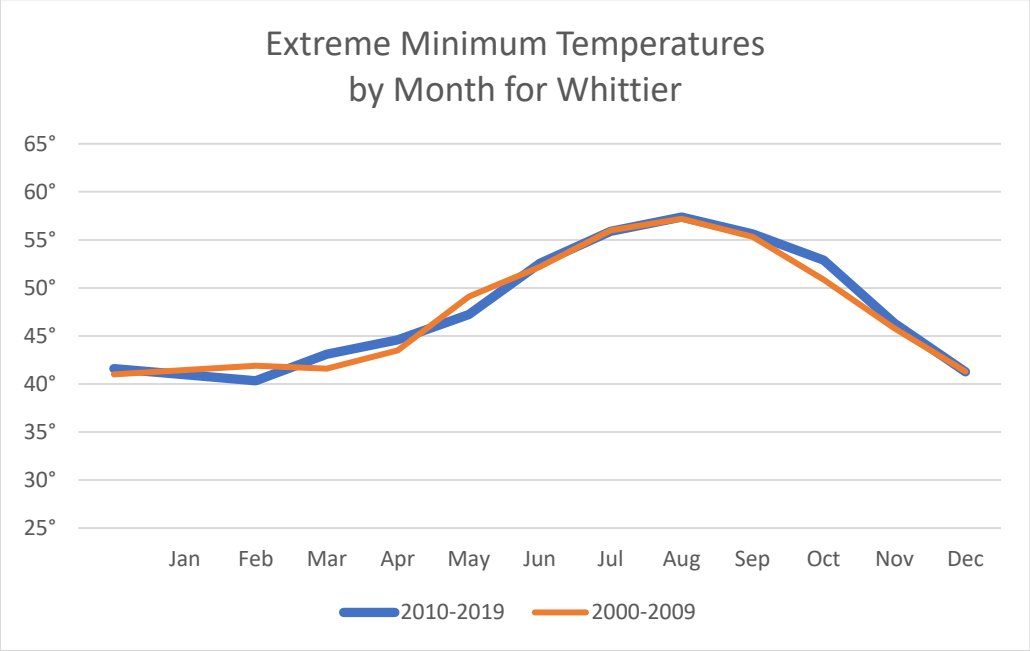


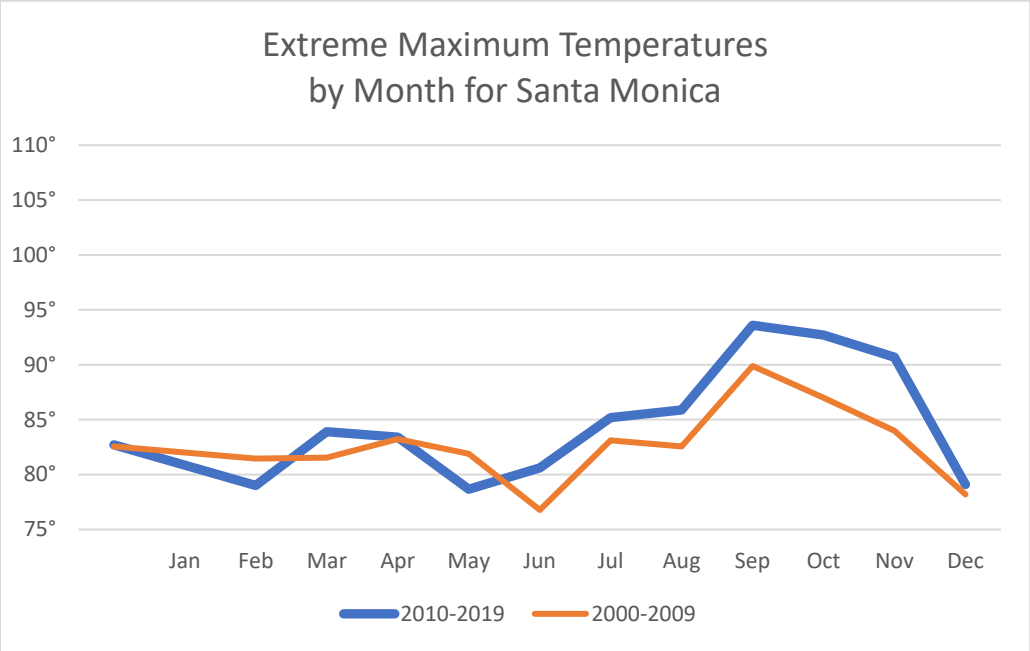
CHART 5. EXTREME MINIMUM TEMPERATURES BY MONTH FOR WHITTIER



Santa Monica

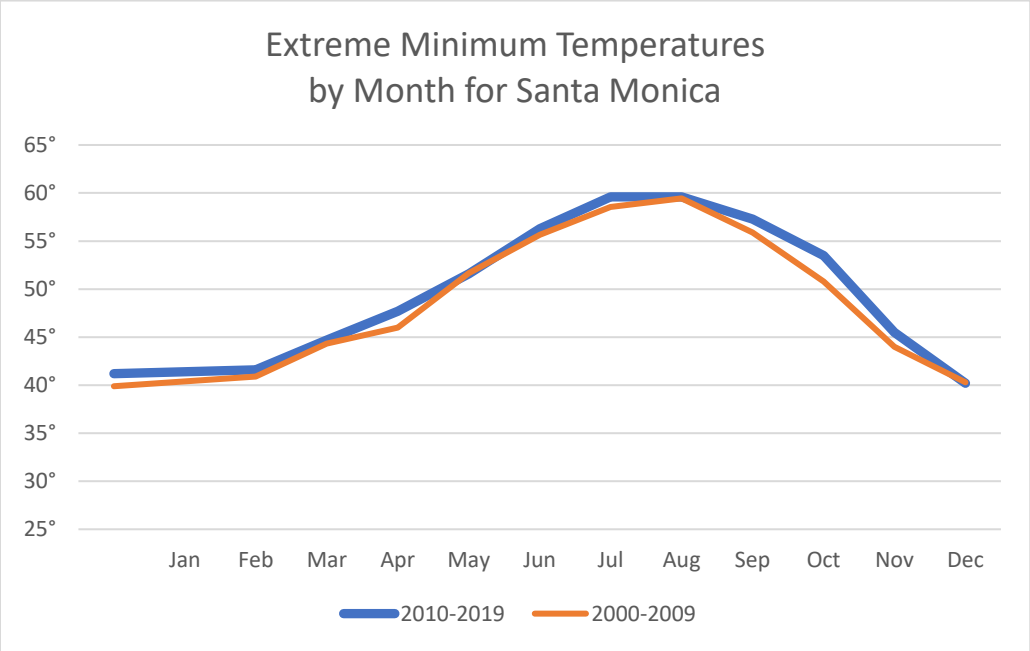
Although Santa Monica is closer to the coast than Whittier or Claremont, it has shown a dramatic variability in monthly maximum temperatures. For example, while temperatures in the 2010s were lower in January, February, and May than in the previous decade, maximum temperatures were demonstrably warmer during the summer and fall.

CHART 6. EXTREME MAXIMUM TEMPERATURES BY MONTH FOR SANTA MONICA



By contrast, extreme minimum temperatures increased only slightly, especially during the second half of the year.

CHART 7. EXTREME MINIMUM TEMPERATURES BY MONTH FOR SANTA MONICA



Again, these changes might be due to shifts in ocean temperatures

Riverside County

Over the last five decades in Riverside County, extreme minimum and maximum temperatures have increased, as shown in the following chart[18].

CHART 8. AVERAGE OF MONTHLY EXTREME MAXIMUM AND MINIMUM TEMPERATURE BY DECADE, RIVERSIDE COUNTY

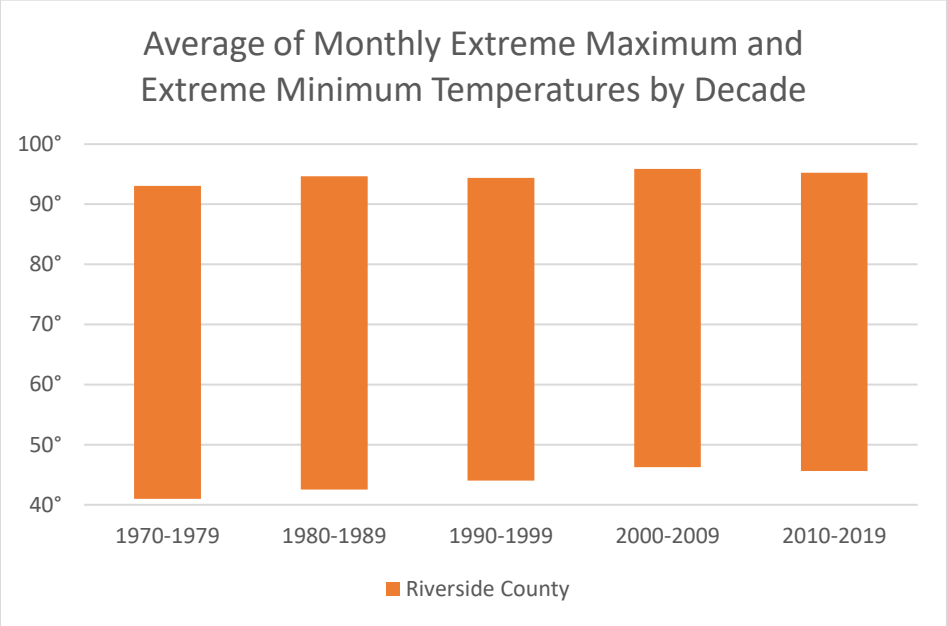
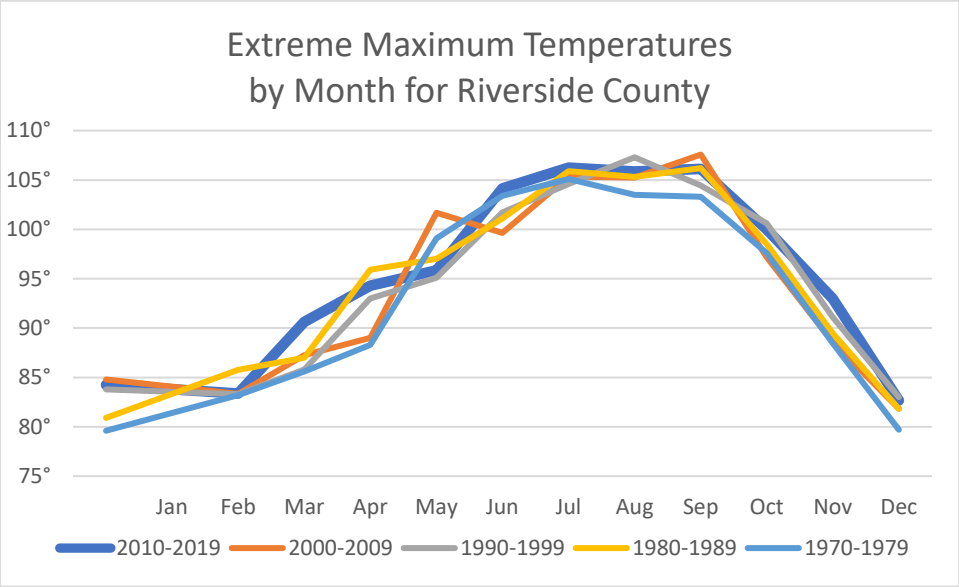


Chart 8 above reveals unexpected patterns about this progression. From the 1970s to the 2010s, the average monthly extreme maximum temperature increased by 2°, from 93° to 95°; yet the average monthly extreme minimum temperature increased by 5°, from 41° to 46°. Thus, the range between extreme maxima and minima is shrinking, albeit slowly.

When we view monthly patterns, we encounter other revealing observations.

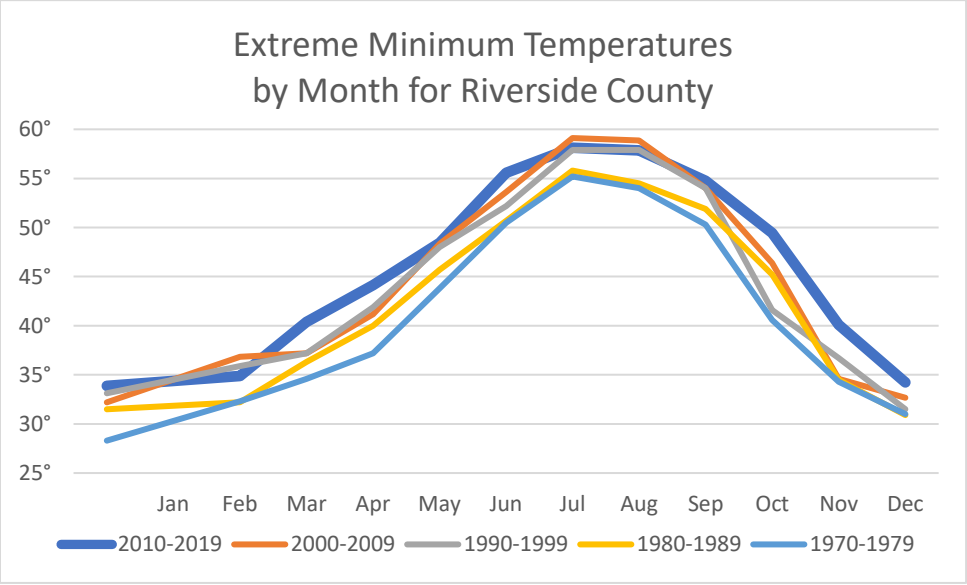
[18] US National Oceanic & Atmospheric Administration (NOAA), "Global Summary of the Month" at https://www.ncdc.noaa.gov/cdo-web/search.

Chart 9. Extreme Maximum Temperatures by Month, Riverside County



As shown above, extreme monthly temperatures in Riverside County have been climbing since the 1970s, but the progression has not been steady. The most significant increases have been in March, June, and November; February and May were cooler in comparison.

Chart 10. Extreme Minimum Temperatures by Month, Riverside County



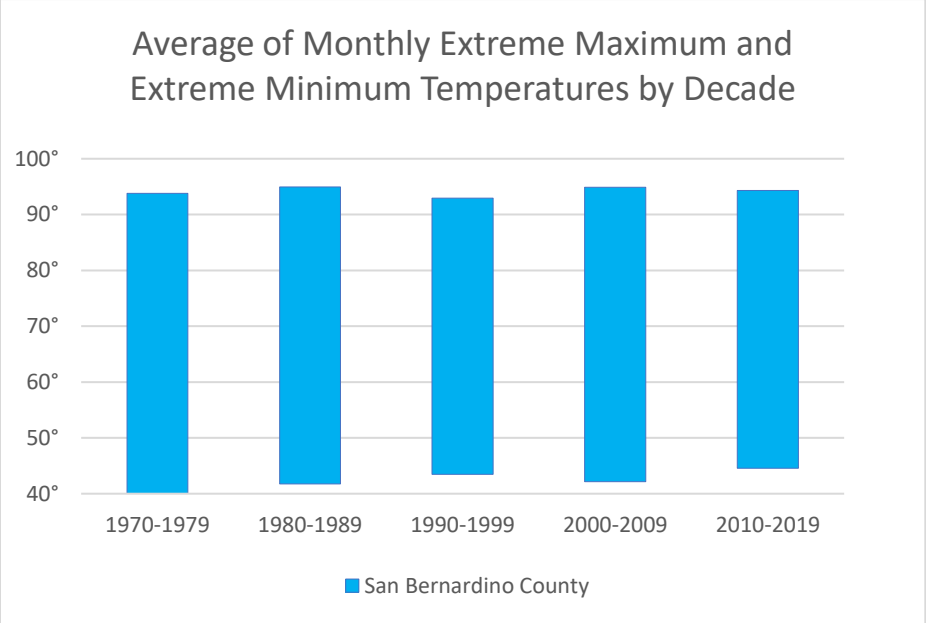
By contrast, extreme minimum temperatures in Riverside County have dramatically risen compared to every month in the 1970s. Moreover, these increases have been generally progressive, though the 2000s experienced higher minimum in February, July, and August.

The surprising conclusion for Riverside County is that extreme minimum temperatures have been rising faster than extreme maximum temperatures.

San Bernardino County

Over the past five decades, extreme maximum temperatures within San Bernardino County have fluctuated but not increased significantly, whereas extreme minimum temperatures have increased.

Chart 11. Average of Monthly Extreme Maximum and Minimum Temperature by Decade, San Bernardino County

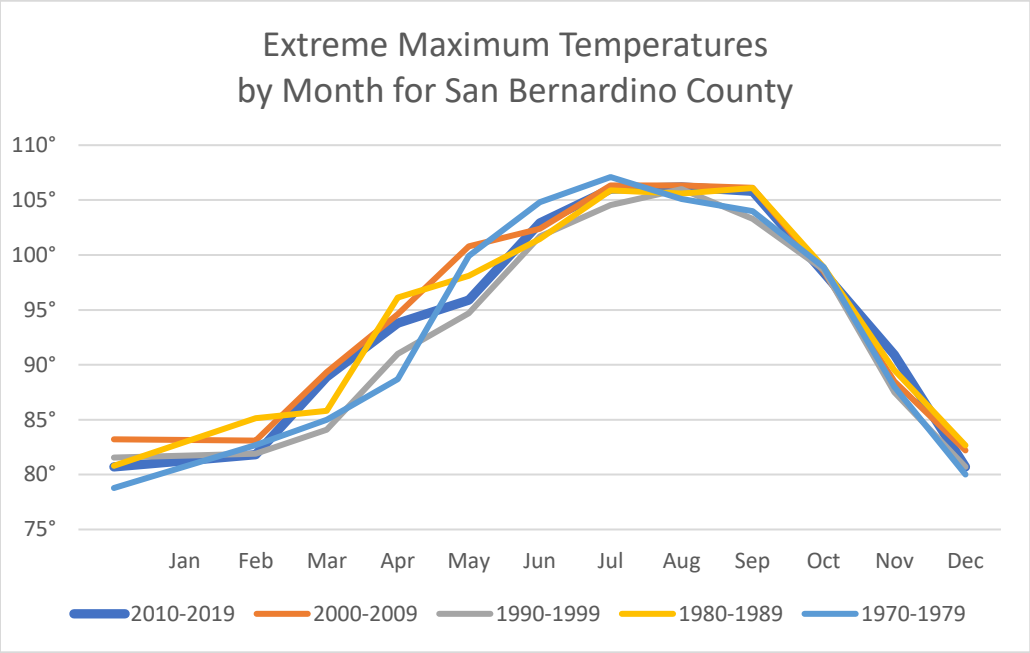


As the above chart[19] reveals, extreme maximum temperatures across the decades varied between 93° and 95°, but the maximum for the 1970s, 94°, equals that for the most recent decade. By contrast, extreme minimum temperatures have climbed from 40° in the 1970s to 45° in the last decade. The range between the extreme maxima and minima has therefore shrunk.

This observation is reinforced when we examine the monthly data shown below. When we look at extreme maximum temperatures by decade, we see that no single decade's monthly maximum dominates the display.

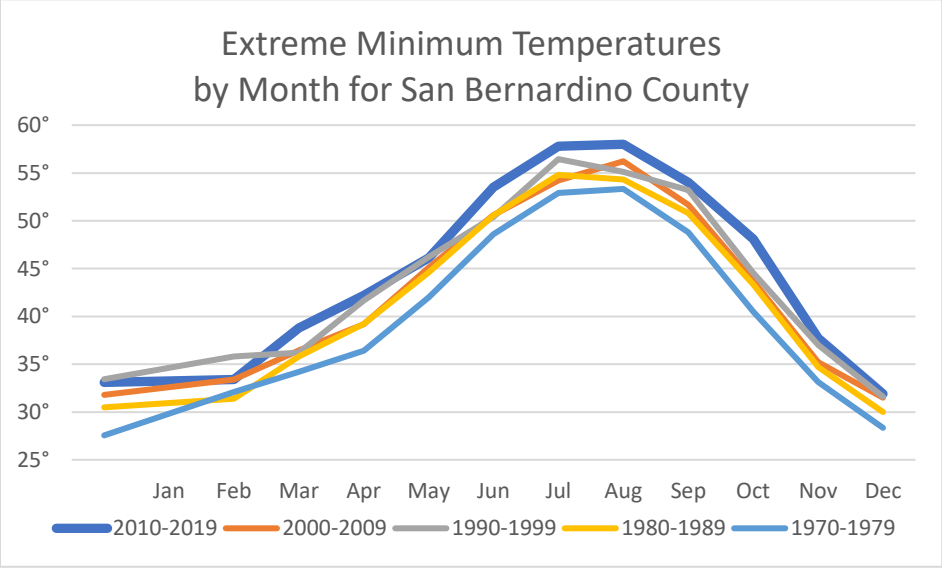
[19] Ibid.

Chart 12. Extreme Maximum Temperatures by Month, San Bernardino County



However, when we look at the same chart for monthly minima, we see that the last decade produced significantly warmer minima than any prior decade, except for February in the 1990s.

Chart 13. Extreme Minimum Temperatures by Month, San Bernardino County

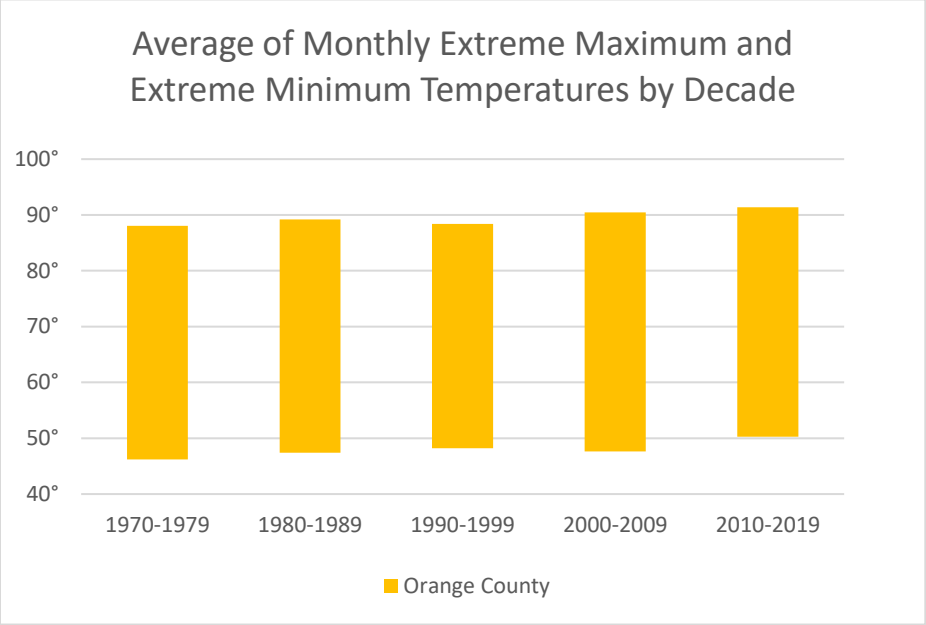


We conclude that the principal impact of climate change on San Bernardino County has been increasing extreme minimum temperatures over the last five decades.

Orange County

Although its proximity to the ocean tends to moderate Orange County's climate compared to its inland neighbors, both the county's extreme maximum and minimum temperatures have increased over the past five decades.

Chart 14. Average of Monthly Extreme Maximum and Minimum Temperature by Decade, Orange County

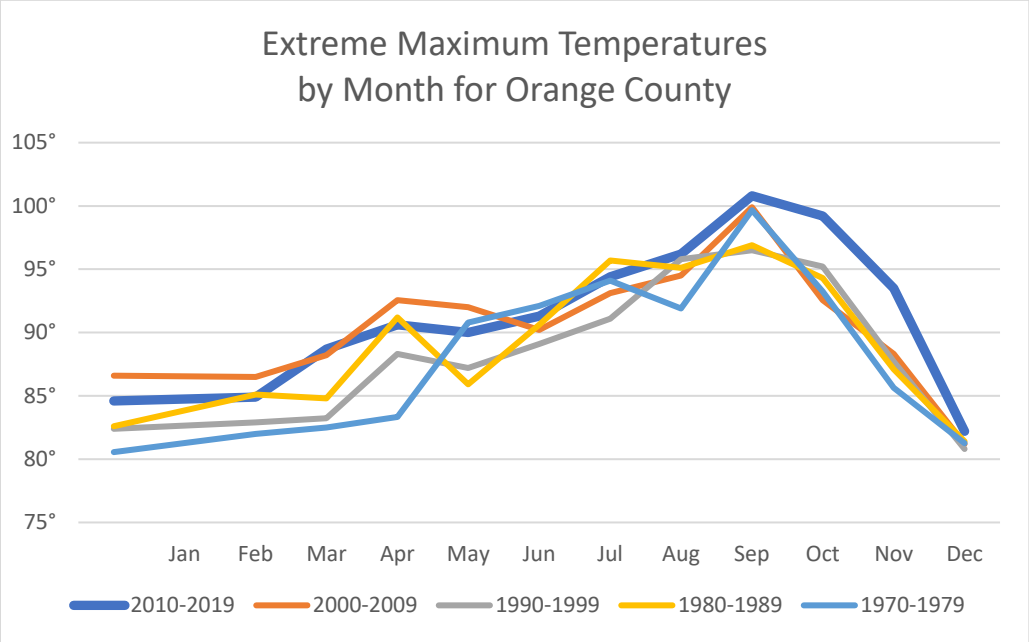


As the above chart[20] illustrates, from the 1970s to the 2010s, Orange County's average extreme maximum temperature climbed 3° from 88° to 91°, its minimum growing 4° from 46° to 50°. Ocean moderation kept the difference between extreme maxima and minima to 42°, compared with 51° and 52° for Riverside and San Bernardino counties, respectively.

[20] Ibid.

Monthly data also reveal a strikingly different profile for Orange County compared to the inland counties.

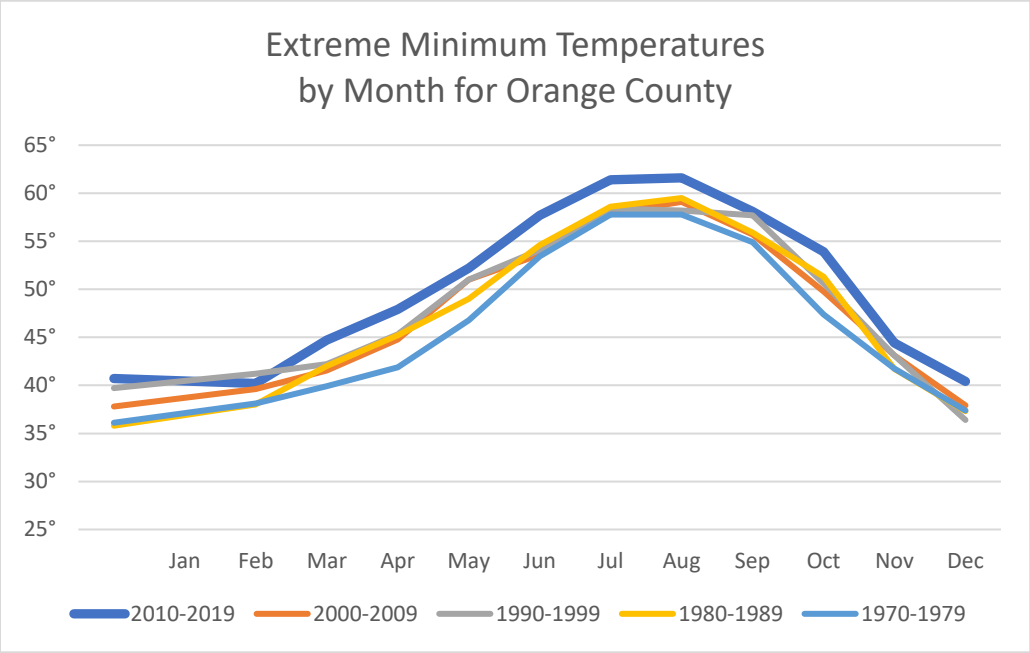
Chart 15. Extreme Maximum Temperatures by Month, Orange County



The most noticeable element is that September consistently ranks as the month with the highest extreme maximum temperature. In the inland counties, July, August, and September all share this distinction. Another critical observation is that extreme maximum temperatures for October and November have increased dramatically from the relatively stable past patterns during the most recent decade.

When we look at average extreme minimum temperatures, we see another dramatic change.

Chart 16. Extreme Minimum Temperatures by Month, Orange County



Possibly due to ocean warming, extreme minimum temperatures in Orange County have increased significantly over the last decade, exceeding those for every month except February.

Appendix E. ESA Program's California Installation Standards (IS) Manual

The Joint-Pilot Program adopts the attached ESA Program California Installation Standard (IS) Manual (2019). The Joint-IOUs will update this manual when the next version becomes available.

It is also essential to understand that not all measures identified in the IS Manual apply to the Joint-Pilot Program.

ESAP IS Manual_August 2019.

Appendix F. SCE and SoCalGas Data Definition

The definition of high-usage for the Joint-Pilot is explicitly developed for customer targeting and planning. Therefore, this is not the exact definition as the filed AL 3842-E, which defines high usage for the ESA Program (i.e., non-pilot).

TABLE 26. OPERATIONAL DEFINITION OF SEGMENTATION AND FLAGS (SCE/ELECTRIC)

RISK FACTOR		OPERATIONAL DEFINITION
1	CARE	Being on CARE or CARE related service plan in at least one monthly bill in CY2020 who reside in single family or mobile homes and are still currently active customers on CARE rate as of July 6, 2021 as recorded in CSS.
2	High Usage	Pilot: Usage of at least 300% of baseline at least thrice in CY2020 among customers in Los Angeles, San Bernardino, or Riverside counties; Basic/Enhanced or Core: Usage of at least 300% of baseline at least once in CY2020 excluding those customers in Los Angeles, San Bernardino, or Riverside counties
3	Disconnection	Having at least one completed disconnection from March 1, 2019 to March 31, 2020 in CSS. Temporary halt of disconnections after March 31, 2020.
4	DAC (Disadvantaged Community)/CA Environmental Score	CA Environmental Score of at least 75%. "The California Environmental Protection Agency (CalEPA) is responsible for identifying disadvantaged communities for purposes of the Cap-and-Trade funding program. In October 2014, after a series of public workshops, the Agency designated as disadvantaged communities the 25% highest scoring census tracts using results of the California Communities Environmental Health Screening Tool Version 3 (CalEnviroScreen 3.0)."
5	Tribal or American Indian	Deduced from receipt of public assistance from Tribal/TANF and/or Bureau of Indian Affairs as recorded in CSS
6	Dwelling Vintage	Living in a dwelling unit of at least 30 years vintage based on time from installation service start date to July 19, 2021 as recorded in CSS
7	Hot climate zone	Living in climate zones 13, 14, & 15
8	PSPS	Customer resides in a High Fire Risk Area (HFRA), i.e. Tier 2 and/or Tier 3, based on circuit associated with customer's dwelling unit as recorded in CSS
9	Medical Baseline and/or Critical Care	Customer is on medical baseline or critical care status in CSS
10	Disabled	Customer is hearing impaired, has respiratory conditions, CIS critical condition, and other similar ailments as recorded in CSS

TABLE 27. DEFINITION OF SEGMENTATION AND FLAGS (SOCALGAS/GAS)

RISK FACTOR		OPERATIONAL DEFINITION
1	CARE	Being on CARE or CARE related service plan in at least one monthly bill in CY2020 who reside in single family or mobile homes and are still currently active customers on CARE rate as of July 6, 2021 as recorded in CIS
2	High Usage	Pilot: Average daily usage in a one calendar month period over 200% baseline during winter months 2020. These winter month peaks are consistent with SoCalGas' system-wide peaks.
3	Disconnection	Having at least one completed disconnection from March 1, 2019 to March 31, 2020 in CSS. Temporary halt of disconnections after March 31, 2020.
4	DAC (Disadvantaged Community)	CA Environmental Score of at least 75%. "The California Environmental Protection Agency (CalEPA) is responsible for identifying disadvantaged communities for purposes of the Cap-and-Trade funding program. In October 2014, after a series of public workshops, the Agency designated as disadvantaged communities the 25% highest scoring census tracts using results of the California Communities Environmental Health Screening Tool Version 3 (CalEnviroScreen 3.0)."
5	Tribal	Living in a dwelling in Federally recognized tribal territory
6	Dwelling Vintage	Living in a dwelling unit of at least 30 years vintage based date facility created in CIS
7	Cold climate zone	Living in climate zones 2 and 3
8	Medical Baseline	Customer is on the Medical Baseline program
9	Disabled	Customer has self-identified as disabled per ESA Program application

Appendix G. WE&T Ordering Paragraph (OP)

Below, we include for your reference quotations OP-104 and OP-111 from the Income Qualified Program D.21-06-015.

OP-104
"Pacific Gas and Electric Company, Southern California Edison Company, Southern California Gas Company, and San Diego Gas & Electric Company must comply with the following additional workforce, education, and training efforts:

- Alignment with the California Workforce Development Board's Energy and Climate Jobs initiatives;
- Alignment of Energy Savings Assistance (ESA) training with the Multi-Craft Core Curriculum; and
- Establishment of formal partnerships between the Utilities, contractors, apprenticeships, and community college programs to better integrate ESA into energy efficiency workforce education, as well as with organizations that provide services to assist in developing ESA workers into more advanced positions, and with community-based organizations that provide services to assist those in disadvantage."

OP-111
"Pacific Gas and Electric Company, Southern California Edison Company, Southern California Gas Company and San Diego Gas & Electric Company must include the following questions to bidders in any request for proposals which covers solicitations for the Energy Savings Assistance (ESA) programs' delivery and/or implementation, including in-home programs and pilots:

- How the ESA WE&T objectives described in Section 6.13 of this decision will be met, including the hiring of local and disadvantaged workers, worker training, and career-ladder job development, as well as any new metrics to track these objectives.
- Where applicable, a payment term structure that reflects the program design shift away from a number of homes treated goal to the portfolio energy savings goal, including deeper energy savings per household.
- How to provide quality of service to the customer, including managing customer expectations on what measures/benefits they will receive at what program phase.
- How community input will be incorporated to develop ideas that increase customer willingness to participate, are practical to implement, and will result in high quality of service from the customer's perspective."

Appendix H. EM&V Plan

The following details are recommended methods, analyses, and descriptions of what are in the framework of the EM&V Plan.

Research Methods and Analyses for Impact Evaluation

The overall framework for the evaluation is informed by the four main pilot evaluation methods from the recent Lawrence Berkeley National Laboratory (LBNL) handbook[1], as presented in Table 1. The selected approach to gas and electric billing analyses will determine critical aspects of the Joint-Pilot implementation. For this Joint IOU pilot, pure Randomized Control Trial (RCT) approach is not appropriate for this application, as it would require withholding services from some customers in targeted areas and may not be feasible.

These methods will contribute to a comprehensive assessment of the effectiveness of the Joint Pilot and how they can be improved. In addition, the proposed evaluation tasks include a combination of methods to provide a more comprehensive evaluation and assess causality using multiple approaches. The following sections discuss the potential applications of these methods in more detail.

TABLE 1. EVALUATION METHODS FOR PILOTS

Analysis Strategy	Description	Application in this Evaluation	Value to the Joint IOUs
Experimental or quasi-experimental methods	Random Encouragement Design (RED), matched control groups, etc.	Quasi-experimental or RED approach to estimate electric and possibly natural gas savings	Develop defensible estimates of savings
Non-experimental observational methods	Pre/post comparison to estimate savings (no control or comparison group)	Possible option for delivered fuels where it may not be feasible to construct a control or comparison group	Provide an estimate of whole house changes in energy use
Non-experimental survey methods	Interviews, focus groups, surveys; the goal is to assess the perspective of a respondent rather than test an action	Customer, contractor, building owner surveys; interviews with pilot implementer and QC contractor	Customer, implementer, and QC contractor perspectives are critical for improving pilots; surveys design will address internal and external validity to the extent possible.

Non-experimental case studies	In-depth analysis, including contextual conditions	Case studies may provide some concrete examples of how the pilot works	Case studies, although somewhat subjective, provide accessible examples of successful installations.

The evaluation tasks described above were developed from research design options to ensure that the evaluation provides a robust and reliable assessment of the performance of the Joint-Pilot. The following discussion is organized by evaluation task.

Methods for Consumption Analysis

There are some methods for conducting pre/post-consumption analysis: 1) Difference-in-Differences, 2) population level NMEC with control group, 3) Regression Discontinuity, two-stage house-by-house regression modeling, and others. These approaches may be applied to the Joint-Pilot. These two methods are described briefly below.

These methods are commonly used for impact evaluation. However, the exact approach will be proposed by the evaluator and reviewed by the Joint-IOUs.

Sampling Issues and Sample Sizes

Developing a control or comparison group with either RED or a quasi-experimental approach will be necessary to develop robust results. However, careful consideration will be needed, as a poorly matched comparison or control group will likely introduce bias to the evaluation results.

Complicating factors include:

1. The initial enrollment for all eligible customers should be the same for the two pilots, with customers assigned to Plus or Deep based on the results of the energy modeling software. Thus, dividing the control group (who will not receive an audit) into those eligible for Plus or Deep would have to be approximated using another basis.
2. Prioritizing eligibility by the number of segmentation flags may make it impossible to develop a representative control or comparison group, as segmentation may affect energy use. Thus, future participants with fewer flags may not be a representative control or comparison group.
3. Experience suggests that a substantial percentage of participants (40% to 60%) may not be used in the consumption analysis due to insufficient data or erratic consumption patterns.
4. The process of matching SoCalGas and SCE high-usage customers may lead to complications. This situation will require careful consideration of the sampling strategy and joint program delivery to ensure mutual success.

Assignment to the treatment and control/comparison groups will need to be thoroughly considered to address the first two issues. One of the approaches is as follows:

1. Segment the eligible population (e.g., by the number of flags or consumption levels),
2. Within each segment, randomly divide the population of eligible customers into three groups, one for each implementation year,

3. Divide the eligible population for each year into treatment and control groups (if needed),
4. Conduct pilot outreach to the treatment group for each year.

This approach would produce a better match between the treatment and control or comparison groups. However, the above action will require coordination at the beginning of the Joint-Pilot implementation period to ensure that the initial outreach is conducted correctly.

Consumption models will incorporate a census of all participants and control or comparison group members with sufficient consumption data. However, as the total number of customers who are ultimately impacted remains unknown, so does the degree of statistical precision. Therefore, an initial power analysis will be required to assess model and sample sizes. ***Other considerations include the following***:

- AMI data: The greater granularity of AMI data will allow for a more nuanced analysis of weather-dependent loads, and this approach is preferred if the data are available.
- Whole-house energy analysis: The Joint-IOUs may seek to estimate Whole-House changes in energy use, including natural gas, propane, and other fuels, if feasible within the budget and the sample size is sufficient.
- Delivered fuels: The results will be more sensitive to random variation caused by irregular deliveries for delivered fuels such as propane. An observational analysis rather than an experimental or quasi-experimental approach may be required due to the difficulties and prohibitive expense of developing a comparison or control group.
- GHG reductions: Annual electric and, if available, fossil fuel energy reduction combined with the current and publicly available conversion data are required to estimate GHG reductions.
- Pre-period consumption patterns: The consumption analysis may also include a pre-period analysis of consumption by customer group to identify any patterns; for example, customers may be motivated to participate in the Joint-Pilot due to equipment failure or other significant events in the home.
- Limits of the impact evaluation: The consumption analysis will be designed to determine savings per home for the Joint Pilot-Plus and Pilot-Deep. However, some participants may also receive services through gas and electric ESA-Basic, ESA-Enhanced/Plus, and Building Electrification Single Family (BE SF) Pilot. As consumption analysis can only estimate savings at the household level with accuracy, the impact evaluation will **not** be expected to attribute savings to these other programs.

These considerations should inform the final design of the impact evaluation.

Joint-Pilot Metrics

Data will be collected through the evaluation activities and program tracking to support the evaluation outcomes. The evaluation objectives and example metrics are outlined in Table 2 below. These metrics will be refined in collaboration with the evaluation contractor.

TABLE 3. HIGH-LEVEL OVERVIEW OF POTENTIAL METRICS

Area	Potential Metric Categories	Purpose
Gas and Electric Impacts	• Pre/post change in gas and electric consumption, relative to comparison or control group • Estimated reduction in Therm, kWh/kW	Quantify gas and electric energy and demand savings

Other Impacts	• Whole house pre/post change in energy consumption, including fossil (gas/electric) and other fuels (i.e., propane) --optional • Non-energy impacts, may be qualitative • Change in gas/electric and overall energy bills • Reduction in GHG emissions	Assess other impacts of the pilots
Evaluability	• Availability of key fields required for evaluation • Percent of key fields that are populated • Assessment of the accuracy of key fields	Ensure availability of relevant data for reliable and valid evaluation of pilots
Program Processes	• Assessment of marketing and outreach effectiveness • Assessment of efficiency of processes in providing services to targeted customers	Identify changes to streamline and improve program processes
Audit Review	• Assessment of the effectiveness of audit in identifying homes with deep retrofit possibilities • Assessment of audit inputs and savings as compared to on-site conditions and house-specific billed use	Assess the effectiveness of the audit
Participant Experience	• Assessment of barriers • Investigate fuel type, use of heating and cooling equipment, and other primary end uses • Investigate pre/post changes in the use of appliances, heating and cooling equipment, and other primary end uses • Assessment of perception of changes in energy bills and ability to pay bills • Assessment of perception of improvements in household health, comfort, and safety, etc.	Improve outreach, investigate NEI's, inform billing analysis, assess causality
Contractor Experience	• Assessment of changes in contractors' installation practices and communication with customers	Assess the impact on the local workforce

Audit Effectiveness Review

This review can be folded into the process evaluation. The goal is to assess if the test-in and energy modeling process can successfully identify the appropriate Joint-Pilot program path for implementation. It is also essential to see if the independent QA/QC process improves the quality of the contractors' energy savings estimate (i.e., not overestimating energy savings).

Participant Surveys and Interviews.

A sample of participants will be surveyed before the installation and from nine months to a year after the installation. These surveys will be designed to inform the billing analysis, provide qualitative (and possibly quantitative) information on NEI's and customer perceptions of the pilot impacts, and support causality. This information will provide context for understanding the customers' experience. The pre-installation and post-installation participant surveys will include questions to inform and support impact evaluation. The evaluator may opt into design customer interviews as well.

Contractor Surveys

Contractor surveys will be used to explore contractors' experiences and contribute to contractor performance analysis. Along with other data sources, this information will provide the Joint-IOUs a better understanding of contractors' experience and performance. Although this is an essential evaluation item, it can be easily incorporated into a well-planned process evaluation.

Case Studies

The evaluation may also include two to four case studies illustrating how pilot programs worked at specific sites. These case studies may include the following:

1. Pre- and post-utility analysis of bills and overall housing burden
2. Physical properties of the home, such as vintage, house type, size
3. Description of pre-existing conditions, including condition and type of mechanical equipment, condition of the building envelope, type of affordable housing and ownership structure, health, and safety issues, etc.
4. Description of EE measures recommended and installed and any other related work (health and safety, building envelope repairs, etc.)
5. Description of other benefits or issues/challenges
6. Pre- and post-project customer testimonial(s), including health, safety, and comfort impacts

Case studies will provide relatable examples of services offered through the program. This is an optional study item.

[1] Cappers, P. and A. Spurlock. "A handbook for designing, implementing, and evaluating successfully electric utility pilots", Lawrence Berkeley National Laboratory, September 2020. Contract

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Appendix I. Joint-Pilot Program Q&A

Below is a list of questions and answers, including relevant items from the statewide pilot workshop. We have organized these Q&As into major categories to make it easier for the readers. Some of these answers may be subject to change as the Joint-IOUs go through the Joint-PIP approval, RFP solicitation, and the Joint-Pilot Program implementation process.

About Program Design and Implementation

Q1: Will Pilot-Deep claim both deemed and calculated energy savings?

A1: The entire project for Pilot-Deep will take a calculated approach, including measures that may have deemed savings already. This approach means that the qualified contractor must make appropriate assumptions for all equipment and appliance hours of usage based on site-specific conditions.

Q2: Are the Joint-IOUs concerned about the possibility of having overestimated Pilot-Deep's calculated energy savings claim?

A2: Yes, this is a serious concern. As we can see from the EUCA Program impact evaluation, the realization rate for the Advanced HUP has a lower realization rate than desired. Joint-IOUs consider this a contractor training issue and challenge the Pilot implementer to address this concern in the RFP process.

Q3: Do you need to collect customer information to re-verify the customer segmentation or needs analysis (i.e., the flag analysis)?

A3: No, the Joint-IOUs must repeat the customer targeting analysis using the 2021/2022 CARE database for implementation in 2023, 2024, 2025. After sampling design considerations, the Joint-IOUs will provide the Pilot implementer a specific list of customers for outreach. Additional random sampling assignment is possible and should be considered annually.

Q4: Will the Joint-IOUs provide the Pilot implementer a specific list of customers for 2024 and 2025?

A4: Yes.

Q5: Can customers from 2024 trade for a spot for 2023 implementation?

A5: The targeted customer list for 2023, 2024, and 2025 has been through a sampling design effort so that the composition can be as balanced as possible. We do not see a problem with a few customers trading slots from year to year (i.e., less than 5% of the list).

Q6: What is the process for assigning eligible customers to Pilot-Plus or Pilot-Deep?

A6: All Joint-Pilot targeted customers are pre-screened for CARE and high-usage status, then prioritized based on the customers' segmentation and characterization. The Joint-Pilot is designed to offer services to homes with the potential for deep energy retrofits. Consequently, it will be necessary to conduct energy modeling of each house to determine the appropriate measures for the home and the potential energy savings. The energy modeling software (e.g., EnergyPro) will be used for this task. Once a list of possible measures has been determined, eligible customers will be assigned to Pilot-Plus or Pilot-Deep based on the magnitude of the calculated potential energy savings. If a targeted customer can't demonstrate the deep energy savings potential from the energy-software modeling efforts, the customer may instead referred to the standard ESA Program.

Q7: How does energy modeling for the impact evaluation differ from the energy modeling for assigning eligible customers to the different Joint-Pilot paths?

A7: The purpose of the initial energy modeling for assigning customers to the Pilot Program path is to estimate the potential savings from installing specific measures. The impact evaluation uses consumption data to compare the pre-and post-period energy use and determine actual savings. The actual energy savings need to be normalized for weather conditions. There are numerous approaches to normalization, most of which rely on linear regression. Some examples are pooled cross-sectional time-series regression (CSTS), normalized annual consumption (NAC), change-point models, and normalized metered energy consumption (NMEC).

Q8: How will Joint-IOUs ensure that program design is customer-centric and still meet the 50% energy savings per home goal?

A8: Targeted customers for the Joint-Pilot are CARE and high-usage customers in Los Angeles, San Bernardino, Riverside counties. The Joint-IOUs conduct a joint account matching to match these counties' high-electric and high gas usage customers, so the Joint-Pilot will serve dual-fuel and high-usage customers. Next, the Joint IOUs will initiate a customer needs and characteristic flag analysis (i.e., disable, disconnect, etc.) to prioritize the outreach. Screened-in targeted customers with the most needs will be the first ones to access program outreach.

Q9: What opportunities are there for IOUs to further workforce development through the pilot, given that these advanced treatments likely require higher wages and skills than basic treatments?

A9: SCE and SoCalGas are planning to conduct a third-party solicitation to select a qualified Joint-Program implementer. In addition, the joint IOUs will select an independent QA/QC vendor and an EM&V evaluation vendor. The Joint-IOUs are looking for BPI-certified contractor(s) to qualify as the Joint-Pilot implementer. In addition, the Joint IOUs will be looking for a HERS Rater to be eligible as the QA/QC vendor. The program is also designed to include a contractor

onboarding process, topic-specific training, and close-the-loop feedback training using QA/QC inspection results.

The program design also incorporates a test-in and test-out process to screen for high energy-savings potential. This rigorous screening process and specific customer targeting have never been tried by the ESA Program before. These requirements will bring a pool of skilled contractors to the program and support them with a feedback loop using the QA/QC results data.

Q.10: How can the pilots incorporate some of the demand response goals of the Summer Reliability and Main EE (Governor's proclamation) proceedings?

A10: This Joint-Pilot is facing a very steep learning curve just to become operational. The Joint IOUs respectfully decline to incorporate this requirement at present. SCE is offering other programs, such as Time-of-Use (TOU) rate programs. These other programs may be more appropriate to address summer reliability concerns promptly.

Q11: What are the lessons learned from prior similar programs?

A11: The Joint IOUs conducted detailed research of prior program studies inside and outside California. Since the EUCA Program has been successfully implemented in California for an extended period, the Joint-Program team authorized a summary of lessons learned.

Q12: What are the lessons learned from the primary ESA Program?

A12: We have learned that ESA Program participants may not reduce energy usage but may increase it after the program treatment. This is a big challenge since the upgraded measures may, for example, be broken room heaters that the households could not access. However, after receiving new heaters, families may use heating more appropriately (i.e., more often). Therefore, we consider that increased usage after program treatment may also be a part of the ESA Program's Health/Comfort/Safety secondary benefit. In addition, the Joint-Pilot Program has incorporated energy education and high-energy-usage tracking as part of after-care during the Pilot Program implementation.

Q13: Do you need high gas and high electricity usage to join the Pilot?

A13: SoCalGas and SCE are currently analyzing whether enough joint households are "high" users of both fuels to provide a sufficient number of homes for EM&V purposes. Factors such as willingness to participate and program drop-outs are being considered for the necessary program sample size. If the targeted sample size is not sufficiently large, the plan will be revised to determine how to select high users of just one fuel.

Q14: How to coordinate services with other programs, and any special consideration for homes that have well water, and maybe prioritizing solar power to those properties?

A14: RFP with implementer will require coordination proposal. The Joint-IOUs will look at the well water concern. This is a newly identified issue.

Q15: Definition of Single-Family (SF) homes? 1-4 units?

A15: We will do so if measures can reduce usage in quadplexes. The Joint-IOUs confirmed after the statewide workshop that Single Family home definition will stay the same (i.e.,1-4 units).

Q16: How will you decide on 15% savings overall when you have both gas and electric savings?

A16: This will be determined based on the on-site audit.

Q17: Will you be using EnergyPro outputs to calculate % savings, or doing it on a BTU basis, or percent of each?

A17: Specific energy modeling software has not been selected. Energy Pro is just an example. The tool will be used to determine which treatment path each home will receive (core ESA Program, Pilot Plus, or Deep). The tool will also be used to calculate savings after Pilot-Deep installations are completed. Electric and gas energy use will need to be combined/converted to a standard unit such as BTU.

Q18: I did not notice any fuel substitution measures on the measure list. Were they considered for this pilot?

A18: Given that this is a Joint-Pilot between SoCalGas and SCE, the decision was not to offer Building Electrification Single Family (BE SF) measures within the Joint-Pilot Program. In addition, as a part of the Joint-Pilot Program customer outreach process, potential pilot participants will be asked if they are interested in electrification. If the customer is interested, they will be referred to SCE's BE SF Pilot, where they will receive marketing materials and detailed information on electrification.

Separately, SCE will offer some BE SF Pilot measures in its new standard ESA Program at the Enhanced and Plus level and the BE SF Retrofit pilot, covering a wide array of BE measures.

Q19: For renters, will you require owners not to increase rents?

A: Yes, this pilot will implement rent-increase protection similar to what is being done in the San Joaquin Valley (SJV) Disadvantaged Communities (DAC) pilot.

Q20: Have you decided on the type of audit to be conducted?

A20: Test-in and test-out audit using energy modeling software and blower door testing. May also sample some homes for infrared testing to check for thermal leakage locations.

Q21: For the targeted area, will the contractor be given a list of customers for outreach?

A21: The IOUs will provide the list of high potential customers for outreach. IOUs will analyze potential candidates' usage and identify which customer segments they fall into to characterize their needs.

Q22: For the energy savings from 15% to 50%, can you talk about the relationship between energy savings versus project cost?

A22: The Joint-Pilot will focus on higher energy users because if you want to save a lot of energy, you have to be using a lot of energy. Investing in high usage homes will provide the

biggest bang for the buck. Customers who have an inefficient central AC they have not been using much would not see much (or if any) savings if the Pilot replaced their system. Systems cost the same to replace regardless of how much they are used. We will experiment within the guidelines for this pilot and see what savings and cost-effectiveness are genuinely obtained.

Q23: Will the same TRC method be used as in the standard ESA Program?

A23: IOUs have not yet determined which cost-effectiveness metric will be used to analyze the CE of the pilot. TRC may be most appropriate but to be determined.

Q24: In addition to lists of customers to be sent to the Pilot contractors, what other type of marketing support is planned?

A24: SCE & SoCalGas at this time do not have more detail. We may have brochures and events, but that will be determined in the solicitation process.

Q25: Is the pilot program non-resource?

A25: The primary goal of the Joint-Pilot Program is to provide deep energy savings. But there will be some non-resource services offered to allow installation of resource measures, similar to Minor Home Repair in the standard ESA Program, plus mold abatement and others.

About the Qualification of the Joint-Pilot Implementer and Others

Q1: Can the Joint-Pilot implementer be a Pilot Program qualified contractor?

A1: Yes, the Joint-Pilot implementer can be a qualified contractor performing direct installations as necessary.

Q2: Can the Joint-Pilot implementer be an ESA Program contractor?

A2: Yes, the Joint-Pilot implementer can be an ESA Program contractor. The Pilot-Program's design will guide the participants to the most appropriate program path based on the energy savings potential, including participating in the ESA Program.

The Pilot Program Implementer (and subcontractors) will also need to provide standard ESA Program services for which the customer may be eligible. This will help streamline the process for the customer to minimize visits and increase customer satisfaction.

Q3: What is the Joint-IOUs' vision of the role of the implementer?

A3: The Joint Implementer will coordinate activities with IOUs as well as with contractors. The Joint Implementer will provide training and ensure contractors are eligible to provide the required services. The Joint-Implementer should also be able to perform installation services as well.

Q4: Scope of work for the inspector role vs. the implementer role. Will the inspector do the initial assessment and routing projects to the standard ESA Program and the Pilot-Plus or Pilot-Deep? Or will they be doing more of a post-installation QA/QC?

A4: The inspector will be doing QA/QC after the installation.

Q5: Will the implementor do the audit?

A5: Yes, either the implementor or their subcontractor, whoever is at home.

Q6: Do you anticipate issuing multiple implementer contracts by region or one master PO (with a bunch of subs)?

A6: SoCalGas and SCE plan on contracting with one implementor who can subcontract as necessary to provide the required range of services.

About EM&V Actions

Q1: Does the evaluation also include the ESA Program Building Electrification Pilot and Clean Energy Homes pilot (in addition to the Plus and Deep Pilot)? If not, will there be separate contracts?

A1: The IOUs are considering issuing one RFP for all three pilots, but the plan is to issue three separate contracts due to the different scopes of work required for each evaluation.

About the RFP Process

Q1: How do you take the mystery out of working with the utilities to respond to the RFPs?

A1: The IOUs have filed a communication with the service list regarding their RFP plans. The plan is to provide training, a workshop, etc., to educate prospective bidders on each utility's respective RFP process. The statewide workshop was part of that communication process.

Q2: The IOUs are taking different approaches. SCE and SoCalGas have designed the program in-house and plan to put out to bid the implementation, inspection, and evaluation functions. On the other hand, PG&E and SDG&E opted to allow bidders to offer innovative ideas to design the pilot and the implementation. How did the IOUs arrive at their respective approaches?

A2: SCE and SoCalGas feel they need to determine how to ensure the ambitious 5-15% and 15-50% energy savings. SCE can't do it alone. It was never our intent to outsource the program entirely. We will encourage innovation during our RFP phase and be open to new ideas from CBOs, non-profits, current ESA Program contractors, and other contractors. For the RFP process, we are providing a little more structure but will be seeking more innovation. Areas for additional improvement include marketing and outreach, such as designing continuous engagement after project completion. Other areas for bidder input include how to project and measure energy savings. A set of measures can also be modified via the bidding process.

Q3: For Market Rate bidder solicitation, there is a process to allow bidders to opt-in or partner together. Contractors new to the low-income field may not be ready to be prime contractors. A prime may have a gap in their skill set for which they would want to subcontract out. Is this something that the IOUs are considering? The important thing is for IOUs to encourage bidders to form a team as appropriate. Allow bidders to find out who else is interested in building stronger teams and creating better RFP responses.

A3: SCE is promoting all the solicitations using the EE processes. SCE also set up a webpage on sce.com specifically for these new low-income solicitations. The goal is to cast a wide net to attract as many bidders as possible. SoCalGas is also leveraging experience from the Energy Efficiency solicitations.

SCE webpage mentioned above:
https://www.sce.com/partners/ESA-solicitations