



Customer Program Advisory Group

July 2018

Agenda

- 3) Residential Electricity Monitoring and Electricity Bill Explorer Deep Dive
 - 3.1) Existing Technologies and Program Experience
 - 3.2) Opportunities and Motivating Factors for Residential Electricity Monitoring and Electricity Bill Explorer Adoption: Would You Sign Up for These?
- 4) Current Utility Programs Available to SVCE Customers



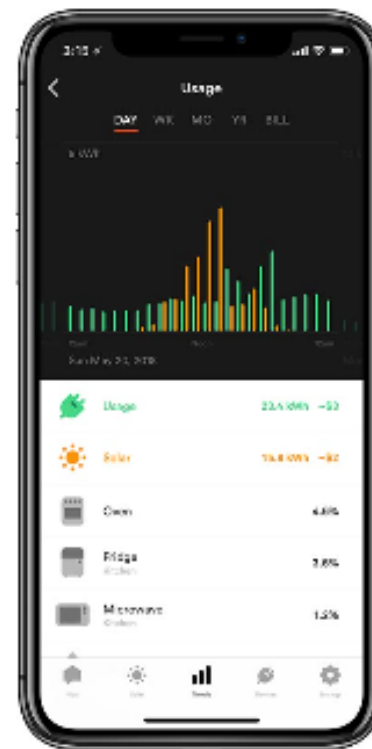
Existing Technologies and Program Experience

Residential Electricity Monitoring	Electricity Bill Explorer
1. Sense	1. HEA
2. Rainforest	2. OPower
3. TED	3. PG&E Rate Comparison Tool
4. Bidgely	4. PG&E My Energy

Residential Electricity Monitoring

Title & Use Case (Do “x” for “y”.)	Residential Electricity Monitoring Facilitate appliance-level (disaggregated) electricity monitoring to increase energy literacy and reduce electricity use
Specific Elements	<ul style="list-style-type: none">• Customer site electricity monitoring with smart phone interface• RFP process to select appropriate monitoring vendor• Facilitate installation of devices• Study to follow up on energy literacy and electricity usage after installation
SVCE’s Role (possible partners or collaborators)	<ul style="list-style-type: none">• Conduct RFP for monitoring solution• Bulk purchase and/or rebate for devices• Connect customers to approved electricians able to install devices• Provide online forum for customers to discuss project among themselves• Possible partners: Sense Labs, Bidgely
Success (define success)	<ul style="list-style-type: none">• Number customers participating in program• Increased energy literacy for participants• Reduced electricity usage for participants (lower bills & reduced carbon emissions)

Residential Electricity Monitoring







Residential Electricity Monitoring



Functionality	Load disaggregation focused
Usability	Installs in panel, available on iOS, Android and web apps
Cost	\$299/\$349 (solar option)
Uptake	1% would be high
Offered by PG&E?	No



-  5:15pm
Garage door opened
-  5:20pm
Kitchen lights turned on
-  6:30pm
Iron was on for 8 minutes
-  7:45pm
Dryer turned off

Track energy use over time

Set goals and monitor your progress through the month to make sure you stay on track.

Set device-level notifications

Set alerts for when the garage door opens, the sump pump turns on, or when the dryer's done.

Identify sources of energy waste

Find energy hogs, identify vampire loads, and see how much they're costing you.

Keep tabs on your home

Stay safe and secure by checking if the oven was left on, or the iron got unplugged.



Residential Electricity Monitoring



Residential Electricity Monitoring



Functionality	Real-time consumption data
Usability	Customers provision device with utility, view on web app (EAGLE connect to cloud/EM-2 connect to meter)
Cost	\$99.99, plus SCE \$25 rebate
Uptake	0.01%*
Offered by PG&E?	Yes (as well as SCE, SDG&E)

*1% during BC Hydro program



Residential Electricity Monitoring



- **BC Hydro Case Study**
 - 9 month period program
 - Reached 1% of the entire customer base
 - 10x adoption rate outside the program (0.01%)
 - Pre-provisioned devices- “just worked” upon arrival
 - Heavy promotion via email (50% open rate) & earned media

Residential Electricity Monitoring



- Effective messaging:
 - Green
 - Saving money (less effective)
 - Efficiency/avoiding waste (tech savvy customers especially)
 - Customer empowerment and visibility (non-engaged customers especially)

80%

When surveyed, 8/10 customers 'liked' or 'loved' the device

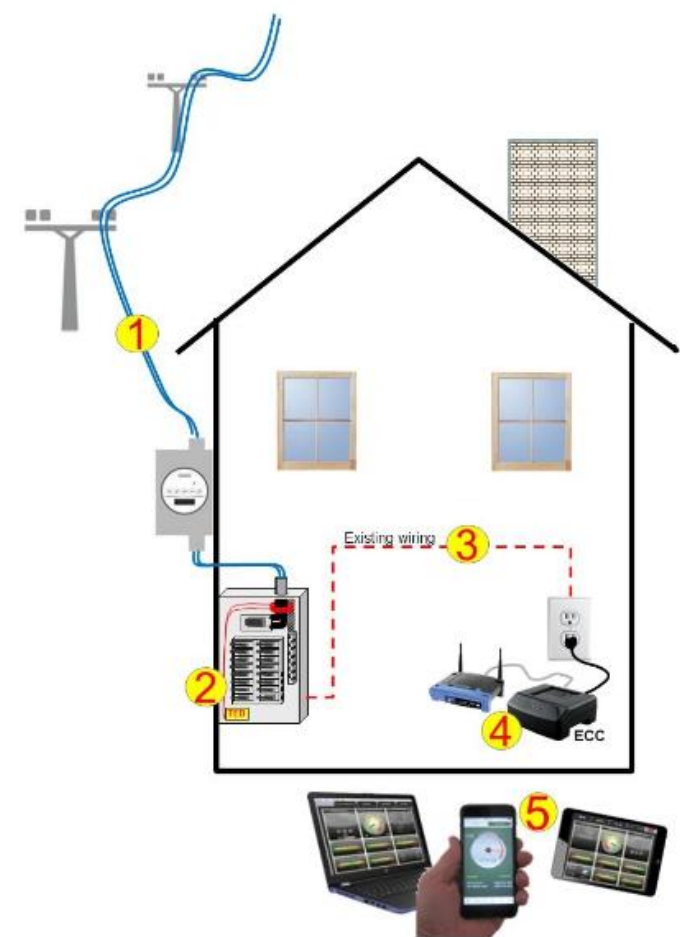
80%

Customers would recommend devices to their friends and family. 85% conducted 'experiments' around the house to better understand their energy use

75%

Customers 'agree' or 'strongly agree' that the device has "provided new insights about how I am consuming electricity at home". A similar number have taken real action as a result of those insights.

Residential Electricity Monitoring



Residential Electricity Monitoring



Functionality	Circuit level data, with solar add on (with manual disaggregation option)
Usability	Hardware install, viewable on free cloud service or mobile app
Cost	~\$300-400
Uptake	
Offered by PG&E?	No

Monitor Individual Circuits with a Spyder



Residential Products

Item 3 PRESENTATION



TED Pro Home \$299.95
TED Pro Home System



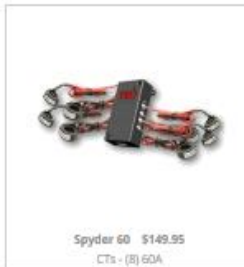
200A MTU/CT Set \$149.95
Additional Pro Home MTU/CT set



Spyder Pop \$169.95
CTs - (2)200A (2)60A (4)20A



Spyder 20 \$149.95
CTs - (8) 20A



Spyder 60 \$149.95
CTs - (8) 60A



Spyder Mix \$149.95
CTs - (4) 60A (4) 20A



Spyder 200-S \$299.95
CTs - (8) 200A split-core



Spyder 200-D \$199.95
CTs - (8) 200A solid core



TED Pro 200A CT \$25.00
Split-Core 200A CT



Single 20 AMP CT \$9.95
Solid Core 20A Spyder CT



Single 60 AMP CT \$9.95
Solid Core 60A Spyder CT



TED Pro 400A CT \$33.00
400A Split-Core CT (CT301)



TED Pro Home MTU \$99.95
MTU only



CT Extension Cable \$14.95
3-pack 80" CT Extension Cables



Desktop Display \$89.95



TED 5000 Upgrade to TED Pro Home
UPGRADE - \$299.95



Commercial / Industrial Products

Item 3 PRESENTATION



TED Pro Lite (200 Amp) \$598.95
200 AMP 3-phase service



TED Pro 400 \$698.95
400 AMP 3-phase service



TED Pro 800 \$898.95
800 AMP 3-phase service



TED Pro 1200 \$798.95
1200 AMP 3-phase service



TED Pro 2000 with coils \$1,198.95
2000 AMP 3-phase service



TED Pro 5000 with coils \$1,498.95
5000 AMP 3-phase service



Spyder Pop \$189.95
CTs - (2) 200A (2) 60A (4) 20A



Spyder 20 \$149.95
CTs - (8) 20A



Spyder 80 \$149.95
CTs - (8) 60A



Spyder Mix \$149.95
CTs - (4) 60A (4) 20A



Spyder 200-B \$298.95
CTs - (8) 200A split-core



Spyder 200-D \$198.95
CTs - (8) 200A solid core



TED Pro Lite MTU w/Power Cable \$149.95
For 3-phase up to 200A



TED Pro MTU with Power Cable \$349.95
For 3-phase up to 1200A



TED Pro MTU-RC with Power Cable \$549.95
For 3-phase 2000A & 5000A



TED Pro 200A CT \$25.00
Single 200A CT



TED Pro 8td 400A CT \$33.00
Single 400A CT



TED Pro Large 400A CT \$98.00
Single 400A CT



Flexible CT 2000A \$160.00
24" Rogowski Coil



Flexible CT 6000A \$260.00
36" Rogowski Coil

Residential Electricity Monitoring



Functionality	Load disaggregation (platform solutions)
Usability	Bidgely HAN device, register through PG&E Stream My Data
Cost	
Uptake	“Thousands”
Offered by PG&E?	Pilot has concluded



Residential Electricity Monitoring



Consumer Engagement

Relevant, timely, personalized insights empower consumers and help build enduring relationships



Energy Efficiency

Insights into appliance-specific energy usage and costs empower consumers to save more



Audits & Surveys

Eliminate the challenges of traditional online surveys via a disaggregation-powered approach



Demand Response

Behavioral demand response generates results at lower cost and enables expansion to millions of homes



New Rate Adoption

Tools and insights to help educate and encourage consumers to adopt and accept new rates

Residential Electricity Monitoring

Functionality	Load disaggregation focused
Usability	Installs in panel, available on iOS, Android and web apps
Cost	\$299/\$349 (solar option)
Uptake	1% would be high
Offered by PG&E?	No



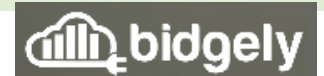
Functionality	Circuit level data, with solar add on (with manual disaggregation option)
Usability	Hardware install, viewable on free cloud service or mobile app
Cost	~\$300-400
Uptake	
Offered by PG&E?	No



Functionality	Real-time consumption data
Usability	Customers provision device with utility, view on web app (EAGLE connect to cloud/EM-2 connect to meter)
Cost	\$99.99, plus SCE \$25 rebate
Uptake	0.01%*
Offered by PG&E?	Yes (as well as SCE, SDG&E)



Functionality	Load disaggregation (platform solutions)
Usability	Bidgely HAN device, register through PG&E Stream My Data
Cost	NO LONGER AVAILABLE
Uptake	"Thousands"
Offered by PG&E?	Pilot has concluded



Residential Electricity Monitoring

Home Energy Monitors: Comparison

Model	Snapshot	Special Features	
Sense Energy Monitor (Editor's Choice)	Excellent monitoring interface and appliance level detection	Amazon Alexa skill, small appliance monitoring, solar add-on	Prices
The Neurio Home Energy Monitor	Best-seller with excellent monitoring, good fit if appliance-level monitoring is not a focus	Bill forecasting feature, smart phone monitoring app	Prices
CURB Home Energy Monitoring System	Good for connecting to smart home controls and solar systems	Appliance level detection, integration with SmartThings, can control electronics	Prices
EyeDro Home Electricity Monitor	Low cost alternative with only the basics	Online monitoring	Prices
Smappee Home Energy Monitor	Good monitoring, but appliance-level detail is lacking	Solar add-on, smart phone app, free "comfort plug"	Prices
Ted Pro Home Electricity Monitor	Pricier model compared to models with similar features	Circuit-level detail, solar add-on option, connects to Alexa	Prices

Source: www.ohmhomenow.com

Our Summary Recommendation

Our recommendation for most consumers, particularly those that want a solar add-on is the [Sense Energy Monitor](#). The Sense Energy Monitor uses machine learning to automatically identify and monitor appliances in your home. The earlier versions of the Sense had issues with the device-level monitoring, but the company has significantly improved these capabilities. In addition, Sense has recently added integration with Alexa and IFTT to enable voice commands and communication with other smart home devices. Sense also comes with a cool interface to show you which devices are on in real-time and timeline throughout the day. Sense stands out as the most innovative model in the market and costs about the same as its main competitors. We expect Sense to continue to release more features targeted at energy savings and smart home integration in 2018. If you just want the basics at a low cost, however, we think the [EyeDro Home Electricity Monitor](#) at under \$130 offers the best value with an easy installation.



Electricity Bill Explorer

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	<ul style="list-style-type: none">• 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)	<ul style="list-style-type: none">• Develop system
Success (define success)	<ul style="list-style-type: none">• Number of customer bills analyzed by system• Number of customers upgrading to GreenPrime after using system• Customer feedback

Electricity Bill Explorer



Electricity Bill Explorer

Oracle and Opower

Oracle Buys Opower



On May 2, 2016, Oracle announced that it entered into a definitive agreement to acquire Opower, the leading provider of customer engagement and energy efficiency cloud services to utilities. The transaction has closed.

Opower's solutions enable over 100 global utilities, such as PG&E, Exelon and National Grid to deliver a modern digital customer experience. Opower's big data platform stores and analyzes over 600 billion meter reads from 60 million utility end customers, enabling utilities to proactively meet regulatory requirements, decrease the cost to serve, and improve customer satisfaction.

Oracle Utilities offers a complete suite of operational applications and cloud services for global electric, gas and water utilities that automate core operational processes and enable compliance. Together, Oracle and Opower will provide the industry with the most complete, modern and integrated cloud platform for the entire utility value chain, from meter to grid to end-customers.

ORACLE



Electricity Bill Explorer



PG&E My Energy

The screenshot shows the PG&E My Energy account dashboard. On the left, the 'Your Account' section displays the last payment of \$121.00 and a current bill of \$106.45, with a total balance of -\$462.49. Below this are sections for 'PAYMENT OPTIONS', 'BILL & PAYMENT HISTORY', and 'SERVICE REQUESTS'. The main 'Usage, Rates & Savings' section includes links for 'ENERGY USAGE DETAILS', 'COMPARE BILLS', 'HOME ENERGY CHECKUP', and 'WAYS TO SAVE'. A 'YOUR RATE PLAN' section offers to help understand rate options. At the bottom, there is a section for 'Get rebates and see efficiency ratings' with icons for various appliances.



Green Button
Download my data



Electricity Bill Explorer





PG&E Rate Comparison Tool

Electric Rate Plan Comparison

Your lowest cost rate plan

Based on your electricity use history, you'll save the most on the Time-of-Use (Peak Pricing 4-9 pm Weekdays) E-TOU-B + SmartRate™ rate plan.

Your Current Rate	Lowest Cost Save \$90
 Time-of-Use (Peak Pricing 3-8 pm Weekdays) E-TOU-A	 Time-of-Use (Peak Pricing 4-9 pm Weekdays) E-TOU-B
<p>How it works: The price you pay changes based on the time of day, the day of the week, and the season. Peak Pricing (highest price) is from 3 p.m. to 8 p.m. weekdays. Off-Peak Pricing (lowest price) is before 3 p.m. and after 8 p.m. weekdays, all hours on weekends, and most holidays. The eight winter months (October - May) have lower prices than four summer months (June - September).</p>	<p>SmartRate™ what's this?</p> <p>How it works: The price you pay changes based on the time of day, the day of the week, and the season. Peak Pricing (highest price) is from 4 p.m. to 9 p.m. weekdays. Off-Peak Pricing (lowest price) is before 4 p.m. and after 9 p.m. weekdays, all hours on weekends, and most holidays. The eight winter months (October - May) have lower prices than four summer months (June - September).</p>
\$1,540 Estimated cost per year	\$1,450 Estimated cost per year
LEARN MORE	LEARN MORE

[CHANGE YOUR RATE PLAN](#)



Would You Sign Up for These?

Questions?

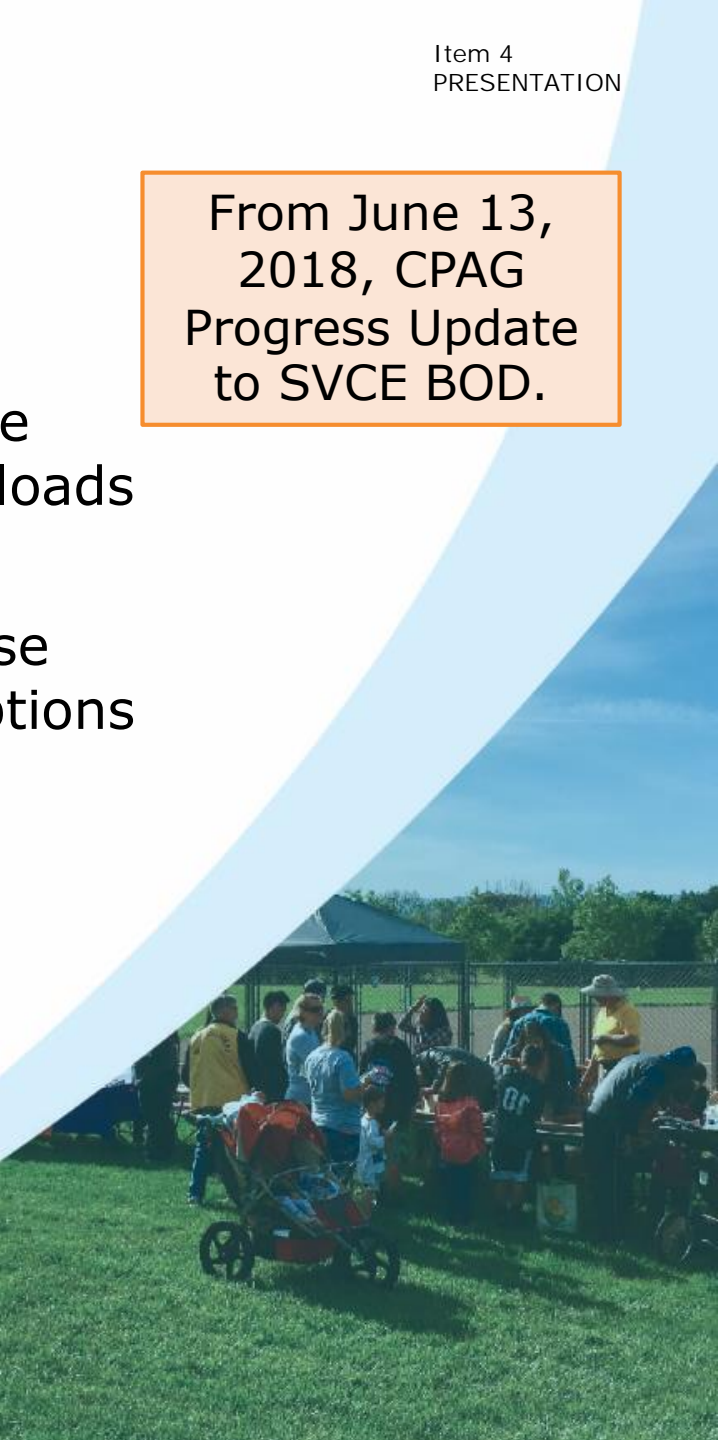
Current Utility Programs Available to SVCE Customers



Top Program Briefs

From June 13,
2018, CPAG
Progress Update
to SVCE BOD.

- **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



Top Program Briefs

Non-SVCE Program Offerings Available to SVCE Customers

Residential Electricity Monitoring

- Sense
- Rainforest
- TED

Electricity Bill Explorer

- Home Energy Analytics
- PG&E My Energy (OPower)
- PG&E Rate Comparison Tool

Residential BE Ready

MF EV Charging

- PG&E's EV Charge Network

**Covered in Prior
Presentation, Under
Agenda Item #3**

Top Program Briefs

	Non-SVCE Program Offerings Available to SVCE Customers	Current Activities & Resources at SVCE
Residential Electricity Monitoring	<ul style="list-style-type: none"> • Sense • Rainforest • TED 	
Electricity Bill Explorer	<ul style="list-style-type: none"> • Home Energy Analytics • OPG&E My Energy (OPower) • PG&E Rate Comparison Tool 	<ul style="list-style-type: none"> • Account Services support & tutorial video
Residential BE Ready		<ul style="list-style-type: none"> • SVCE’s BAAQMD grant for HPWHs covers elements of the program brief
MF EV Charging	<ul style="list-style-type: none"> • PG&E’s EV Charge Network 	

Next Highest-Ranked Program Briefs

From June 13, 2018, CPAG Progress Update to SVCE BOD.

- **Residential Storage**
Expand the use of residential storage to reduce duck curve impacts
- **BE Smart Upgrades**
Mass Beneficial Electrification for residential buildings
- **Used EVs and Smart Chargers**
Incentives or rebates for used electric cars and smart chargers
- **MF Energy Efficiency and Electrification**
Program to reduce cost of living to residents and to reduce GHGs

Next Highest-Ranked Program Briefs

Non-SVCE Program Offerings Available to SVCE Customers

Residential Storage

- Self-Generation Incentive Program (SGIP)



Covered briefly in prior CPAG meeting

BE Smart Upgrades

Used Evs and Smart Chargers

- Clean Fuel Rebate

MF Energy Efficiency & Electrification

- Multifamily Upgrade Program

Next Highest-Ranked Program Briefs

	Non-SVCE Program Offerings Available to SVCE Customers	Current Activities & Resources at SVCE
Residential Storage	<ul style="list-style-type: none"> • Self-Generation Incentive Program (SGIP) 	
BE Smart Upgrades		<ul style="list-style-type: none"> • SVCE’s BAAQMD grant for HPWHs covers elements of the program brief
Used Evs and Smart Chargers	<ul style="list-style-type: none"> • Clean Fuel Rebate 	
MF Energy Efficiency & Electrification	<ul style="list-style-type: none"> • Multifamily Upgrade Program 	<ul style="list-style-type: none"> • SVCE’s BAAQMD grant for HPWHs covers elements of the program brief, specifically MF electrification

Offerings in Un-Ranked Program Areas

- **Do-It-Yourself Home Energy Saving Toolkit**

DIY kit to help residents identify energy savings. Users can check out a toolkit at most library branches across Santa Clara County. They can keep installed materials like light bulbs and low-flow showerheads. The toolkit has a user guide, and new and updated marketing.



DIY Home Energy Saving Toolkits are available in 33 library branches

Program Details	
Administration	City of San Jose
Implementation	Silicon Valley Energy Watch
Oversight	CPUC
Funding source	Rate-payer funds

- **2017 Program Statistics**

365 check-outs total

San José	216
Sunnyvale	83
Milpitas	31
Cupertino	18
Los Altos	7
Morgan Hill	4
Campbell	3
Gilroy	3


From Silicon Valley Energy Watch, 2017 Annual Report

2018 Q1 tally: 149 check-outs



Offerings in Un-Ranked Program Areas

- **Energy Upgrade California** (multiple programs)
Suite of programs under the Energy Upgrade California umbrella brand, including Home Upgrade (up to \$5,500), home energy assessment, appliance rebates, financing, home improvements, etc.
- Example program:

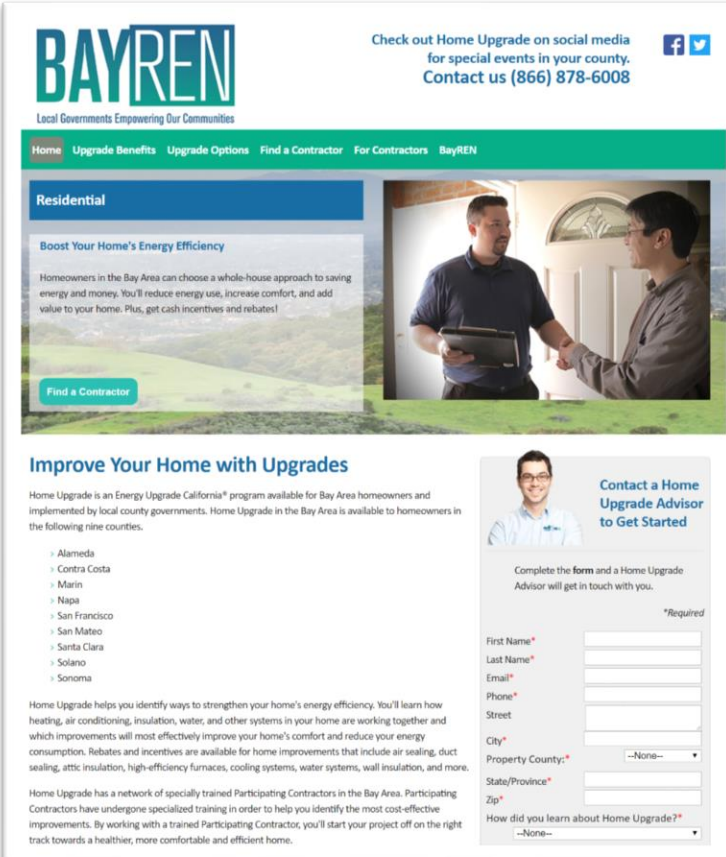


Home Upgrade
Energy Upgrade California®

Summary: Assistance developing efficiency upgrade projects, with up to \$5,500 in rebates.

Program Details	
Administration	BayREN
Implementation	Multiple Participating contractors
Oversight	CPUC
Funding source	Rate-payer funds

<https://www.bayareaenergyupgrade.org/>



BAYREN
Local Governments Empowering Our Communities

Check out Home Upgrade on social media for special events in your county. Contact us (866) 878-6008

Home Upgrade Benefits Upgrade Options Find a Contractor For Contractors BayREN

Residential

Boost Your Home's Energy Efficiency

Homeowners in the Bay Area can choose a whole-house approach to saving energy and money. You'll reduce energy use, increase comfort, and add value to your home. Plus, get cash incentives and rebates!

[Find a Contractor](#)

Improve Your Home with Upgrades

Home Upgrade is an Energy Upgrade California® program available for Bay Area homeowners and implemented by local county governments. Home Upgrade in the Bay Area is available to homeowners in the following nine counties:

- Alameda
- Contra Costa
- Marin
- Napa
- San Francisco
- San Mateo
- Santa Clara
- Solano
- Sonoma

Home Upgrade helps you identify ways to strengthen your home's energy efficiency. You'll learn how heating, air conditioning, insulation, water, and other systems in your home are working together and which improvements will most effectively improve your home's comfort and reduce your energy consumption. Rebates and incentives are available for home improvements that include air sealing, duct sealing, attic insulation, high-efficiency furnaces, cooling systems, water systems, wall insulation, and more.

Home Upgrade has a network of specially trained Participating Contractors in the Bay Area. Participating Contractors have undergone specialized training in order to help you identify the most cost-effective improvements. By working with a trained Participating Contractor, you'll start your project off on the right track towards a healthier, more comfortable and efficient home.

Contact a Home Upgrade Advisor to Get Started

Complete the form and a Home Upgrade Advisor will get in touch with you.

*Required

First Name*

Last Name*

Email*

Phone*

Street

City*

Property County*

State/Province*

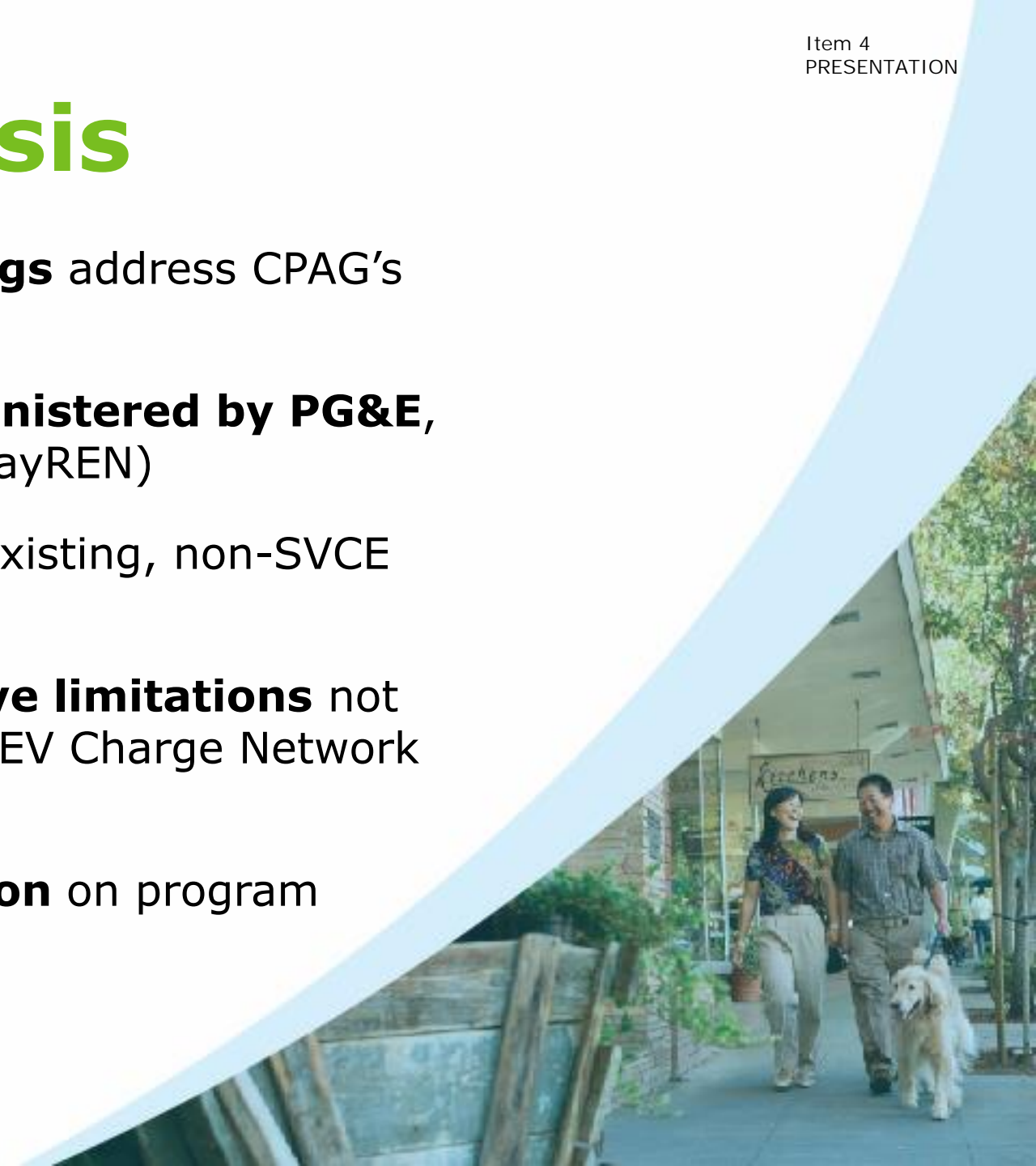
Zip*

How did you learn about Home Upgrade?*



High-Level Synthesis

- **Numerous existing program offerings** address CPAG's top-ranked program areas
- **Non-SVCE programs primarily administered by PG&E**, but other program admins exist (e.g. BayREN)
- **Building electrification ignored** by existing, non-SVCE programs
- **Existing program offerings may have limitations** not reflected in prior summary tables (e.g. EV Charge Network serves limited market segments)
- **Currently compiling add'l information** on program details, budgets, uptake, success



Questions for CPAG's Consideration

- How could SVCE prioritize program development given existing non-SVCE program offerings?
- Under what circumstances should SVCE consider offering a program that overlaps in its objectives to an existing, non-SVCE program offering?
- What role could SVCE have in promoting non-SVCE administered energy efficiency programs?

