Silicon Valley Clean Energy
Customer Program Advisory Group Meeting
Wednesday, June 20, 2018
11:00 am

Sunnyvale Community Center | Recreation Center
Neighborhood Room
550 E. Remington Drive
Sunnyvale, CA

AGENDA

Call to Order

Roll Call

Public Comment on Matters Not Listed on the Agenda
The public may provide comments on any item not on the Agenda. Speakers are limited to 3 minutes each.

Consent Calendar
1) Approve Minutes of the May 16, 2018, Customer Program Advisory Group Meeting

Regular Calendar
2) Board Feedback (Discussion)
3) Customer Experience Presentation (Discussion)
4) SVCE Heat Pump Water Heater Grant Award (Presentation and Discussion)
5) Opportunities and Motivating Factors for Heat Pump Water Heater Adoption: Would You Sign Up for This? (Discussion)

Committee/Staff Remarks and Future Agenda Items

Adjourn

cleanenergy.org
333 W El Camino Real
Suite 290
Sunnyvale, CA 94087

Pursuant to the Americans with Disabilities Act, if you need special assistance in this meeting, please contact the Clerk for the Authority at (408) 721-5301 x1005. Notification 48 hours prior to the meeting will enable the Authority to make reasonable arrangements to ensure accessibility to this meeting. (28 CFR 35.105 ADA Title II).
Call to Order

Board Clerk Andrea Pizano called the meeting to order at 11:04 a.m.

Roll Call

Present:
Member Gary Latshaw, City of Cupertino
Member Tara Sreekrishnan, City of Cupertino
Member Donald Weiden, City of Los Altos
Member Peter Evans, Town of Los Altos Hills
Member George Parton, Town of Los Gatos
Member Bryan Mekechuk, City of Monte Sereno (arrived at 12:11 p.m.)
Member Robert Brewer, City of Mountain View
Member Sandeep Muju, City of Saratoga (arrived at 11:06 a.m.)
Member Douglas Kunz, City of Sunnyvale
Member Tara Martin-Milius, City of Sunnyvale
Member James Tuleya, City of Sunnyvale
Member Pamela Garcia, Unincorporated Santa Clara County
Member Tristan Mecham, Unincorporated Santa Clara County

Absent:
Member Thomas Clavel, City of Milpitas
Member Jeff Homan, City of Mountain View

Board Clerk Pizano noted a resignation letter was received from Member My Nguyen, City of Campbell.

Public Comment on Matters Not Listed on the Agenda
No speakers.

Consent Calendar

1) Approve Minutes of the April 18, 2018, Customer Program Advisory Group Meeting

MOTION: Vice Chair Martin-Milius moved and Member Garcia seconded the motion to approve the Consent Calendar.
The motion carried unanimously with Members Homan, Clavel, Mekechuk, and Muju absent.

**Regular Calendar**

2) **Other Program Factors Scoring**

CPAG Chair Peter Evans introduced the item and reviewed information distributed to the group regarding additional program benefits identified and estimated program costs and CO2 measurements associated with the programs. Chair Evans provided instruction for an exercise to score the additional program factors identified using a high/low, broad/narrow, or short/long ranking. Chair Evans referred to an article by Jim Bushnell of the Haas Energy Institute.

Following is a list of the factors to be scored by the group:

- Scalability (high/low)
- Customer Participation (broad/narrow)
- Time to Implement (short/long)
- Time to outcomes/benefits (short/long)
- Uncertainty of outcomes/benefits (high/low)
- Cost (high/low)
- Cost of Carbon (high/low)

The group briefly discussed the Bill Explorer program, benefits of customer comparisons, and the role of the CPAG in regards to program selection.

Director of Account Services & Customer Relations Don Bray provided information regarding program funding and comments on the program briefs.

Chair Evans opened public comment.

Michael Closson, Chair of Peninsula Clean Energy’s (PCE) Citizens Advisory Committee, commented he was present to learn what the SVCE CPAG is doing and explore collaboration opportunities with SVCE down the road. Closson noted PCE's current program efforts.

Chair Evans closed public comment.

The group participated in the scoring exercise and took a brief recess for lunch at 11:50 a.m.

3) **Customer Experience Presentations**

Following a brief recess, Member Kunz provided a presentation on his experience installing a heat pump water heater and responded to member questions.

Following discussion on Item 3, Chair Evans addressed Item 5 without objection.

5) **Input from Members’ Community Outreach**

Item 5 was heard following Item 3.
Vice Chair Martin-Milius and Members Tuleya, Muju, and Mekechuk provided brief comments regarding feedback they have received from their respective communities.

At the request of Community Outreach Manager Pamela Leonard, the group heard Item 6.

6) Next Steps for Report to the SVCE Board

Chair Evans introduced the item and outlined the proposed report to the Board:

Present the prioritized list of twelve proposed programs, include the twelve program briefs, include the score sheets, include the group scoring of other factors, and include the program costs/CO2 sheet.

Director of Account Services and Customer Relations Bray responded to member questions regarding the Bay Area Air Quality Management District (BAAQMD) grant which SVCE applied for.

Members and Staff viewed a timeline diagram and discussed the CPAG’s involvement in shaping future programs and providing input for the next few months until the CPAG’s term concludes.

Community Outreach Manager Leonard displayed results of the exercise performed in Item 2 and the group briefly discussed the outcome. Chair Evans responded to member questions.

Following Item 6, the group addressed Item 4.

4) Program Prioritization

Item 4 was heard following Item 6.

Vice Chair Martin-Milius provided instruction to the group on a three-dot vote exercise to rank and prioritize the twelve proposed programs. Each member was allotted three dots to vote for the programs which they most valued based on the information discussed at all CPAG meetings.

Following are the results of the three-dot voting exercise:

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<tr>
<th>Programs</th>
<th>Votes</th>
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<td>Residential Storage – reduce duck curve impacts</td>
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<td>Connected Home Devices – customer understanding and load management</td>
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<td>Residential &amp; MF EV Charging – encourage vehicle electrification</td>
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<td>BE Smart Residential Water and Space Heating Upgrade</td>
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Following the first three-dot voting exercise, members were allotted a second set of three dots for a second round of voting.
Following are the results of the second three-dot voting exercise:

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<tr>
<th>Programs</th>
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<td>Residential Storage – reduce duck curve impacts</td>
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**Committee/Staff Remarks and Future Agenda Items**

Chair Evans invited CPAG members to attend SVCE’s Board of Directors meeting in June.

Member Tuleya encouraged members to attend SVCE’s other open meetings and provide individual input during open comment.

Community Outreach Manager Leonard confirmed a July Board meeting as well as CPAG meetings scheduled through September.

**Adjourn**

Chair Evans adjourned the meeting at 1:06 p.m.

**Attachments**

1. Other Factors Scoring Sheet Displayed to the CPAG Group on 5/16/18
2. Post meeting Other Factors Scoring Sheet with Tally Figures
### Scoring Sheet

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### SVCE CPAG Program Evaluation Worksheet - Other Factors

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### Other Factors

- **Scalability (high/low):**
  - HIGH: 9, LOW: 3
  - BROAD: 8, NARROW: 3
  - SHORT: 9, LONG: 2
  - SHORT: 10, LONG: 3
  - HIGH: 3, LOW: 8
  - HIGH: 1, LOW: 6
  - HIGH: 4, LOW: 5

- **Customer participation (broad/narrow):**
  - BROAD: 8, NARROW: 3
  - SHORT: 9, LONG: 2
  - SHORT: 10, LONG: 3
  - HIGH: 3, LOW: 8
  - HIGH: 1, LOW: 6
  - HIGH: 4, LOW: 5

- **Time to implement (short/long):**
  - SHORT: 9, LONG: 2
  - SHORT: 10, LONG: 3
  - HIGH: 3, LOW: 8
  - HIGH: 1, LOW: 6
  - HIGH: 4, LOW: 5

- **Time to outcomes/benefits (short/long):**
  - SHORT: 9, LONG: 2
  - SHORT: 10, LONG: 3
  - HIGH: 3, LOW: 8
  - HIGH: 1, LOW: 6
  - HIGH: 4, LOW: 5

- **Uncertainty of Outcome (high/low):**
  - HIGH: 3, LOW: 8
  - HIGH: 4, LOW: 6
  - HIGH: 5, LOW: 5
  - HIGH: 6, LOW: 7
  - HIGH: 7, LOW: 2
  - HIGH: 8, LOW: 3
  - HIGH: 9, LOW: 9

- **Cost (high/low):**
  - HIGH: 4, LOW: 8
  - HIGH: 1, LOW: 6
  - HIGH: 5, LOW: 5
  - HIGH: 7, LOW: 2
  - HIGH: 3, LOW: 9
  - HIGH: 0, LOW: 2
  - HIGH: 2, LOW: 4

- **Cost of Carbon (high/low):**
  - HIGH: 1, LOW: 6
  - HIGH: 0, LOW: 2
  - HIGH: 3, LOW: 10

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5/16/18
Staff Report – Item 3

To: Silicon Valley Clean Energy Board of Directors
From: Girish Balachandran, CEO

Item 3: Customer Program Advisory Group Progress Update Report
Date: 6/13/2018

RECOMMENDATION

BACKGROUND
In October of 2017, the SVCE Board of Directors voted to form the CPAG, chartered to:
- Serve as a conduit for community input and review of prospective residential customer programs
- Consider residential customer program recommendations through qualitative analysis
- Prioritize and recommend candidate programs through quantitative analysis
- Communicate and promote Board-adopted programs

The work of the CPAG will expand and complement programmatic input from the Member Agency Working Group (MAWG). The MAWG, formed by the CEO earlier in 2017, meets monthly and is comprised of staff representatives from SVCE’s member agencies with roles in sustainability, communications, and general administration.

The MAWG reviewed and provided input to the CPAG charter. Qualitative analysis performed by the CPAG will consider community needs, priorities and engagement opportunities in the recommended set of programs. It was established that detailed quantitative analysis of prospective programs would be completed utilizing program measurement criteria and metrics established by staff and the MAWG. CPAG members will not be expected to perform the calculations; however the quantitative analysis will be an important process for CPAG members to understand. In addition, the CPAG can play a critical role as a focus group, providing input on how to make proposed programs as relevant as possible to SVCE customers.

An initial readout of program recommendations from the CPAG was set for June of 2018. In subsequent monthly meetings of the CPAG, the group will act on input from the SVCE Board, and provide additional customer input on key programs recommended by staff.

ANALYSIS & DISCUSSION
Initial program recommendations and subsequent input from the CPAG will be folded into an overall SVCE process for forming a program roadmap. As outlined below, SVCE staff is also working with the MAWG to establish common electrification and decarbonization program priorities across the member agencies.

Several member agencies, including the Cities of Sunnyvale and Mountain View, have detailed climate action planning (CAP) updates in process. Similar to the purpose of the CPAG, these cities have established citizen taskforces to provide input to City staff in development of their CAP updates. At the July meeting of the MAWG, member agency representatives will share their respective CAP priorities with respect to decarbonization and electrification. The MAWG will then work to determine common electrification and decarbonization program priorities, a critical input into SVCE’s program roadmap development process.
Candidate programs addressing the needs of commercial and industrial customers will be included in the SVCE program roadmap, through input provided by large commercial and industrial customers via SVCE workshops focused on electrification of transportation, the built environment, and energy storage and demand management (grid innovation). The roadmap will outline goals, strategies and tactics that extend over a multi-year period. Development of a multi-year roadmap is essential to establish decarbonization goals and prioritize program and spending goals.

The program roadmap development process will be supported by SVCE’s new Director of Decarbonization and Grid Innovation, joining the SVCE staff in June of 2018. A high-level program roadmap will be presented by SVCE in Fall of 2018, and in a more detailed format in Winter 2018. A multi-stakeholder workshop to receive input for the roadmap development is expected to be held in late-summer/early Fall.

**STRATEGIC PLAN**
The work of the Customer Program Advisory Group supports SVCE’s strategic plan Goal 5, ‘work with the community to achieve energy and transportation GHG reductions of 30% from the 2015 baseline, by 2021’.

**FISCAL IMPACT**
Input from the CPAG will help launch and guide SVCE’s program roadmap development efforts. The roadmap will direct approximately $5M in annual program investments currently budgeted by SVCE.

**CONCLUSION AND RECOMMENDATIONS**
Staff recommends that the Board receive the Customer Program Advisory Group’s progress update report and provide input and direction for the CPAG, in the context of SVCE’s overall program roadmap development process.

**ATTACHMENTS**
1. CPAG Progress Update Report from CPAG Chair, Peter Evans
Customer Program Advisory Group Progress Update

To: Silicon Valley Clean Energy Board of Directors
From: Peter Evans, CPAG Chair
Date: 6/13/2018

Progress Update from SVCE’s Customer Program Advisory Group

Summary
In this report the CPAG provides our list of potential SVCE residential customer programs, prioritized by the committee, with accompanying quantitative and qualitative evaluation.

The committee’s purpose here is to provide to the Board a list of potential residential energy customer programs that address topics the committee cares about and that the committee believes the communities and customers care about. The committee identified twelve potential programs, of which four received the strongest support:

- Residential Electricity Monitoring
- Electricity Bill Explorer
- Residential BE Ready Program, SF + MF Variants
- Residential & MF EV Charging - encourage vehicle electrification

The programs the committee considered are drawn from a fresh look at potential benefits residential energy customer programs might provide and what initiatives might achieve those benefits. The committee evaluated these programs for their potential to contribute to these benefits, for other factors the committee felt were important, and ultimately, based on individual committee members’ preferences.

The programs themselves are not presented as defined in their final form, and the cost estimates are general, for comparison purposes. The CPAG anticipates this list is one input into a larger program selection, refinement and implementation process, which the committee looks forward to continuing to support.

Process
The SVCE Customer Program Advisory Group (CPAG) was created by SVCE’s Board of Directors at its November 29, 2017 meeting. CPAG members were nominated by SVCE Board members and by the Board Chair; they represent ten of the SVCE member communities and unincorporated Santa Clara County.

Upon formation the CPAG was chartered to:
1. Serve as a conduit for community input and review of prospective residential customer programs.
2. Prioritize and recommend candidate programs through quantitative analysis.
3. Consider residential customer program recommendations through qualitative analysis.
4. Communicate and promote board-adopted programs.
We interpreted this charter as having two key elements that guided our process. The CPAG should consider new ideas from members (i.e., not just review and comment on existing proposals), and the CPAG should give voice to community and customer priorities and needs.

**Potential Benefits of Customer Programs (February Meeting)**

The committee first conducted an exercise to list the possible benefits that SVCE customer programs should provide, from CPAG members’ perspectives. The initial list of customer benefits identified by the committee follows.

- Increase customer energy literacy
- Provide personalized customer engagement; promote active choices (e.g. upgrading to GreenPrime); increase SVCE awareness
- Engage customers in their energy use through comparisons with peers, benchmarks, their own trends (gamification)
- Improve transparency on decisions for customers
- Provide customers more choices and local control
- Increase engagement and participation in energy programs for disadvantaged communities
- Provide customer services or programs not offered by PG&E and leverage services and programs offered by PG&E
- Reduce customer bills by reducing usage and shifting usage from peak price periods
- Reduce customer costs in purchasing and using energy-consuming devices
- Reduce demand during peak hours and increase demand during peak PV production (duck curve)
- Reduce the need for/use of carbon-emitting peaker plants
- Reduce GHG emissions through reduced electricity use
- Promote local jobs and economic development
- Provide customer backup power
- "Transform markets"
- Accelerate adoption of clean energy devices and practices
- Alleviate climate change impacts (GHG reduction)
- Increase readiness for expanded use of clean electricity
- Improve indoor/outdoor air quality
- Increase SVCE sales of clean electricity

The committee intentionally did not assign priority to these potential benefits. For readability they are listed in a loose grouping – customer empowerment, demand/supply alignment, customer cost savings, and GHG reduction – that emerged in subsequent meetings.

**Potential Program Ideas (March Meeting)**

At its next meeting, the committee held an open and creative process to come up with as many program ideas as possible to address one or more of the potential program benefits identified in the prior meeting.

Between the March and April meetings, the CPAG members broke into sub-committees to develop “program briefs.” These briefs were intended to provide enough information about each potential program – its use case, program elements, SVCE’s role in the program, and what a successful program would look like – to allow the full committee to discuss it. A list of the program briefs the sub-committees produced follows.

- Residential Storage - reduce duck curve impacts
- Connected Home Devices - customer understanding and load management
• Residential & MF EV Charging - encourage vehicle electrification
• MF Residence Energy Efficiency - GHG and customer cost reduction
• Safety Preparedness & Resilience with Micro Grids
• Incentives or Rebates for Used Electric Cars and Smart Chargers
• Electricity Bill Explorer
• Residential Electricity Monitoring
• Residential BE Ready Program, SF + MF Variants
• Pilot "Mass Produced" Zero Emission Retrofit Approach
• Electrification Process "Survivorship Curve" Analysis
• BE Smart Residential Water and Space Heating Upgrade

Again, the committee did not give these program briefs any order or grouping. They are listed here in the order in which they were presented. The full text of the program briefs is provided as Attachment 1.

Program Evaluation (April and May Meetings)

At the April meeting, each sub-committee presented its program brief to the full committee. In turn, each CPAG member completed an evaluation of whether that program would directly contribute to, or detract from, or would be neutral to, each potential benefit. Attachment 3 shows, for each program, the total of the committee scores for a positive contribution to each benefit, and the total for all benefits. Attachment 4 shows, for each program, the total of the committee scores for a negative contribution to each benefit, and the total for all benefits. The green color indicates the programs with the highest third of total positive contributions to benefits and lowest third of negative contribution to benefits.

The committee also came up with a list of factors other than pure benefits that the committee viewed as relevant to a decision to adopt or implement a customer program. This list of other factors follows:

• Scalability (high/low)
  o high = can expand program with minimal additional resources
  o low = expansion requires additional or increasing resources
• Customer participation (broad/narrow)
  o broad = most customers can/will participate
  o narrow = few customers can/will participate
• Time to implement (short/long)
  o short = can be implemented immediately
  o long = may take more than one years to implement
• Time to outcomes/benefits (short/long)
  o short = within 1 yr
  o long = 3 yrs or more
• Uncertainty of outcomes/benefits (high/low)
  o low = uptake and outcomes are demonstrated
  o high = uptake or outcomes are undemonstrated
• Cost (high/low)*
• Cost of Carbon (high/low)*

*To support this evaluation, the chair developed rough range-of-cost and GHG reduction estimates for each program based on the program scope proposed by the program sub-committee. Staff reviewed these, but they are not the staff's product. These program cost, GHG reduction, and cost of carbon estimates and explanatory notes are included as Attachment 6.
At the May meeting, the committee evaluated each of the briefed programs for these other factors, and the aggregated results were presented to the committee. Attachment 5 provides for each program the committee total pro and con scores for each of these other factors. Green color indicates where the committee predominantly saw the factor as "pro" for the program, and orange color where the committee predominantly saw the factor as "con" for the program.

Importantly, in addition to these evaluation steps, the committee also hosted presentations followed by group discussions to illuminate real-world energy customer conditions and potential solutions. These included multifamily housing, residential heat pump hot water heater retrofits, and "mass produced" energy efficiency upgrades.

Finally, in the May meeting, to arrive at the group’s prioritization of the briefed programs, CPAG members selected their favored programs using a three-dot vote. A ranked list of the programs follows, and the dot rank scores are included in Attachment 1; a second round of voting did not change the ordering.

1. Residential Electricity Monitoring
2. Electricity Bill Explorer
3. Residential BE Ready Program, SF + MF Variants
4. Residential & MF EV Charging - encourage vehicle electrification
5. Residential Storage - reduce duck curve impacts"
6. BE Smart Residential Water and Space Heating Upgrade
7. Incentives or Rebates for Used Electric Cars and Smart Chargers
8. MF Residence Energy Efficiency - GHG and customer cost reduction
10. Connected Home Devices - customer understanding and load management
11. Electrification Process "Survivorship Curve" Analysis
12. Safety Preparedness & Resilience with Micro Grids

The top one-third (four) programs received broad support from the committee and generally also evaluated well in terms of their potential contribution to program benefits identified by the committee and in terms of the other factors the committee valued. That said, the precise ordering is probably not determinative -- the committee saw merit in all of these programs, and further refinement could change the order.

Going Forward
Now that the CPAG has identified and ranked some of the proposed programs, we will use the following meetings to further explore the top program ideas. Staff will provide additional input on program design considerations, such as lessons learned from other utilities, market opportunities and barriers.

In particular, we believe the committee provides a unique, close-to-the-customer perspective. Arguably whether a program is valued and embraced by customers is as important as its posited contribution to policy goals.

ATTACHMENTS
1. 12 Program Briefs
2. Program Dot Rank Results
3. Program Benefits Positive Results
4. Program Benefits Negative Results
5. Other Factors Results
6. Program Cost and Cost of Carbon Assessment
| **Title & Use Case** (Do “x” for “y”.) | **Residential Storage Program**  
Expand the use of residential storage to reduce duck curve impacts. |
|-----------------------------------|---------------------------------------------------------------------|
| **Specific Elements** | - Pre-engineered package  
- Residential  
- 3 – 5 KW  
- Pair with solar?  
- New construction and/or retrofit?  
- Single family or MUD?  
- Financial modeling tools  
- Group buy  
- Permit assistance |
| **SVCE’s Role** (possible partners or collaborators) | - Promotion  
- Bulk purchase  
- Storage-friendly rate structure  
- Installer pre-qualification  
- Collaborate with installers, startups and established manufacturers |
| **Success** (define success) | - Number of deployments as a direct result of program offering  
- Kilowatt hours under management  
- Kilowatt peak reduction |
<table>
<thead>
<tr>
<th><strong>Title &amp; Use Case</strong> (Do “x” for “y”..)</th>
<th>Connected home for customer understanding and management of their loads and for load management</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Specific Elements</strong></td>
<td>• web connected thermostats (off the shelf)</td>
</tr>
<tr>
<td></td>
<td>• web-connected pool pump controller (off the shelf?)</td>
</tr>
<tr>
<td></td>
<td>• app for customers with device operation and consumption data</td>
</tr>
<tr>
<td></td>
<td>• additional analytics</td>
</tr>
<tr>
<td></td>
<td>• device/load management capability (with customer over-ride) - e.g. peak reduction or summer-only AC management</td>
</tr>
<tr>
<td></td>
<td>• ability to move between solar production to grid and solar storage to optimize viz the Duck Curve for single family homes with solar.</td>
</tr>
<tr>
<td><strong>SVCE’s Role</strong> (possible partners or collaborators)</td>
<td>• rebates for new participants?</td>
</tr>
<tr>
<td></td>
<td>o rebates for thermostats</td>
</tr>
<tr>
<td></td>
<td>o rebates for storage</td>
</tr>
<tr>
<td></td>
<td>• enlistment &amp; customer permission</td>
</tr>
<tr>
<td></td>
<td>• work with one or more 3rd parties (e.g. Nest) - really its their platform; downselect from proposals</td>
</tr>
<tr>
<td><strong>Success</strong> (define success)</td>
<td>• participation rate (different targets for different devices) - find out how willing customers are to participate; maybe pilot 2,500 volunteer Nests with a history</td>
</tr>
<tr>
<td></td>
<td>• customer feedback (are they willing to continue)</td>
</tr>
<tr>
<td></td>
<td>• How much demand reduction there is (what does 2,500 participants map to in kW demand reduction); use control group</td>
</tr>
</tbody>
</table>
| **Title & Use Case**  
(Do “x” for “y”.) | Electric Vehicle Residential Charging Station Incentive program in order to encourage vehicle electrification. |
<table>
<thead>
<tr>
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</thead>
<tbody>
<tr>
<td><strong>Specific Elements</strong></td>
<td>Financial assistance in the form of a rebate or reduced-interest loan to prepare for and install a vehicle charging station. Aimed to offset the split incentive problem.</td>
</tr>
</tbody>
</table>
| **SVCE’s Role**  
(*possible partners or collaborators*) | SVCE would offer the program to residential home and multi-family residence owners and tenants.  
Streamline the process with:  
1) Reduced-cost of charging unit from bulk discount  
2) Preferred contractors to carry out work  
3) Streamlined permitting process  
Tenant – educate on cost and benefits of EVs with recommended tariffs, $ benefits and GHG reduction.  
Property owner – inform about benefits of having a charging station on-site. e.g. better occupancy rates.  
Inform property owner about any incentives from city/state/government.  
SVCE would process the administration and billing of the charging stations on behalf of the landowner. |
| **Success**  
(*define success*) | Take up of program – measured vs a target based on installation and utilization of charging units at residences.  
This program is a double win for SVCE. Reduced GHG from EV use vs gasoline-fueled cars and electricity sourced form carbon-neutral sources. |
<table>
<thead>
<tr>
<th><strong>Title &amp; Use Case</strong> (Do “x” for “y”.)</th>
<th>Multifamily (MF) residence energy efficiency program – program to reduce cost of living to residents and to reduce GHGs.</th>
</tr>
</thead>
</table>
| **Specific Elements** | • Incentives/financial assistance to increase energy efficiency at MF residences.  
• Suggested changes: solar panels, energy efficient appliances (e.g. washers and dryers), energy efficient AC and heating, switch from natural gas/propane to electric cookers.  
• EV Charging  
• Power storage to smooth demand  
• Ability for landowner to sell back excess electricity to reduce split incentive problem.  
• Either replace at end of life or retrofit energy efficient devices.  
• Energy rating scheme to incentivize landowners and inform tenants. |
| **SVCE’s Role (possible partners or collaborators)** | • Financial assistance for work carried out. Either in the form of rebate, discount, or reduced interest-loan.  
• Streamlined permitting process with municipalities.  
• Inform end users and landowners on $ and environmental benefits of specific energy efficient appliances and equipment.  
• Pilot these benefits in an everyday-use scenario.  
• Model the acceptance rate of each recommendation and the actual GHG reduction. (e.g. which devices/appliances had the biggest GHG-reduction impacts in aggregate).  
• Measure the customer experience.  
• Provide an energy efficiency rating. Measure $ benefit to the landowner.  
• Inform about government rebates/tax benefits available to landowner.  
• Recommend energy tariffs to customers to maximize benefit. (e.g. solar or TOU tariff).  
• Partner with housing authorities, construction firms. |
| **Success (define success)** | • A numerical goal of customer monetary savings and GHG savings over 10 years balanced with a positive customer experience. |
### Safety Preparedness and resilience with micro grids

Assuring functional government and community safety in massive emergencies by assuring communications and functionality with micro grids for civic centers/Public Safety. Providing resilience with a distributed grid and power system.

### Specific Elements

- Separable from PGE grid in emergencies
- Critical civic emergency response
- Minimal renewables and storage on site for generation
- Critical crisis response for regional governments
- Critical services for residents and displaced people
- Business continuity and disaster recovery
- Possible connection to Electrification Readiness program

### SVCE’s Roles and possible partners or collaborators

- SVCE with PGE as regional support and resources for grid assessment and design requirements especially as cities update their Civic Government buildings

Other potential collaborators:
- Cities
- School Districts
- Regional communications systems

### Success as defined by...

- Emergency command centers up and running within 5 minutes
- Functional government communication systems

### Benefits

- Local and regional resilience
- Community services including phone and computer charging availability in micro-grid areas
- Enhanced local safety for government, residents, and businesses
- Faster more efficient and effective emergency response
- Fewer lives lost
### SVCE modified Sonoma Clean Power EV and Charger Program

Incentives or rebates for Used Electric Cars and Smart Chargers...

### Specific Elements

- Reduce GHG emissions
- Help Grid balancing
- Move from fossil fuels to clean electricity

### SVCE’s Roles and possible partners or collaborators

- Provide Smart chargers to EV Customers
- Possible rebates for used electric cars

**Incentives:** Purchased Electric Vehicles qualify for government tax credits and state rebate programs:

- Federal Income Tax Credit for up to $7,500. Learn more at [fueleconomy.gov](http://fueleconomy.gov)
- California Rebates: $1,500 to $2,500 depending on the vehicle type. Learn more at [cleanvehiclerebate.org](http://cleanvehiclerebate.org)
- Carpool Lane Access: A limited number of single-occupancy carpool lane stickers are available for EV drivers. Learn more at [dmv.ca.gov](http://dmv.ca.gov)

**Collaborators:**

- Sellers of new and used EVs
- Shared economy providers of things like Zip car services
- Companies like Lyft

### Success as defined by...

- Quantity of purchasers = GHG reduction
- Thanks to Silicon Valley Clean Power’s clean electricity mix, charging an EV significantly reduces greenhouse gas emissions. An EV charged with our Green Prime product has 96%+ fewer emissions than a Toyota Prius Hybrid.
| **Title & Use Case**  
(Do "x" for "y"). | **Electricity Bill Explorer**  
Make bills easy to understand and show how customers can reduce their bills and/or reduce carbon emissions |
|---|---|
| **Specific Elements** | • Import bill data (GreenButton standard or direct from PG&E)  
• Show how different rate plans would impact customer bill  
• Provide personalized comparisons of customer’s usage with norms, peers, and customer’s own past patterns to inform outliers and alert changes in usage.  
• Show how much money & CO2 emissions SVCE saves  
• Show how little it would cost to switch to GreenPrime (if not already a GreenPrime customer) |
| **SVCE’s Role**  
(*possible partners or collaborators*) | • Develop system |
| **Success**  
(*define success*) | • Number of customer bills analyzed by system  
• Number of customers upgrading to GreenPrime after using system  
• Customer feedback |
<table>
<thead>
<tr>
<th>Title &amp; Use Case</th>
<th>Residential Electricity Monitoring</th>
</tr>
</thead>
<tbody>
<tr>
<td>(Do &quot;x&quot; for &quot;y&quot;.)</td>
<td>Facilitate appliance-level (disaggregated) electricity monitoring to increase energy literacy and reduce electricity use</td>
</tr>
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<table>
<thead>
<tr>
<th>Specific Elements</th>
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<tbody>
<tr>
<td></td>
<td>• Customer site electricity monitoring with smartphone interface</td>
</tr>
<tr>
<td></td>
<td>• RFP process to select appropriate monitoring vendor</td>
</tr>
<tr>
<td></td>
<td>• Facilitate installation of devices</td>
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<td></td>
<td>• Study to follow up on energy literacy and electricity usage after installation</td>
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<table>
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<tr>
<th>SVCE’s Role</th>
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<tr>
<td>(possible partners or collaborators)</td>
<td>• Conduct RFP for monitoring solution</td>
</tr>
<tr>
<td></td>
<td>• Bulk purchase and/or rebate for devices</td>
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<td></td>
<td>• Connect customers to approved electricians able to install devices</td>
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<td></td>
<td>• Provide online forum for customers to discuss project among themselves</td>
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<tr>
<td></td>
<td>• Possible partners: Sense Labs, Bidgely</td>
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<thead>
<tr>
<th>Success</th>
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<tbody>
<tr>
<td>(define success)</td>
<td>• Number customers participating in program</td>
</tr>
<tr>
<td></td>
<td>• Increased energy literacy for participants</td>
</tr>
<tr>
<td></td>
<td>• Reduced electricity usage for participants (lower bills &amp; reduced carbon emissions)</td>
</tr>
</tbody>
</table>
| Title & Use Case (Do “x” for “y”.) | Residential BE Ready Program *(SF + MF variants)*  
Increase readiness for planned, economic migration from fossil-fuel use to efficient, clean electricity *(“Beneficial Electrification”) use in residential homes. *(Two variants to address both Single-Family and Multi-Family homes.)* |
|----------------------------------|------------------------------------------------------------------------------------------------------|
| **Specific Elements**            | - Stand-alone program or combine as companion program to any Electrification Migration program.  
- Combine with Green Lease program for rental homes (SF & MF) that aligns cost-benefit interests of renters and landlords.  
- Promote pre-planning for a retrofit migration to a more-efficient and cleaner/safer electric home.  
- Promote an economic and ecological bundle of Beneficial Electrification technologies  
  - Various applicable combinations of electric car/charger, heat-pump water heater, solar PV, heat-pump heat & cool, energy efficiency measures and energy storage.  
  - Press the bundle/package concept since savings from EVs, solar and/or EE more than cover added expense over business-as-usual for heat-pumps until costs get lower.  
- Standard and simple BE Ready Assessment form, which would lead to educated customer, cost estimate and electrification migration Plan. *(See attached examples of Assessment and Plan; focus on biggest impact items, but can lead to a complete all-electric plan.)*  
- Pre-engineered best standard options for panel/sub-panel needs for going all-electric.  
- Promote that trade allies (electricians, solar contractors, HVAC contractors, others?) pitch and conduct a BE Ready Assessment of home as desired and whenever any electric-related work is to be done. *(See attached draft BE pitch slide – with draft BE talking points.)*  
-Draft program design research survey (attached) can morph into lead generation survey form. |
| **SVCE’s Role** *(possible partners or collaborators)* | - Recruit, qualify? and train trade ally “participating” contractors to make BE Ready pitch and Assessments, leading to increased business opportunities for them. |
- Finalize program documents/outputs for Pitch, Assessment/Plan, Lead-Generation survey and standard set of best panel/sub-panel configs.
- Education and Outreach to customers.
- Possible nominal participation incentive, depending on how well the bundled-savings pitch works.
- Coordinate integrated BE-favorable local policies of SVCE member jurisdictions (for remodels and new)
  - Green building codes
  - Permit fee and inspection streamlining
- PG&E partner on local distribution service needs and energy efficiency savings programs/promotion
- For Multi-family program variant, partner with union labor organizations, and apprenticeship programs (e.g. from NOVA).
- For Multi-family variant, consider program design and partner collaboration options for different types of MF buildings, landlords and potential HOA partners.
- Potential partnership/collaboration with BAAQMD and/or local water districts on grants, incentives.
- Extend outreach and education via allied non-profit and climate advocacy groups, as well as members.

**Success**

*(define success)*

- Number of participating customers.
  - # with completed Assessments/plans
  - # of BE Ready work projects completed
  - # of Electrification-related technologies adopted (total and per home)
- Kilowatt hours per customer.
- Number and engagement level of participating trade allies.
- Number of aligned policies among SVCE members.
- Number of new Green Leases adopted.
- Estimated total $ savings for participants
- Estimated total GHG reductions for participants
| Title & Use Case (Do “x” for “y”). | Pilot “Mass Produced” Zero Emission Retrofit Approach  
Run pilot program that attempts to locally replicate approach pioneered by “EnergieSprong” ([http://energiesprong.eu/](http://energiesprong.eu/)) in the Netherlands, to reduce hassle and upfront cost of Zero Emission housing retrofits using combination of financing techniques and demand aggregation that makes robust project coordination and more economical manufacturing (offsite prefabrication) feasible.  
3-minute overview video:  
[https://youtu.be/gm_EIE99W0o](https://youtu.be/gm_EIE99W0o) |
|---|---|
| Specific Elements | Coordinate energy-efficiency+electrification retrofit project that aims to address all housing units in a defined area (e.g. a housing tract, or a single block within one) at once. Project has following characteristics:  
- Financing  
  - Costs financed rather than paid up-front, using “Pay as you save” (PAYS) model – savings from increased efficiency cover monthly finance cost  
- Timing  
  - Everything that’s aging out and/or  
  - Strategically phased implementation  
- Single solution provider  
  - One party designing, coordinating, installing and financing  
- Minimize Disruption to Homeowners’ Lives  
  - Fast installation due to pre-fabricated components made possible by similar housing stock (e.g. a housing tract)  
  - Desirable improvements make it worthwhile |
| SVCE’s Role (possible partners or collaborators) | • Provide on-bill financing mechanism  
• Identification of potential vendors  
• (Potentially) Project Management  
• Identification of potential pilot sites: institution/company that owns large amount of |
<table>
<thead>
<tr>
<th>existing housing stock (e.g. university, large-scale private landlord)</th>
</tr>
</thead>
</table>
| **Success**  
*(define success)*  | • Pilot site retrofits completed; GHG emissions reduced at pilot site  
• Vendors identified for similar future projects (assuming they performed well)  
• SVCE gains knowledge/experience about how to facilitate these retrofit projects  
• Successful pilot gives later potential project sites example that “shows it can be done” |
<table>
<thead>
<tr>
<th>Title &amp; Use Case (Do “x” for “y”.)</th>
<th>Electrification Process “Survivorship Curve” Analysis</th>
</tr>
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<tbody>
<tr>
<td></td>
<td>Identify current “theoretical maximum” number of existing homes that are potentially ready to fuel switch key fossil fuel end uses to electricity, and which prerequisites for electrification form the biggest barriers to increasing that pool of electrification-ready homes.</td>
</tr>
<tr>
<td></td>
<td>NOTE: This program is not an end in itself, rather it is intended to create a clear decision-making tool that SVCE’s policymakers can use over time to consider tradeoffs and effectively prioritize potential programs being considered for driving fuel switching from fossil fuels to electricity.</td>
</tr>
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<table>
<thead>
<tr>
<th>Specific Elements</th>
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<tbody>
<tr>
<td></td>
<td>• Identify bundle(s) of end uses to be converted (there may be several, e.g. “EV only,” “EV+Water Heater” etc.)</td>
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<tr>
<td></td>
<td>• Map out key criteria that must be met before a home is ready to electrify the target set of end uses in each bundle (sufficient utility service connection, large enough panel for that bundle, etc.). Note that the definition of a criterion can vary depending on the bundle, e.g. the power requirements for a “sufficient” service connection go up as you attempt to electrify more end uses.</td>
</tr>
<tr>
<td></td>
<td>• Identify logical sequence in which those criteria would be addressed (e.g. a homeowner would not enlarge electrical panel if service connection cannot supply enough power)</td>
</tr>
<tr>
<td></td>
<td>• Starting with “all homes” (100%), graph for each successive criterion (for each bundle) how many homes in SVCE service area (or relevant sub-geography or sub-set of customers) meet that criterion, to produce a graphical depiction of where the current biggest opportunities are for SVCE’s programs.</td>
</tr>
</tbody>
</table>

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<thead>
<tr>
<th>SVCE’s Role (possible partners or collaborators)</th>
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<tbody>
<tr>
<td></td>
<td>• Gather data for each criterion and update over time</td>
</tr>
<tr>
<td>Partners: PG&amp;E, member cities (sources of needed data)</td>
<td></td>
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</tbody>
</table>

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<thead>
<tr>
<th>Success (define success)</th>
</tr>
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<tbody>
<tr>
<td>Clearly identify where the current opportunities are so that programs may be targeted appropriately.</td>
</tr>
<tr>
<td>Allow consideration of tradeoffs between depth of electrification (more electrified end uses at a site) vs. breadth (more sites electrified but with fewer end uses converted to electricity)</td>
</tr>
</tbody>
</table>
Based on a proposal by Carbon Free Palo Alto in collaboration with Carbon Free Silicon Valley for potential adoption by SVCE, PCE, City of Palo Alto Utility and other CCEs, Munis.

<table>
<thead>
<tr>
<th>Title &amp; Use Case (Do “x” for “y”.)</th>
<th>BE Smart Residential Water &amp; Space Heating Upgrade Program</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Mass Beneficial Electrification for residential buildings</td>
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</tbody>
</table>

### Specific Elements

- See also attached presentation & context slides.
- On-bill financing of extra upfront costs: Customer still pays what would have paid for otherwise Business as Usual (BAU) case of a just another new natural gas (NG) unit, but extra up-front costs associated with new efficient electric heat pump water heaters or HVAC systems is financed on the customer bill to eliminate key barrier to adoption. Only about $13/month extra, not including potential program rebate options.
- Planned proactive replacement of units before usual failure at end of useful lives of 13 and 20 years for water heaters and furnaces, respectively, to avoid emergency replacement scenario that would prevent fuel-switching.
- Concierge service: Managed by third-party contracted to SVCE – made easy for customers.
- SVCE rebates optional.
- Some details to decide on how to handle sale of home or other possible exceptions – customer may need to pay off remainder of financed amount.
- Can integrate with potential BE Ready electrification readiness program.

### SVCE’s Role (possible partners or collaborators)

- Contract with third-party program manager to implement program details.
- Possibly combine with Green Lease program for rental homes (SF & MF) that aligns cost-benefit interests of renters and landlords.
- Arrange with PG&E for line item on bill for financing.
- Education and Outreach to customers.
- Possibly add rebate to make even more attractive to customers, although reduces budget available for other programs.
- Coordinate integrated BE-favorable local policies of SVCE member jurisdictions (for remodels and new)
  - Permit fee and inspection streamlining
  - Green building codes, including, but not limited to:
Based on a proposal by Carbon Free Palo Alto in collaboration with Carbon Free Silicon Valley for potential adoption by SVCE, PCE, City of Palo Alto Utility and other CCEs, Munis.

| Add BE conduits/wires for HP water heater and EV charger, and possibly HP Heat/Cool, as a required component of solar PV installations. |
| Other specific green codes to add? |
| - Potential partnership/collaboration with BAAQMD and/or local water districts on grants, incentives. |
| - Extend outreach and education via allied non-profit and climate advocacy groups, as well as members. |

**Success (define success)**

- Estimated total GHG reductions for participants
- Number of participating customers.
- # of Electrification-related technologies adopted (total and per home)
- Kilowatt hours per customer.
- Number and engagement level of participating trade allies.
- Number of aligned policies among SVCE members.
- Number of Green Leases adopted by participants.
<table>
<thead>
<tr>
<th>Item</th>
<th>Description</th>
<th>Dot Score</th>
<th>Total Blue Dots</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Residential Electricity Monitoring</td>
<td>7</td>
<td>7</td>
</tr>
<tr>
<td>2.</td>
<td>Electricity Bill Explorer</td>
<td>6</td>
<td>6</td>
</tr>
<tr>
<td>3.</td>
<td>Residential BE Ready Program, SF + MF Variants</td>
<td>6</td>
<td>6</td>
</tr>
<tr>
<td>4.</td>
<td>Residential &amp; MF EV Charging - encourage vehicle electrification</td>
<td>5</td>
<td>5</td>
</tr>
<tr>
<td>5.</td>
<td>Residential Storage - reduce duck curve impacts</td>
<td>4</td>
<td>4</td>
</tr>
<tr>
<td>6.</td>
<td>BE Smart Residential Water and Space Heating Upgrade</td>
<td>4</td>
<td>4</td>
</tr>
<tr>
<td>7.</td>
<td>Incentives or Rebates for Used Electric Cars and Smart Chargers</td>
<td>3</td>
<td>3</td>
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SVCE CPAG Program Evaluation
Worksheet -
DOT RANKING

CPAG Report Presented to the BOD on June 13, 2018
CPAG Progress Update, Program Briefs
Attachment 1
## SVCE CPAG Program Evaluation

**Worksheet - PROGRAM BENEFITS**

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Program Benefits (+):
- Reduce customer bills by reducing usage and shifting usage from peak price periods
- Reduce customer costs in purchasing and using energy-consuming devices
- Reduce demand during peak hours and increase demand during peak PV production (duck curve)
- Reduce the need for/use of carbon-emitting peaker plants
- Reduce GHG emissions through reduced electricity use
- Promote local jobs and economic development
- Provide customer backup power
- Transform markets (accelerate adoption of clean energy devices and practices)
### SVCE CPAG Program Evaluation

**Worksheet -**

**PROGRAM BENEFITS**

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## SVCE CPAG Program Evaluation
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### Cost & Carbon

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<th>Cost &amp; Carbon</th>
<th>5 Yr Program Cost Range</th>
<th>5 Yr Program GHG (mTCO2)</th>
<th>Cost of Carbon ($/mTCO2) at midpoint of cost range</th>
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<td>11k/yr</td>
<td>10% MF penetration in 5 yrs</td>
<td>$1m-$5m</td>
<td>indirect</td>
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<td>11k/yr</td>
<td>25% capture of 1/20 annual renovation rate</td>
<td>$1m-$5m</td>
<td>indirect</td>
<td>38</td>
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<td>10s of thousands of participants</td>
<td>13 member agencies and 30 year facility refit interval (2 in 5 years) plus one other site</td>
<td>$500k - $1m</td>
<td>indirect</td>
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<td>10k in 5 yrs</td>
<td>5% per yr uptake rate</td>
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<td>1,000 pilot then assess peak reduction benefit</td>
<td>25% capture of 1/13 WH and 1/20 SC annual replacement rates</td>
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<td>350/yr used EV rebates, 750/yr smart chargers</td>
<td>Pilot only, based on 2017 Nest 'Seasonal Savings' quote</td>
<td>$5m - $10m</td>
<td>indirect</td>
<td>42,674</td>
</tr>
<tr>
<td>6k/5 yrs</td>
<td>2.5% capture of 1/13 WH and 1/20 SC annual replacement rates</td>
<td>$1m-$5m</td>
<td>indirect</td>
<td>54,162</td>
</tr>
<tr>
<td>pilot site; but critical mass</td>
<td>HPHWH only; 170 T/yr avoided per unit (Carbon Free PA); 0.00531 mT/T nat gas emission factor (PG&amp;E)</td>
<td>&lt; $500k</td>
<td>indirect</td>
<td>90</td>
</tr>
<tr>
<td>2,500 pilot then assess peak reduction benefit</td>
<td>Gives full &quot;additional&quot; CO2 credit to used vehicles; 4.25 mTCO2/yr per unit</td>
<td>&lt; $500k</td>
<td>indirect</td>
<td>910</td>
</tr>
<tr>
<td>one-time analysis/market assessment</td>
<td>Assumes every charger results in one EV, 4.25 mTCO2/yr per unit</td>
<td>&lt; $500k</td>
<td>indirect</td>
<td>910</td>
</tr>
<tr>
<td>3 sites in 5 yrs</td>
<td>Assumes every charger results in one EV, 4.25 mTCO2/yr per unit</td>
<td>&lt; $500k</td>
<td>indirect</td>
<td>1,125</td>
</tr>
<tr>
<td>6k/5 yrs</td>
<td>Pilot &quot;Mass Produced&quot; Zero Emission Retrofit Approach</td>
<td>$33,234</td>
<td>indirect</td>
<td>1,125</td>
</tr>
<tr>
<td>350/yr used EV rebates, 750/yr smart chargers</td>
<td>Connected Home Devices - customer understanding and load management</td>
<td>&lt; $500k</td>
<td>indirect</td>
<td>1,125</td>
</tr>
<tr>
<td>5k/5 yrs</td>
<td>&quot;Mass Produced&quot; Zero Emission Retrofit Approach</td>
<td>&lt; $500k</td>
<td>indirect</td>
<td>1,125</td>
</tr>
<tr>
<td>50m-$100m</td>
<td>Safety Preparedness &amp; Resilience with Micro Grids</td>
<td>&lt; $500k</td>
<td>indirect</td>
<td>1,125</td>
</tr>
</tbody>
</table>

### Notes

- 16. 0.133 mTCO2/MWh benefit shifting from high GHG emission period (CAISO, NPT analysis)
- 17. 13.5kWh/d load shift per unit (Powerwall rating)
- 18. 2h shift of 1.5 kW load, or 3 kWh/d per unit, daily, 3mo/yr
- 19. Assumes every charger results in one EV, 4.25 mTCO2/yr per unit
- 20. HPHWH only; 170 T/yr avoided per unit (Carbon Free PA); 0.00531 mT/T nat gas emission factor (PG&E)
- 21. Gives full "additional" CO2 credit to used vehicles; 4.25 mTCO2/yr per unit, no "additional" CO2 credit to smart chargers
Customer Program Advisory Group Progress Update

Peter Evans, CPAG Chair
SVCE Board of Directors Meeting
June 13, 2018
Members

- My Nguyen (Campbell)
- Gary Latshaw (Cupertino)
- Tara Sreekrishnan (Cupertino)
- Don Weiden (Los Altos)
- Peter Evans (Los Altos Hills)
- George Parton (Los Gatos)
- Thomas Clavel (Milpitas)
- Bryan Mekechuk (Monte Sereno)

- Robert Brewer (Mountain View)
- Jeff Homan (Mountain View)
- Sandy Muju (Saratoga)
- Doug Kunz (Sunnyvale)
- Tara Martin-Milius (Sunnyvale)
- James Tuleya (Sunnyvale)
- Pamela Garcia (Santa Clara County)
- Tristan Mecham (Santa Clara County)

SVCE Staff

- Pamela Leonard
- Andrea Pizano
- Don Bray
- Others
CPAG “Charge”

• Bring new ideas
• Reflect customer & community priorities
• Identify and prioritize programs; quantitative & qualitative
• Report recommendations in June
Month 2 – Potential Program Benefits

- Customer energy literacy
- Personalized customer engagement, active choices
- Customer energy use comparisons/“gamification”
- Transparency of decisions for customers
- Customer choices & local control
- Disadvantaged community participation
- Leverage/compliment PG&E programs
- Reduce customer bills – usage reduction & peak shifting
- Reduce customer costs in energy consuming devices
- Peak demand period reduction/peak PV period increase

- Reduce use of carbon emitting peakers
- Reduce GHG through reduced electricity use
- Local jobs & economic development
- Customer backup power
- Transform clean energy markets
- Alleviate climate change impacts/GHG reduction
- Clean electricity use readiness
- Indoor/outdoor air quality
- Increase SVCE sales of clean electricity

Themes
- Customer empowerment
- Customer cost savings
- GHG reduction
- Demand/supply alignment
Month 3 – Potential Program Ideas

CPAG Brainstorming

Small Group Program Briefs

- Residential Storage
- Connected Home Load Management
- MF EV Charging
- MF Energy Efficiency and Electrification
- City Center Microgrid Resilience
- Used EVs and Smart Chargers

- Electricity Bill Explorer
- Residential Electricity Monitoring
- Residential BE Ready
- “Mass Produced” Zero Emission Retrofits
- Electrification “Survivorship Curve” Analysis
- BE Smart Upgrades
Program Brainstorming

**How Might We...**

- Increase customer energy literacy
- Provide personalized customer engagement; promote active choices (e.g., upgrading to GreenPrime); increase SVCE awareness
- Engage customers in their energy use through comparisons with peers, benchmarks, their own trends (gamification)
- Improve transparency on decisions for customers
- Provide customers more choices and local control

**How Might We...**

- Alleviate climate change impacts
- Increase readiness for expanded use of clean electricity
- Improve indoor/outdoor air quality

**How Might We...**

- Reduce customer bills by reducing usage and shifting usage from peak price periods
- Reduce customer costs in purchasing and using energy-consuming devices
Months 4 & 5 – Program Evaluation

- CPAG scoring for program benefits
- High-level cost and carbon evaluation (offline)
- Input gathered from community contacts
- CPAG scoring for “other factors”:
  - Scalability
  - Customer participation
  - Time to implement
  - Time to outcomes/benefits
  - Uncertainty of outcomes/benefits
  - Cost
  - Cost of carbon
Months 4 & 5 – Program Evaluation (Cont.)

CPAG Final Dot Ranking

**Top third**
- Residential Electricity Monitoring
- Electricity Bill Explorer
- Residential BE Ready
- MF EV Charging

**The rest (in order)**
- Residential Storage
- BE Smart Upgrades
- Used EVs and Smart Chargers
- MF Energy Efficiency and Electrification
- “Mass Produced” Zero Emission Retrofits
- Connected Home Load Management
- Electrification “Survivorship Curve” Analysis
- City Center Microgrid Resilience
Top Program Briefs

• **Residential Electricity Monitoring**
  Monitoring and analytics to provide customers with real-time consumption data via smart phone and to reveal individual loads

• **Electricity Bill Explorer**
  Bill data analytics to provide customers with personalized use comparisons against benchmarks and peers, fit with rate options

• **Residential BE Ready**
  Self-assessment tool and resources to ease electrification conversion

• **MF EV Charging**
  EV charging infrastructure for multi-family residences
Next Steps

• Incorporate board feedback
• Identify and address potential program barriers, success factors
• Work with staff and MAWG to shape final program recommendations
Summary of SVCE’s Climate Protection Grant Program

Silicon Valley Clean Energy (SVCE)’s ‘FutureFit Home’ initiative will create and promote clear, customer-centric messages about the health, environmental and financial benefits of integrated residential electrification and de-carbonization. The initiative will focus on replacement of 150 natural gas-fired water heaters with electric heat pump water heaters (HPWH), including upgrades where necessary to the home’s electric service panel. An upgraded panel and heat pump water heater serve as foundational elements in a carbon-free all-electric home.

The FutureFit Home initiative will play a critical role in establishing a local marketplace ecosystem for heat pump water heaters. Prospective end customers will be engaged at opportunistic decision points, such as home remodels, solar installations, group buys and housing authority-led major rehabilitations. Funding support for initial installations will be substantial – as experience to date has shown this to be essential for offsetting the current cost and complexity of fuel-switching in existing homes. Key features of SVCE’s FutureFit Home initiative include:

- target of 150 HPWH units installed
- associated service panel upgrades (as required)
- core team comprised of SVCE and its thirteen member agencies
- partnering with local organizations to establish higher volume opportunities, and other regional agencies for programmatic leverage
- hosting community meetings to educate local homeowners and renters
- supporting training for local permitting and inspection staff
- developing proactive sales channels (e.g. solar, HVAC)
- collaborating with local academic institutions on HPWH impact and market trajectory
- engaging manufacturers to include Time-of-Use and Demand Response compatibility
- establishing robust publicly viewable installation cost and usage data

SVCE is requesting grant funding for the FutureFit Home initiative of $500,000 to enable SVCE to scale this initiative for substantial impact. In addition, with receipt of grant funding, Silicon Valley Clean Energy’s Board of Directors has committed dollar-for-dollar matching funding up to an additional $500,000.

De-carbonization and Residential Electrification

SVCE, as a Community Choice Energy agency, provides carbon-free electricity to over 240,000 residential customers, 97% of all residences in SVCE’s thirteen-member jurisdictions. The switch to carbon-free electricity reduced community-wide emissions by 20%, but 80% still remains. SVCE’s mission is to utilize carbon-free electricity to continue to reduce emissions in all sectors, including the built environment, mobility, and on the grid. This proposal squarely
aligns with our agency’s focus on the built environment and grid innovation. Natural gas used for water heating now accounts for approximately 40% of GHG emissions from our residential structures, and an estimated 4.5% of GHG emissions in our service territory. Each gas-fired water heater contributes just under one metric ton of CO$_2$e emissions per year.

**Heat Pump Water Heaters – Background**

Electric heat pump water heaters are standard in many countries, with cost and efficiency levels very competitive with natural gas. Gas-fired water heaters remain standard, with over 200,000 installed in our service area alone. Natural gas has been supported at the California Building Code level which led to near ubiquitous utilization. Importantly, electric heat pump water heaters utilizing carbon free electricity produce no emissions. In addition, they can engage dynamically with the utility grid – using electricity when it is cleanest and least expensive. They serve as a thermal battery, storing heat produced from electricity during high supply hours and then relying upon that stored energy during high demand hours – highly compatible with demand response initiatives. Traditional electric resistance efficiency pales in comparison to HPWH and electric on-demand cannot engage so seamlessly with grid supply and constraint.

**Current Market Challenges**

In California’s nascent HPWH market, a number of critical barriers must be addressed to establish a viable market, including customer awareness, installation cost, and availability.

**Awareness**

Consumer awareness and understanding of heat pump water heaters is low. Customers are primarily interested in having hot water when they want it. Since hot water replacements often happen when an existing gas-fired unit breaks, neither the customer nor the contractor is inclined to consider alternatives. Conversations about switching to a HPWH typically do not happen.

**Cost**

The cost of switching from a gas water heater to an electric HPWH is often very high, driven by the existing conditions at a residence. Buildings were typically designed to accommodate the gas-fired water heater that is currently in place. Often there is no 220-volt outlet or line available nearby. The main electrical panel may not be sized adequately or have enough space for a new 30-amp breaker required for a HPWH. Service lines from the utility may also need to be upgraded. Beyond electrically-related barriers, HPWHs may not work in closet spaces due to lack of adequate circulation without additional ventilation. Any or all of these increase the cost and function as a substantial barrier to fuel switching.

To date, fuel switching has not been supported by Investor Owned Utilities (IOU’s). As such, they provide little in the way of awareness on the benefits of fuel switching. And while there may be token incentives available for adopting HPWHs, these rebates are only for switching away from propane or electric resistance, not natural gas. Even if the HPWH itself were incentivized, the fundamental method of program cost-effectiveness discourages the inclusion of incentives for service panel upgrades as it is a cost without a direct reduction in energy use or carbon emissions. SVCE maintains a longer-term view in which this cost must ultimately be
addressed. Spreading the cost of a service panel across an entire decarbonization portfolio, such as FutureFit, improves performance against tests for cost effectiveness and societal benefits.

Availability
The existing supply chain is predominantly natural gas-focused. Because gas water heaters have been the standard, gas water heaters are what the warehouses have in large supply. Contractors may not even be familiar with the HPWH technology itself. This unfamiliarity likely increases the contractor estimate to account for unforeseen expenses. HPWH units require not just plumbing but also electrical work. Gas-only plumbers have not historically needed electrical partners to complete their work and vice versa. This type of work is primarily reactionary in nature – when a heater breaks, it is replaced in short order with a like-fueled unit. Few market actors appear to be proactively encouraging early retirement of water heaters even though doing so likely saves hundreds of dollars in repairs should the unit leak during failure.

Strategic Approach
SVCE proposes an investment into the HPWH marketplace with the goal of installing 150 new heat pump water heaters. Existing residences with service panels less than 200A will be upgraded to a 200A service panel, to support future electrification efforts - even if a smaller existing panel can handle the HPWH. Crafting a meaningful customer value proposition and first-cost for HPWH on par with that of natural gas is essential for launching a more robust and functional marketplace for HPWH. Other critical strategic elements include the FutureFit all-electric home context, community workshops, equipping key contractors with HPWHs in their own homes, engaging academia, and streamlining permitting.

<table>
<thead>
<tr>
<th>Barrier</th>
<th>FutureFit Approach</th>
</tr>
</thead>
</table>
| Lack of Awareness            | • Buyer Guide with compelling messaging  
                                 • Community Workshops  
                                 • Contractor & Permitting Training |
| High First Cost              | • Cost neutral offering, free for CARE/FERA customers  
                                 • Heat Pump Water Heater + Installation + 200A Service Panel Upgrade = cost of replacing Natural Gas Water Heater |
| Permitting Cost, Burdens     | • Share best practices on cost and documentation  
                                 • Train local permitting agents |
| Slower installation time     | • Working with opportune customer decisions  
                                 • Establish electrical and plumbing partnerships  
                                 • Increase supply at local warehouses |
Awareness
The message around HPWH is powerful – cleaner, healthier, functions as thermal storage, and interactive with Time-of-Use (TOU) and demand response. According to the National Fire Protection Agency, electric water heaters are also safer. SVCE will create consumer-centric collateral to communicate this message. We will promote this messaging via our website, newsletter, on-bill messaging, and community meetings. SVCE will seek to work with individual actors making larger scale decisions (developers/housing agencies) or numerous actors making similar decisions for a single location (group buy/contractors). SVCE has identified these as opportunistic customer groups.

SVCE territory includes hundreds of multi-unit dwellings, some of which are in the process of major rehabilitation. By engaging with these properties, SVCE recognizes how these ownership groups represent a scale unparalleled in the single-family marketplace. Further, SVCE is in early discussions with BC3 regarding a group buy through their existing SunShares opportunity normally focused on solar. Since solar customers often face the need to upgrade their service panel to accommodate solar, this initiative functions as a de facto incentive for some solar customers. The same holds true for EV customers looking for Level 2 charging in their home.

Supply Chain
Contractors must become familiar with HPWH technology. By placing the equipment specific incentive for the HPWH at the distributor level, distributors will be motivated to recruit contractors to sell this product. One distribution partner has committed to this recruiting and training effort. In collaboration with our member cities, SVCE will host a workshop series leveraging the very limited group of current HPWH installers in our area.

SVCE will work with the General Contractor (GC) pool as well as with the established plumbing community to improve proactive sales efforts. Working with GC’s are especially important as they are a primary contact during remodeling and HPWHs require expertise in both electricity and plumbing. A proactive sales channel exists with solar contractors who are already actively selling their product. Given the synergy between the service panel upgrade needed for both HPWH and solar, this initiative becomes a solid opportunity for customers considering solar.

Manufacturers have added several useful features to HPWH over the years. These include multiple operation modes, remote apps to control settings and connectivity to connected thermostats, like Nest. They are currently missing the ability to work with utility TOU periods. SVCE will work with manufacturers to deploy this feature as it is a necessary innovation for grid optimization.

Other stakeholders
Permitting plays an important role. For HPWH to become viable during the conventional sales process (e.g. failure), the time to install must be reduced. One city in Santa Clara county, Palo Alto, has already addressed several of the permitting concerns – cost and complexity. Permit costs there have been cut by more than half and the onerous load calculations have been streamlined as well. SVCE will work with our member cities to adopt these improvements. Increasing awareness at the inspector level will also reduce costly re-inspections. The permit office itself serves as an
important hub for contractors. We will tailor collateral appropriate for placement at the building permit departments as well as run trainings for contractors in collaboration with these departments.

To establish a virtuous cycle, SVCE will work with academia to foster their engagement in this space, specifically with HPWHs and generally with overall decarbonization. With local colleges already investing in sustainable education, we will have a growing data set for them to analyze. We have already engaged with local colleges, Stanford and Foothill-De Anza, in other aspects of the SVCE mission and this initiative enables us to expand that relationship.

**Cost**
The value proposition is simple – receive an electric HPWH with a 200A service panel upgrade and necessary interior electrical work for the same price as a natural gas water heater replacement. Input from contractors and other program administrators supports this effort as first cost currently serves as a major barrier. Upgrading the service panel now will also reduce the future costs of additional electrification efforts. While many other programs have incentivized the heat pump itself, this initiative recognizes that the true cost to switch must deal with the fully installed cost and not just the appliance cost. To support SVCE’s social equity goals, any customers participating in either the CARE or FERA rate relief will have their customer contribution reduced to $0. This initiative has allocated 10% of the budget for this, equal to our CARE/FERA customer population.

**Market Transformation**
SVCE must learn about the market factors necessary to achieve decarbonization. We will establish a collaborative design process involving market stakeholders and provide them with the dual goals of protecting rate payer funds and minimizing participation barriers. SVCE anticipates using a contractor bonus allocation if 150 installations are achieved to foster collaborative participation and minimize contractor inflation of installation prices.

To establish proper market characteristics, SVCE recognizes the need to collect a robust data set on the costs to implement these changes, and we will share that data with the public even beyond the scope of the grant. This information can help shape cost projections for future installations for customers, contractors, and for new contractors necessary to meet the expected growth of this market. See Table 1.0, Project Costs by Contractor and Type.

<table>
<thead>
<tr>
<th>Site</th>
<th>Contractor</th>
<th>Scope</th>
<th>Cost</th>
<th>Ventilation</th>
<th>Existing 220v</th>
<th>Extra electrical work</th>
</tr>
</thead>
<tbody>
<tr>
<td>#1</td>
<td>Company 1</td>
<td>HPWH+Panel</td>
<td>$5,500</td>
<td>Existing</td>
<td>Yes</td>
<td>No extra work</td>
</tr>
<tr>
<td>#2</td>
<td>Company 1</td>
<td>HPWH only</td>
<td>$2,000</td>
<td>Added vents</td>
<td>Yes</td>
<td>No extra work</td>
</tr>
<tr>
<td>…#150</td>
<td>Company 8</td>
<td>HPWH+Panel</td>
<td>$7,500</td>
<td>Added vents</td>
<td>No</td>
<td>Knob &amp; Tube</td>
</tr>
</tbody>
</table>

An additional dataset of interest will emerge from monitoring the installed systems and publishing the load data. This data will be anonymized and shared to support academic, regional and national interests. Each installed system will include a circuit breaker-level monitor and a data collection/transmission unit. This data will help SVCE design a market solution for electrification
based on a new rate design. If SVCE can demonstrate actual usage savings and demand response compensation, that will reduce the need for future cash incentives. See table 2.0, Usage per Hour.

| Site  | 10am | 11am | 12pm | 1pm | 2pm | 3pm | 4pm | ...
<table>
<thead>
<tr>
<th></th>
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<th></th>
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</thead>
<tbody>
<tr>
<td>#1</td>
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<td>.5</td>
<td>.25</td>
<td>.25</td>
<td>.25</td>
<td>.25</td>
</tr>
</tbody>
</table>

To support future electrification possibilities, participating contractors will also survey potential home sites regarding the current state of furnaces, clothes dryers, solar, EV chargers, battery storage, and cooking fuel. This will provide valuable on-site information to SVCE and reduce customer acquisition costs for future programs.

**Timeline**

<table>
<thead>
<tr>
<th>Date</th>
<th>Activity</th>
<th>Milestone(s)</th>
</tr>
</thead>
<tbody>
<tr>
<td>July 2018</td>
<td>Execute Contract with BAAQMD</td>
<td>Signed Contract</td>
</tr>
<tr>
<td>August 2018</td>
<td>Engage partners and stakeholders</td>
<td>List created, outreach begun</td>
</tr>
<tr>
<td></td>
<td>Design initial Program Elements</td>
<td>Draft program</td>
</tr>
<tr>
<td>September 2018</td>
<td>Finalize Program for Approval</td>
<td>Submitted for Internal Approval</td>
</tr>
<tr>
<td></td>
<td>Approve Final Program design</td>
<td>Approved</td>
</tr>
<tr>
<td>October 2018</td>
<td>Release RFPs – EMV, Data Monitoring</td>
<td>Posted and distributed</td>
</tr>
<tr>
<td></td>
<td>Finalize midstream partners</td>
<td>Contract(s) executed</td>
</tr>
<tr>
<td></td>
<td>Release limited “Pre-enrollment”</td>
<td>Pre-enrollment posted on website</td>
</tr>
<tr>
<td>November 2018</td>
<td>Design Consumer Guide and outreach campaign</td>
<td>Draft document &amp; campaign plan</td>
</tr>
<tr>
<td></td>
<td>Select and contract EMV &amp; Data Monitoring Partner</td>
<td>Contract(s) executed</td>
</tr>
<tr>
<td></td>
<td>Establish agreements with Outreach partners</td>
<td>MOU(s) or Contract(s) executed as applicable</td>
</tr>
<tr>
<td>December 2018</td>
<td>Outreach partners begin Community Meetings etc.</td>
<td>Community meeting dates released through various channels</td>
</tr>
<tr>
<td></td>
<td>Contractor Training</td>
<td>Training(s) held with Distribution partner</td>
</tr>
<tr>
<td></td>
<td>Soft launch for Pre-enrolled to test systems</td>
<td>Contractors begin work with customers and deliver feedback</td>
</tr>
<tr>
<td></td>
<td>EMV &amp; Data Partner Protocol established</td>
<td>Protocol document</td>
</tr>
<tr>
<td>January 2019</td>
<td>Launch FutureFit Home</td>
<td>Full website, Application, Marketing begins</td>
</tr>
<tr>
<td>July 2019</td>
<td>Share Contractor cost data</td>
<td>Data posted to website</td>
</tr>
<tr>
<td></td>
<td>Share anonymized Usage data</td>
<td>Data posted to website</td>
</tr>
</tbody>
</table>
Objective 1 – support of 85 control measures
This initiative aligns with multiple BAAQMD 2017 Control Strategy goals. Specifically, within the Building and Energy goals; to promote the switch from natural gas to electricity for space and water heating in Bay Area buildings. SVCE’s program will reduce reliance on natural gas for water heating, specifically accelerating Building Decarbonization (BL2). SVCE anticipates saving a total of 144 MTCO$_2$e per year for the expected 13-year HPWH useful life, totaling 1,872 MTCO$_2$e.

As FutureFit efforts continue beyond HPWH, SVCE expects to see a reduction in gas-powered Equipment Leaks (SS2) as fewer gas-using devices will be utilized. While SVCE does not expect to see arterial gas distribution lines capped during the grant window, this effort is the initial entrance into a decarbonized built environment which will necessarily mean a reduction in Natural Gas Distribution (SS15) issues.

Objective 2 – Air quality co-benefits
While most natural gas water heaters function properly, the replacement of these with carbon-free powered electric HPWHs will reduce carbon monoxide issues in the home resulting from poor natural gas combustion. The vision of FutureFit includes a world with no carbon monoxide detectors as there will be no sources of combusted carbon in a residence.

Objective 3 – Accelerate local implementation of GHG policies and programs
Most of our member cities have and/or are revising their Climate Action Plans (CAP). Specifically, the target for this grant – heat pump water heaters – came directly from the member agency representatives themselves. They recognize the hurdles in decarbonizing the built environment and see this as a crucial beginning effort.

Objective 4 – Engage and benefit impacted/CARE communities
Within our member cities, Campbell is specifically identified as Community Air Risk Evaluation (CARE) target. Even though Campbell represent less than 15% of our residential accounts, SVCE is allocating 15% of the overall budget for this city.

Objective 5 – Implement Innovative approaches
Beyond awareness, assurance of savings, availability and affordability, this proposal includes several key aspects SVCE has not seen in other programs addressing HPWH. First, SVCE is
including incentives for the service panel. Second, by creating a publicly viewable customer-anonymized dataset, SVCE will provide installation cost details including circumstances driving HPWH costs. Third, by monitoring and sharing usage patterns, SVCE will have the foundation to build proper tariffs/time-of-use pricing for all-electric customers.

Objective 6 – Create replicable solutions for the Bay Area and elsewhere
By providing a rich dataset of costs, extenuating circumstances, and usage data, SVCE sees a variety of beneficiaries. Cost and usage data is useful as discussed in Objective 5 above. With residential Demand Response (DR) growing, usage data may provide additional DR opportunities. Customers may be able to monetize HPWH in ways that natural gas water heaters cannot match which may further improve the return on the fuel switch investment.

Potential for GHG Reduction
Water heaters use an average of 192 therms/year x 150 water heaters x 0.005 MTCO₂e/therm = **144 MT CO₂e per year for each year of HPWH operation**, 1,872 MTCO₂e over the 13-year useful life of a HPWH. Therm usage based on 3 Person household with shower and faucet sourced from “California Residential Domestic Hot Water Draws” by Neal Kruis et al, May 2016.

Measuring Success
SVCE will work with an EM&V professional to ascertain the impact of the investment in our community. Given the level of potential incentive, SVCE is keenly interested in the free-ridership and spillover effects. Those will be necessary for us to understand how to support this market once the grant period ends. All units are equipped with data monitoring to support this effort.

Regional Support
SVCE recognizes the need for effective local, countywide, and regional efforts in order for the market to transform. SVCE would like to recognize the opportunity to collaborate with other entities currently seeking support for the heat pump water heater marketplace.

- **City of San Jose** – as a potential countywide partner, SVCE identifies opportunities for co-marketing, incentive and permitting standardization, contractor outreach, and midstream incentives. We both serve within the framework of the county of Santa Clara.
- **BAYREN/Stopwaste** – as a potential regional partner, SVCE views playing a locally focused role. Contractors generally serve a constrained geographic territory. SVCE sees promoting Stopwaste’s regional education and outreach efforts within Santa Clara county and with SVCE customers and local contractors. SVCE would provide the incentives to address first cost issues via the Stopwaste provided midstream incentive mechanism, in addition to promoting the customer and contractor education.

Partners
Non-Profits – Committed. Convene regional community meetings and promote program.
Solar Contractors – Committed. Recommend program to viable customers.
Distributor – Committed. Engage in midstream incentive. Train contractors.
**BUDGET**

$500,000 – BAAQMD Request  
$500,000 – **Board-committed** SVCE Matching Funds  
$1,000,000 - Total Funds Available for the two year program

<table>
<thead>
<tr>
<th>Item</th>
<th>Per</th>
<th>Qty</th>
<th>BAAQMD</th>
<th>SVCE</th>
<th>Subtotal</th>
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<td>200-amp box</td>
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**STAFF**

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Meetings/training workshops  |  $450  |  24  |  $10,800  |  $10,800

$500,000  |  $500,000  |  $1,000,000

Budget Explanation

- **200-amp box** – material cost for new 200A service panel. Quantity based on approximately 2/3 of participants needed 200A service panel.
- **200-amp service – installation** – all-inclusive electrical service panel installation cost
- **50-gallon heat pump** – material cost for new HPWH with COF of at least 3.0
- **Installation – all-inclusive installation costs**
- **Customer Contribution** – payment made by 90% of customers, free for CARE/FERA customers
- **Bonus Pool** – shared bonus for contractors if program meets goals
- **Data Collection** – compensation for customer site surveys even if customer does not participate. This number is expected to be 3x actual participant figures.
- **Program Management** – new staff to be funded by SVCE, 0.5 FTE
- **Project Management** – new staff to be funded by SVCE, 0.5 FTE
- **Analyst** – existing staff cost share, 0.5 FTE
- **Legal** – existing staff cost share
- **Marketing** – existing staff cost share
- **Fringe** – requested by grant at 25%
- **Indirect Rate** – requested by grant at 5%
- **EM&V** – overall contract rate for an EM&V partner
- **Communication collateral** – printing cost for Consumer Guide
- **Website Development** – program specific updates to website
- **Data Monitoring** – contract with data monitoring partner
- **Remediation** – set aside for contractors who fail to perform requiring a new contractor to engage
- **Payment processing** – estimated cost of payments for 150 program participants and 300 total site surveys
- **Program documentation** – application, process flow
- **Meetings/training workshops** – payments to partner organizations for organizing community education and awareness workshops throughout our territory