



# Sonoma Clean Power and PG&E's Advanced Energy Rebuild Program

Group B, Deliverable 33 Case Study 2



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# **1. Executive Summary**

This document is a case study of the efforts Sonoma Clean Power (SCP) and PG&E to support the State's goals for zero net energy and carbon reduction in the building sector. The aim of this study is to identify the best practices and lessons learned through review of the program background and specific efforts.

After wildfires destroyed thousands of homes in Sonoma County in the fall of 2017, Sonoma Clean Power and PG&E collaborated with the Bay Area Air Quality Management District (BAAQMD) to create the Advanced Energy Rebuild (AER) program to help homeowners rebuild new, more energy efficient homes with lower greenhouse gas (GHG) emissions. Launched in May of 2018, the AER program provides financial incentives, education, and project advising to encourage homeowners to adopt state-of-the-art energy efficient technologies and carbon-saving strategies in order to rebuild their fire-damaged homes at 2019 Title 24 standards, which are at a minimum 20% more efficient than the current 2016 code.

The program's innovative design layers funding from each of the three partners in order to provide incentives for both dual fuel and all electric homes. Qualifying dual fuel homes are eligible for up to \$7,500 in incentives, while higher incentives of \$12,500 are provided for all electric homes, with an additional \$5,000 available to encourage customers to add solar panels and battery storage to either type of home. Funding for accessory dwelling units (ADUs)<sup>1</sup> and multifamily properties is also available. Single family homes receive an average of \$9,615 per home, of which SCP averages \$4,950, while PG&E and BAAQMD average \$3,188 and \$1,476, respectively.

As of June 2019, the program has received 105 applications with a total of 207 dwelling units. This represents approximately 6% of the 3,246 fire rebuild related building permits that were issued in the Sonoma and Mendocino areas over the first 13 months of the program. Of these applications, 104 were for single family homes, while one was for a multifamily complex with 96 units. To date, 66 projects have been approved and four have completed construction. Of the 66, 22 are all electric, while the remainder are dual fuel. Of the 22 all electric homes, 21 installed solar panels, and 12 opted to include solar panels and batteries. The enrolled projects averaged an increase of 24% energy efficiency improvement above 2016 Title 24 code, with the average home estimated to be 26% more efficient than a standard home, -saving \$650 on electricity bills and offsetting 14 metric tons of CO<sub>2</sub>. Because solar production is excluded from the savings calculations, the enrolled projects represent 9,620 kWh of energy savings, with an average of 60 kWh per dwelling unit. Total therm savings are 62,780, with an average of 387 therms per dwelling unit. Combined, the enrolled projects are contributing 340 total tons of GHG savings.

Beyond the details of the Advanced Energy Rebuild program design and implementation, this case study also yielded key best practices and lessons learned that can be applied to broader ZNE and other decarbonization efforts, including:

#### **Best Practices**

Utilize existing program infrastructure. Rather than create a new program from scratch, the AER team made creative use of pre-existing efforts and allocated responsibilities according to the strengths of each participating entity. At its core, the AER program is built upon PG&E's California Advanced Homes Partnership infrastructure as implemented by TRC. SCP leverages its local presence and existing marketing and social media networks for outreach and face-to-face customer

<sup>&</sup>lt;sup>1</sup> An accessory dwelling unit (ADU) is a small permanent home on the same residential lot that may be attached or detached from the main home. Other names for ADU include granny unit, in-law and casita.

service. While BAAQMD uses its numerous social media and messaging networks to help promote awareness.

- Layer multiple funding sources. One of the most pivotal program design elements has proven to be
  its layered funding stack. Each entity contributes funds for different measures based on that
  organization's goals and requirements. PG&E covers program implementation costs and provides
  resource funding for dual fuel or all electric homes, through the CAHP program's existing structure,
  based on the home's modelled improvement in energy efficiency beyond code requirements.
  BAAQMD provides deemed funds for solar and electrification measures in all electric homes. SCP
  pays for carbon-reducing measures in both home types, with contribution amounts varying
  depending on customer equipment choices and the resulting contribution from PG&E.
- Present one forward-facing program to customers. While the AER program is an amalgam of parts contributed by multiple entities on its back end, from the customer perspective it is presented as a single program that is designed to increase customer interest, ease participation, and maximize access to program resources. The hybrid program design creates larger incentives that make the program more enticing, while also allowing for more stringent participation requirements. Likewise, the program offers one easy-to-access program application, a streamlined review process, a unified set of customer messages, and a single customer rebate check drawn from a shared funding pool.
- Study your customers and design your program accordingly. At the start of the program design phase, the AER team took the time to speak with homeowners, builders, energy consultants, and other stakeholders to learn what was really needed for a fire rebuild program. Their research yielded key findings that contributed directly to the program design. Among other things, they concluded that production homebuilders and individual homeowners, particularly those participating in a fire rebuild, have different interests, needs, and program processing requirements. Production builders submit plans for large housing developments in one application with a handful of home models. This makes energy modeling and incentive processing easier. Conversely, individual homeowners present custom home models that must be reviewed on a one-off basis. Additionally, production builders are primarily concerned with low construction costs rather than long-term efficiency. While individual homeowners can be more interested in energy savings since they want comfort, resiliency, and a balance between upfront costs and life-cycle operating expenses. Moreover, while developers may be content to wait until project end for incentive payments, homeowners are often cash-strapped, so paying 50% of incentives upon application approval is extremely helpful to keep smaller contractors paid and projects moving forward.
- Prewire new homes for future all electric and solar panel installations. Customer preference for gas appliances represents a sizable barrier for the adoption of all electric homes. While many customers are interested in building more efficiently, fewer of them are ready to give up natural gas service and live in all electric homes. The AER program addresses this by requiring any participating dual fuel home to be prewired to accommodate future installations of all electric equipment for HVAC, water heating, cooking, and laundry. Likewise, roof designs must accommodate the structural loads associated with solar panels and they must have conduit for panel installation, even if panels are not included at the time of construction. These requirements increase the likelihood of converting dual fuel homes to all electric homes in the future by significantly reducing homeowner financial hurdles if and when such upgrades are considered.
- Establish an induction cooking lending program. Customer desire for natural gas cooktops ranks high among the reasons for opting for a dual fuel rather than all electric home. To overcome this barrier to customer acceptance, SCP offers an induction cooktop program that lends interested

homeowners a portable induction cooktop and associated cookware for a free 30-day trial so they can become familiar and comfortable with the speed and convenience of induction cooking. All that is required of the homeowner is a commitment to respond to a survey at the end of the trial. Survey results can provide insights into customer experiences, hesitations, preferences, and customer testimonials to promote induction cooking. A similar cooktop lending effort could be incorporated into other types of new construction programs and used as a familiarization tool to build customer interest in induction cooking.

- Educate all stakeholders involved in the construction process. Encouraging wider acceptance of ZNE construction requires educating all of the groups involved in the construction process, including architects, builders, homeowners, certified energy analysts, HERS raters and others. The AER program design includes educational elements directed at each of these groups, including numerous public workshops and webinars to explain the program to homeowners, training courses offered to architects and builders through a regional builders' association to familiarize them with electrification and ZNE principles; hosted local training sessions and paying testing costs to encourage local people to become certified energy analysts (CEAs), as well as uncounted one-on-one conversations with homeowners, CEAs, and HERS raters to help them appreciate the many benefits of increased efficiency and electrification and their place within the construction process.
- Align program strategies and implementation tactics with larger goals. While energy efficiency and electrification are the primary objectives of the AER program, SCP has also taken steps to further leverage the program to help meet its bigger picture carbon-reduction goal. To that end, SCP is using the program as an opportunity to recruit participating homeowners into its GridSavvy load shifting and demand management program that will dispatch electric vehicle charging, grid interactive heat pump water heating, and smart thermostat-controlled heat pumps—all of which are already installed in the homes and poised to offset carbon-intensive electric loads during on-peak hours.
- Work with "block captains" in each neighborhood. SCP credits neighborhood advocates called "block captains," who represent groups of neighbors who are rebuilding, as being among the most effective of the program's marketing tools. Block captains are loosely akin to the energy champions that are used in other energy efficiency programming efforts. Their extensive social networks, relatively greater knowledge of the program, and comfort with the rebuild process combine to make them well suited to speaking with PG&E, SCP and local government officials to discuss the rebuilding effort and then relaying those messages back to their friends and neighbors. SCP indicates that the role of block captains has been unique to the AER program and recommends their use in other efforts.

#### Lessons Learned

- Connect with customers as early as possible in the building process. Customer participation rates, as well as feedback from both program participants and nonparticipants, reveal the importance of early marketing to ensure that the program is top of mind for customers as they begin making their home design decisions. The AER program missed the opportunity to work with a few fast-moving homeowners because they learned of the program's existence after they were already committed to less efficient, dual fuel home plans. Early outreach to make people aware of program offerings gives customers a greater opportunity to explore and model the best options, while also affording program implementers a greater chance to explain the program and influence decisions.
- Be prepared to handle waves of applications. While a fire rebuild program requires the processing
  of individual applications for each custom home, participating homeowners tend to apply to and
  proceed through the program in cohorts. While each homeowner is individually responsible for

their own decisions, they tend to apply in groups because it takes approximately the same amount of time to move through the various stages of the rebuilding process, such as removing debris from their lots, settling with their insurance companies, finding contractors, and developing building plans. As a result, it is essential to have a sufficient number of certified energy analysts and program staff on hand to help with applications, review energy models, and process checks in order to avoid bottlenecks that slow down the rebuild process.

- Allocate sufficient time and funding to recruit, educate and incentivize certified energy analysts. CEAs are essential for developing the standardized energy models needed for the program since CEAs submit higher quality energy models than untrained persons and thus the models require less back and forth to meet program standards. Yet despite the program's numerous efforts to recruit, educate, inform and motivate CEAs, the program fell short in the number of local CEAs available to help homeowners and in their willingness to prepare high quality models to assess differing equipment and design considerations. As a result, SCP staff were sometimes required to shoulder the burden of some of the energy modeling needed to properly prepare homeowner applications in a timely manner. Future efforts will need to allocate more resources to this facet of the program.
- Promoting high efficiency is easier than promoting fuel switching. The program's \$5,000 incentive for upgrading to an all electric home has enticed one third of customers to forgo natural gas service. While electric heat pumps and water heaters are readily accepted measures in dual fuel homes, fireplaces and cooktops have proven to be more challenging for customers to relinquish. While SCP's cooktop lending program has helped, other concerns, such as the home's resale value, remain as barriers. To further increase adoption of all electric homes, additional education and higher financial incentives may be necessary.

# 2. Program Design

In October of 2017 multiple wildfires burned across Sonoma County, destroying parts of Santa Rosa, Calistoga, Sonoma, and other communities.<sup>2</sup> By the time that the fires were extinguished thousands of structures burned and were destroyed. In Santa Rosa alone, damage was estimated at \$1.2 billion. From the ashes of these fires in May of 2018 Sonoma Clean Power's Advanced Energy Rebuild (AER) program rose to help homeowners rebuild new, more energy efficient homes with lower greenhouse gas (GHG) emissions.

The Advanced Energy Rebuild program is a first of its kind partnership between Sonoma Clean Power (SCP), Pacific Gas and Electric (PG&E), and the Bay Area Air Quality Management District (BAAQMD). With one easy-to-access application, the program provides incentives of up to \$17,500 to encourage homeowners to adopt state-of-the-art energy efficient technologies and carbon-saving strategies in order to rebuild their fire-damaged homes at 2019 Title 24 standards, which are 20% more efficient than the current 2016 code.

The program gives customers a choice of either performance-based and prescriptive menu-based paths that feed into a multi-tiered model that layers funding from each of the three partners in order to provide incentives for both dual fuel and all electric homes. Qualifying dual fuel homes are eligible for up to \$7,500 in incentives, while higher incentives of up to \$12,500 are provided for all electric homes, with an additional \$5,000 available to encourage customers to add solar panels and battery storage to either type of home. Funding for accessory dwelling units (also known as granny units) and multifamily properties is also available.

Program-supported measures include advanced building envelopes, smart thermostats, high efficiency heat pumps, grid interactive heat pump water heaters, induction cooking, EnergyStar appliances, water efficient landscaping, electric vehicle charging stations, and mandatory pre-wiring for electric appliances so that any participating dual fuel home can be more easily upgraded to an all electric home in the future. In addition to providing financial incentives for installing these measures, the program also offers participating homeowners:

- Advising on building design and measure selection, including review of construction plans, energy models, and documentation
- Referrals to lists certified energy analysts who help homeowners with the required energy modeling and the Title 24 documentation required for building permits
- Referrals to lists of HERS raters who will verify the new homes' efficient features

Even before the 2017 fires were fully extinguished, SCP and PG&E began working separately to find ways to help the fire ravaged communities. It didn't take long for them to recognize their parallel efforts and begin discussions about coordination. "Early on we reached out to PG&E saying, 'We have more than 6,000 structures we need to rebuild over the next few years. How can we work together to create a program and financial incentives to serve these customers? And how we can put this together fast enough to help before it's too late to make a difference,'" says Rachel Kuykendall, senior program manager of the Advanced Energy Rebuild Program for Sonoma Clean Power.

PG&E was interested in working with SCP, but such a possibility wasn't a foregone conclusion since the two entities hold differing goals and they're bound by different requirements. SCP is a self-funded, not-for-profit, public agency, or community choice aggregator (CCA), that supplies electric power to 500,000 residences and businesses in Sonoma and Mendocino counties. SCP's mission is to lower the costs and environmental

<sup>&</sup>lt;sup>2</sup> Residents of Mendocino County are also served by Sonoma Clean Power, so the program was expanded to cover homes lost in Mendocino County in fires during 2018.

impacts of energy use for its customers by improving energy efficiency, increasing local renewable energy, and reducing greenhouse gas emissions. Meanwhile, PG&E is an investor-owned utility with ratepayer-funded energy efficiency programs and goals that are measured in terms of cost-effective kilowatt hour (kWh), kilowatt (kW), and therm savings as allowed by PUC regulations.

Initial conversations between the two entities were further constrained by the fact that PG&E wanted to use its existing residential new construction program, California Advanced Homes Partnership (CAHP), to enable customers to rebuild dual fuel homes, while Sonoma Clean Power wanted its rebuild program to be all-electric and not allow homes with natural gas service in the program. At first, this discrepancy seemed like a non-starter because, while SCP was free to spend its funds on fuel-switching GHG-reducing measures, CPUC guidelines at the time dictated that PG&E's ratepayer-funded program needed to incentivize the homes to be efficient regardless of their fuel choice. Fortunately, the conversation did not stop there.

"We started talking with Sonoma Clean Power with the hope of not having competing programs," says Conrad Asper, program manager for PG&E, but the idea of merely offering people the opportunity to enroll in both programs had its own drawbacks. "People would still have to go through two processes with two applications, and, to be honest, most people don't want to go to that trouble. They either would have been put off by it or they would have gone with the program that paid the higher incentive."

So the two entities began to brainstorm ideas until they realized that they could leverage PG&E's relationship with TRC, the third party implementer of its California Advanced Energy Homes Partnership. If SCP contracted with TRC to implement its Advanced Energy Rebuild program, then TRC could essentially run what appeared to the customer as a single program on the surface, while behind the scenes it was in some ways closer to two separate programs; one for PG&E that was based on the existing CAHP program that supported dual fuel homes, and a new one for SCP that supported all electric homes with electric vehicle charging, solar panels and battery storage.

This unique twist of using a third party implementor with the ability to engage in multiple contracts opened the doors for a number of other groundbreaking innovations as well (Figure 1). First, because PG&E and SCP were not contracting directly with each other, Sonoma Clean Power was able to invite in the Bay Area Air Quality Management District as an additional provider of incentive dollars. Moreover, the arrangement enabled each entity to fund different measures and to contribute to the program based on their goals and limitations. As a result, PG&E provides resource funding for kWh and therm savings, while SCP and BAAQMD fund measures targeted at GHG reductions.





The new program design effort began with SCP, PG&E, and TRC staff talking to homeowners, contractors, energy consultants, and other stakeholders to learn what was really needed. Their research yielded a few key findings that contributed directly to the program design. With so many homes destroyed, the area had an acute housing crisis and a labor shortage that would make rebuilding more costly and time consuming. Also, unsurprisingly, homeowners were eager to rebuild quickly, yet they were facing significant insurance shortfalls. "We learned that generally homeowner priorities were to build the fastest and least expensive houses possible since many of them were underinsured," Kuykendall says. In fact, many customers reported a gap of \$200,000 to \$300,000 between the funds they received from their insurance settlement and the actual cost to rebuild their homes. Moreover, "these folks don't have any experience with building homes and most of them don't even think about energy efficiency. So, we need to get people to slow down for the few extra weeks it takes to think about integrated design and energy efficiency."

Other important factors soon became clear as well. As PG&E's residential new construction program, CAHP primarily works with production builders who own large tracks of land, submit plans for entire developments under one application, propose a handful of home models per development, and enable incentives to be processed in large batches. None of these factors applied to the fire rebuild. Instead, each homeowner had a single lot and would be submitting a unique application, home plan, and energy model. As a result, each one-off application would require individual processing for plan review and incentive processing. Although these facts meant that the CAHP program would need to be retooled to accommodate the extra work involved, the rebuild effort also presented new opportunities to promote energy efficiency. For instance, production builders are generally not motivated by energy efficiency since they are concerned with meeting code as inexpensively as possible. Conversely, homeowners can be motivated by energy savings since they're looking for a combination of long-term comfort, resiliency, and a balance between upfront costs and life-cycle operating expenses.

All these factors led to a program design that encourages customers to reach beyond the current 2016 Title 24 codes by making the rebuilding effort as easy as possible for homeowners. Consequently, the program also features a single application form, streamlined processes, and rapid incentive payments—all of which reflect the program's sensitivity to helping customers get back into their homes as quickly as possible. "It took a lot of back and forth," Kuykendall says. "But ultimately our program shows people the ideal home from a holistic,

green building design perspective and it includes things like renewable energy and water savings that are atypical for a utility program."

As the program elements coalesced in January of 2018, PG&E submitted an advice letter<sup>3</sup> describing the proposed joint effort to the CPUC. The letter included a request for permission to double CAHP incentives and technical support; the ability to apply CAHP funds to in-law units to help alleviate the local housing shortage; and longer rebuild timelines through 2021. The request was approved on April 27, 2018 and the program launched in May of 2018.

## 3. **Program Implementation**

Because the AER program is a joint effort between SCP, PG&E, TRC and BAAQMD, the team needed to sort out the best way to divide the responsibilities of implementation. In the end, it largely came down to each party doing what they were best suited to handle. As the primary local presence, SCP focuses its attention on customer-facing activities, including marketing, education, and outreach, as well as working with customers to ensure their building plans, energy models, and program applications are in order. TRC handles program implementation, project review, incentive processing, and program infrastructure in a manner similar to the way it handles the CAHP program. PG&E covers program administration and incentive costs, while BAAQMD's role is limited to providing funding for solar and electrification measures in all electric homes. All parties except BAAQMD have contributed to stakeholder education for homeowners, builders, energy consultants, and HERS raters.

"We really tried to leverage Sonoma Clean Power's local community feel and boots on the ground presence," says PGE's Asper. "We didn't want to duplicate that effort with a marketing strategy on our side of it. So, we provide them with resources, and we help with outreach and customer-facing activities as needed. In a sense, that's why it has come to be viewed as a Sonoma Clean Power program. PG&E stepped back and said you're a trusted local entity, and we want to support this collaboration."

"And it really worked out," adds Nic Dunfee, TRC Senior Program Manager. "SCP has lots of one-on-one local contacts, so it was natural for them to take on marketing and awareness. While the CAHP program on the PG&E side is focused more on implementation, technical review, and processing the incentives."

## **3.1** Marketing, Education, and Outreach

From the beginning the AER team knew the program needed to reach out to homeowners while they were still in the process of making design decisions and before they got to the building permit stage of their rebuild efforts. But they also wanted to be sensitive to the facts that people were grieving, that they first needed to clear their lots of fire damaged debris; and that they were in varying stages of dealing with their insurance companies. Consequently, SCP's marketing efforts covered a wide range of channels including direct mail, social media, posting notices at city and county permitting offices, speaking with city and county staff members who could in turn educate homeowners, and attending public events where SCP staff could speak directly with homeowners (Figure 2), such as the Rebuild Green Expo, the Watershed Revival Community Gathering, and Sonoma County's annual State of the County meeting. To reach homeowners who left the area or otherwise couldn't attend events like these, the AER team also explained the program in a live online webinar; a recording of which remains viewable from a link on the SCP website.

<sup>&</sup>lt;sup>3</sup> Request for Energy Efficiency Program Enhancements to Assist October 2017 Wildfire Impacted Customers" Advice letter 3928-G/5219-E and supplemental advice letter 3928-G/5219-E-A, January 23, 2018

As part of its ongoing marketing efforts, SCP is also leveraging homeowner's personal networks by working with "block captains," who represent a group of neighbors who are all rebuilding. These block captains interface with SCP, PG&E, and/or their local government and then bring information back to their friends and neighbors. "I'd say we get the most traffic in the door from word of mouth. So, finding those block captains and local advocates for the program has been huge," says Kuykendall. "It's my understanding that's somewhat unique to our area, and not something that the other fire areas have done."

Figure 2 Rebuilding Workshop and Resource Fair in Oakmont, CA



In addition to working with homeowners, the program also seeks to educate and assist the professionals who work with the homeowners, including architects, contractors, energy analysts, and HERS raters. For this, the AER team partnered with as regional builders association called the North Coast Builders Exchange to teach a series of trainings on design thinking for ZNE, building high performance walls, designing efficient plumbing systems, building codes and standards, and other related topics (Figure 3). The classes were funded by PG&E. "We taught that series of classes twice to engage our community of builders and designers about the concept of zero net energy and zero net carbon," says Kuykendall. This was important because it familiarized the attendees with these new possibilities and prepared them for discussions with homeowners.

It was also important to the AER team to ensure that Sonoma County had a sufficient number of certified energy analysts to help participating homeowners prepare the energy modelling needed for the program. "We drew a line when we decided to require people to work with certified energy analysts to help them prepare the energy models that TRC reviews for qualification in the program," says Asper. "We knew we needed to promote better quality energy modeling with a set of minimum standards because otherwise anyone could submit an energy model, and TRC would probably need to re-do the model to get it to where we could actually use it." To build out a qualified group of local CEAs, the AER team sponsored live and online CEA and HERS rater certification courses in Santa Rosa, with SCP paying the costs of the exams for local residents in order to encourage more participation. While this training effort did increase the number of qualified CEAs to work with the program, the local CEAs have proven to be extremely busy, and they have not necessarily had the time or desire to work with AER participants to create an accurate energy model that meets the requirements for the program. Consequently, SCP often works with the CEAs to develop a preliminary model, and then works with the homeowner to determine a work scope that would get them into the program.

Finally, because cooking with natural gas is one of the biggest hurdles to promoting all electric homes, SCP also offers a related sister program designed to familiarize homeowners, designers, builders—and in fact any Sonoma or Mendocino County resident—with the concept of induction cooking. That program lends out portable induction cooktops and cooking pans that people can test for up to three weeks. "The only requirement is that people answer a survey to tell us what they think of it," she says. "That's been really successful as an accompanying educational piece because cooking and fireplaces are the trickiest for us in terms of pushing the electric home option to customers." According to the survey, respondents rate their overall cooking experience at an average score of 8 out of 10, and the likelihood of switching to induction cooking at 7 out of 10.



Figure 3 AER-sponsored workshop on high performance building envelopes

If all these different marketing and education angles sound like a lot of work, it is, and deliberately so since SCP needed to deliver different messages to each audience. For homeowners the main messages are to start thinking about energy efficiency and carbon neutral design as soon as possible and to start talking with their architects, contractors, and energy analysists sooner rather than later to avoid trying to undo previous decisions after building is underway. For builders, the program has focused on educating them about the value of high efficiency design and new technologies, since they need to be familiar with equipment options and understand pricing before they'll feel comfortable talking to customers about the benefits and advantages. Meanwhile, for the CEAs the main focus has been on empowering them to be advocates for energy efficiency rather than merely serving as a clearinghouse for Title 24 compliance. Consequently, SCP has striven to help the CEAs to appreciate the advantages of energy modeling and the value in helping homeowners to understand the options offered by the program.

### 3.2 Implementation

After the program's outreach efforts capture a homeowner's interest, the customer arranges a time to sit down with SCP staff. Often this happens around the time the customer is ready to obtain a building permit. When the customer arrives, SCP staff review their Title 24 documents and any plans if they bring them. "Then we ask if they've thought about these energy efficiency measures to get over the 20% hurdle," says Kuykendall. In about 95% of cases, SCP then helps the interested homeowner to follow up with their certified energy consultant to obtain the customer's energy model and plug in the more efficient measures. SCP then gives

the homeowner an updated project scope that will work for the program so that they can price things with their contractor. When the customer and contractor agree, the homeowner takes the updated project scope back to their CEA, who adds the new measures and sends in the updated energy model. Once all the new measures are modeled and ready, the customer can submit an online application with all the accompanying documentation needed for the program. "It's actually very time-intensive," admits Kuykendall. But it's worth the effort since the handholding results in higher program participation.

Upon receiving the application, TRC reviews the energy model and all accompanying documentation. "Our reviews make sure that the models properly reflect what's shown in the plans, and also that the requirements match up with what is required by code," says Dunfee. If everything is in order, the project is approved and TRC issues the customer an upfront payment for half of the total incentive amount. "That's something that's unique to the fire rebuild program," adds Kuykendall. "It was important to us to help people buydown some of the equipment costs because, again, a lot of these folks are underinsured, cash-strapped, and they need to make progress payments to their contractors." The second half of the incentive amount is withheld until a certified HERS rater visits the new home and verifies the completed work. Once the HERS rater enters the project verification data into the HERS registry for the program, the completed project file is reviewed by TRC. Once the final project is confirmed, TRC cuts the second check.

Approved projects are valid for 36 months from the date of acceptance. Within this extended construction time frame, if a customer wants to make changes to the building envelope or decides to go with a different kind of equipment, they must notify the program of the change and then TRC will work them to ensure the changes remain within program parameters.

Both PG&E and the Bay Area Air Quality Management District remain largely uninvolved in these day-to-day program implementations activities, although they are kept apprised and they provide incentive funding as new projects work their way through the program pipeline.

### **3.3 Incentive Options**

As noted above, the Advanced Energy Rebuild program offers financial incentives for both advanced energy (dual fuel) homes and all electric homes. The program is open to single family homes, duplexes, townhomes, ADUs and multifamily projects. Incentive levels vary depending upon several factors, including the type of structure, the fuel sources for the home, and whether a solar plus storage option is included.

The program offers a \$7,500 incentive for dual fuel Advanced Energy single family homes, duplexes, or townhomes. ADUs and multifamily projects can receive incentives of \$3,750 per dwelling unit. All electric homes without gas service receive higher incentives, totaling \$12,500 for single family dwellings and \$6,250 for ADUs or multifamily projects. An additional \$5,000 can be added on to any of the incentive packages for homeowners who install a solar panel system with a battery storage or who pre-purchase a 20-year commitment to 100% local renewable power through either SCP's EverGreen service.

In order to receive these incentives, the AER program offers homeowners a choice of one of two pathways, (1) a flexible performance path that is based on overall efficiency or (2) a simple menu-based path based on a checklist of measures for dual fuel and all electric homes. The flexible performance path gives homeowners the ability to mix and match measures and design options by requiring their new homes to meet the following overall requirements:

• The home's time-dependent energy efficiency must be modeled to be 20% above 2016 Title 24 energy code

- Roof design must accommodate the structural load associated with solar panels and it must feature conduit for panel installation, even if panels are not included at the time of construction
- An electric vehicle charging station must be installed. Sonoma Clean Power provides free level 2 charging stations.
- For dual fuel homes, if a gas stove/range, water heater, and/or clothes dryer are planned, 220V outlets must be also installed so that any of these gas appliances can be readily converted to electric versions at a future date.

The simple menu-based path provides a checklist of items that must be installed including 2016 Title 24 high performance walls, 2019 code windows, WaterSense efficient plumbing features, Energy Star appliances, and a number of other measures listed in Figure 4.

Figure 4 Advanced Energy Rebuild Incentive Pathways

1 Advanced Energy Home	2 All El	ectric Home			
\$7,500	\$12,500				
Flexible Performance Path	Flexible Performance Path				
<ul> <li>20% above Title 24 energy code</li> <li>220V outlet at stove/range, water heater, and clothes dryer</li> <li>Design roof for additional structural loads associated with solar panels, and add conduit for future installation</li> <li>Electric Vehicle Charging Station - Equipment free from Sonoma Clean Power</li> </ul>	<ul> <li>20% above Title 24 energy code, all electric end uses</li> <li>Design roof for additional structural loads associated with solar panels, and add conduit for future installation</li> <li>Electric Vehicle Charging Station - Equipment free from Sonoma Clean Power</li> </ul>				
\$7,500	\$12	,500			
Simple Menu-Based Path	ole Menu-Based Path Simple Menu-Based Path				
<ul> <li>2016 Title 24 High Performance Walls or 2016 Title 24 High Performance Attics* (note: unvented attic can qualify)</li> <li>2019 Code windows (Max U-factor 0.30, SHGC 0.23)</li> <li>High efficiency water heater: Heat Pump Water Heater w/ EF of 3.0+or gas tankless w/ EF of 0.92 and 220v outlet</li> <li>Heating/cooling ducts that are well sealed, insulated (R-8), and located primarily in conditioned space (note: buried ducts as defined by Title 24 can qualify)</li> <li>Water Sense efficient plumbing fixtures</li> <li>Water efficient landscaping</li> <li>Energy Star Appliances</li> <li>220V outlet at stove/range and clothes dryer</li> <li>Electric Vehicle Charging Station – Equipment free from Sonoma Clean Power</li> <li>*Must meet requirement of CEC Climate Zone 4. See program handbook.</li> </ul>	<ul> <li>2016 Title 24 High Performance Walls</li> <li>2016 Title 24 High Performance Attics* (note: unvented attic can qualify)</li> <li>Insulation Inspected by a HERS Rater (QII)</li> <li>Building Enclosure Airtightness verified by a HERS Rater (less than 3 ACH50)</li> <li>*Cool* Roof</li> <li>2019 Title 24 Windows (Max U-factor 0.30, SHGC 0.23)</li> <li>NEEA Tier 3 Heat Pump Water Heater w/ grid-integration controls installed</li> <li>High efficiency heat pump for heating/cooling (EER of 12.5+, HSPF of 9.5+)</li> <li>*Must meet requirement of CEC Climate Zone 4. See program handbook.</li> </ul>	<ul> <li>Heating/cooling ducts that are well sealed, insulated (R-8), and located primarily in conditioned space (note: buried ducts as defined by Title 24 can qualify)</li> <li>Smart Thermostat</li> <li>Water Sense efficient plumbing fixtures</li> <li>Water efficient landscaping</li> <li>Induction Cooking</li> <li>Energy Star Appliances for all Refrigerators, Dishwashers, Clothes</li> <li>Washers, and Bathroom Fans</li> <li>Heat Pump or Electric Clothes Dryer</li> <li>Electric Vehicle Charging Station – Equipment free from Sonoma Clean Power</li> </ul>			
Add solar to either option					
\$5,000					
Solar panel system designed to offset annual electric usage with 7.5 kWh battery storage system					

· Pre-purchase of 20-year premium on 100% local renewable power (e.g., EverGreen).

If homeowners install all the measures on the menu-based path, the program will pay the full incentive amount (\$7,500 or \$12,500) regardless of whether the resulting energy model matches the 20% savings required by Title 24. "The menu-based path is less common but was important to us in terms of selling this to homeowners because it's a way for them to visualize what 20% better than code looks like in terms of efficiency measures. Otherwise, it's really hard for them to understand what 'better than code' means in terms of what they need to put into their homes," explains Kuykendall.

Incentive payments are only made payable to the homeowners whose names appear in the program application. Program rules prohibit applicants from accepting duplicate funding for the same measures from more than one utility-sponsored energy-efficiency program. However, if customers opt for the solar and storage package, they can also apply to PG&E's self-generation incentive program for a State of California tax credit on top of the program's \$5,000 incentive.

According to program eligibility rules, incentives are available to homes, condominiums, apartments, and accessory dwelling units in Sonoma and Mendocino counties that were destroyed by the October 2017 wildfires or the 2018 Mendocino Complex fire. To be eligible, fire damaged lots must have been red tagged by CalFIRE and the new project must receive electric and/or natural gas service from Sonoma Clean Power and/or PG&E. Because eligibility applies to both the fire damaged lot and to the homeowner at the time of the fire, it's possible for the homeowner to sell the fire damaged lot and for the new owner to rebuild with a participating project. It's also possible for original homeowner to rebuild a qualifying home on another lot somewhere else in Sonoma or Mendocino county. When asked about the decisions behind the measures required by the program, the AER team cites the pre-wiring requirement as being central to the joint funding arrangement. "That was a big point in coming up with a program design that would work for both SCP and PG&E." says Dunfee. "It's cheaper to run conduit and wire when the drywall hasn't been installed than it is to go into an existing home and fish the wire through the walls and add those outlets and extra wiring in the panels. It also gives SCP a list of homes and addresses that they can go out and target in the future if they're operating an electrification and retrofit program. Plus, it will make for a much easier selling point to those homeowners of why they should be considering an all electric retrofit."

## 3.4 Funding

Measure selection was only one of many points that needed to be negotiated. As the program came together, SCP, PG&E and BAAQMD also needed to surmount three funding challenges. The first involved determining who would pay for which measures and how much they would contribute. The second revolved around how to manage the joint funding arrangements, made all the more complex by the fact that the amount paid by each entity per home varies depending on the efficiency, fuel source, program pathway, and solar plus storage options selected. The third required devising a way for the program to maintain sufficient reserves to pay out half of the incentives upon project approval.

The first challenge was to align the funding sources and work within the goals and limitations of each entity. As a recipient of ratepayer dollars, PG&E's energy efficiency programs were subject to California's Three Prong Test<sup>4</sup> that imposed cost effectiveness requirements and limited the utility's ability to promote fuel switching activities. However, because SCP and BAAQMD don't take ratepayer dollars in the same way, they're funding options were not limited. The AER team solved this by agreeing that each entity would pay for different measures, that PG&E would only fund cost effective projects, and that PG&E would not directly support any fuel switching with ratepayer dollars. In other words, PG&E's ratepayer dollars pay for the new homes' energy efficiency measures, while the program's electrification and solar efforts are paid for by SCP and BAAQMD whose funds are earmarked for electrification and GHG reductions (Figure 5).

<sup>&</sup>lt;sup>4</sup> Original decision 92-02-075, 1992. This was revised June 28, 2019 per Rulemaking 13-11-005, Decision Modifying the Energy Efficiency Three-Prong Test Related to Fuel Substitution



Figure 5 Advanced Energy Rebuild program funding in Sonoma and Mendocino Counties

The second challenge required the team to devise a funding scheme that accommodated different customer choices regarding fuel types, program pathways, measure selection, and solar. "To the customer it looks like a unified program with fixed incentive amounts, but on the back end it is a jamming together of funding sources and messy calculations, depending on customer choices, efficiency calculations, and cost effectiveness," says Kuykendall. The solution to this challenge was to meet the program's fixed customer payment amounts by combining deemed incentives for certain measures with varying incentive amounts for other measures. For instance, BAAQMD funds certain measures at set dollar amounts. A heat pump water heater receives \$1,000, while a heat pump for heating or cooling receives \$1,500, and solar panels get \$3,000. PG&E's portion of the incentives are paid in the same way as it does for the CAHP program. Those amounts are determined by the home's Energy Design Rating (EDR) score, which fluctuates from home to home depending on the home's modelled energy efficiency measures. As a result, the amount of funding that Sonoma Clean Power provides also varies from home to home, since it must make up the difference between the fixed customer payments promised by the program and actual incentive dollars provided by PG&E and BAAQMD.

For example, if customers opt for the menu-based path, there is a chance that the measures they select will not produce an EDR improvement of 2 as required by PG&E's CAHP program. If this happens, SCP picks up the tab for the difference. "We designed the menu path with the sense that those homes would be roughly 20% complaint, but it really varies. The lowest we've seen was only about 5% above code, but we usually see more like in the 15 to 20%," Kuykendall says. When that happens, SCP draws from its funding pool to make up the difference in order to provide customers with the full incentive amount.

TRC's Dunfee, explains that despite this potential financial risk to SCP, it's actually a good thing for both customers and for the program. "It gives SCP a little more skin in the game to really use their marketing and

customer outreach to push folks to add more efficiency measures, since the more efficient they can get them to be, the more incentive dollars PG&E actually picks up," he says. According to Asper, the increased motivation to push for higher efficiency also works for PG&E, since paying incentives for more efficient homes is what the CAHP program is intended to do.

The third challenge arose from the program design decision to provide customers with a single check for half of the total rebate amount at the time their program applications are approved. The team resolved this by establishing an escrow account that TRC manages. "Sonoma Clean Power puts funds into that account, and we use it to cut a check for the 50% up-front incentive payment as soon as a project is approved for enrollment," says Dunfee. "When the account gets depleted, we request another deposit from Sonoma Clean Power. We also track the measures and payments and calculate things for them as part of our monthly reporting to all the various stakeholders so we can invoice PG&E and BAAQMD for their share."

All told, for the three-year life of the program BAAQMD has agreed to contribute \$2 million in total. SCP committed to \$6 million total, with a cap of \$2 million per year, and PG&E's offered \$10 million based on kilowatt hours and therms savings. When all funding sources are combined the program can provide incentives for between 800 and 1,500 homes.

## 3.5 Sample Project

As of June 2019, four Advanced Energy Rebuild homes had been completed. The first was finished on October 25, 2018, almost exactly one year after the October 8, 2017 Tubbs fire that destroyed the home. Those homeowners replaced their former 1986 ranch-style home with a zero net energy 2,100 square foot home. Because their new home is all-electric and ZNE, it qualified for the full \$17,500 incentive package. Among other features, the home includes the following high efficiency and renewable measures:

- Rheem EcoNet enabled heat pump water heater
- LG mini split heat pump HVAC
- Jenn-air induction range and electric oven combo
- 20-panel array of 360-watt LG solar panels with SolarEdge inverters
- LG Chem 9.8 kWh AC- energy storage system
- 2 JuiceBox Pro 40 electric vehicle chargers

The home's solar panels and battery storage are sufficient to power the entire house and charge two electric vehicles. Moreover, the solar and battery system also makes the home more grid resilient, providing self-generated power if in the future PG&E needs to curtail electric service due to high winds and fire danger. The home's energy savings are anticipated to average \$3,840 per year, for a total savings of \$95,991 over 25 years. Images of the home are shown below (Figures 6 and 7).



Figure 6 First Home Rebuilt with the Advanced Energy Rebuild Program<sup>5</sup>

Figure 7 High efficiency induction cooktop, grid interactive heat pump water heater, and mini-split HVAC system<sup>6</sup>



<sup>5</sup> Photo credit: John Sarter <sup>6</sup> Photo credit: John Sarter

# 4. Measuring Success

When asked how the program defines success, Kuykendall emphasizes the central importance of helping the local community to recover. "I think ultimately for us success looks like getting people back in their homes," she says. "When we started, we were starting something new and racing to get the program launched in time to help people rebuild. We didn't really set a specific goal for participation or a metric for what portion of homes would go the all-electric pathway versus the dual fuel pathway, although we certainly wanted to maximize that since we'd love to see plenty of carbon reduction associated with these homes." Despite this lack of initial goals and metrics, the program now has a sufficient track record to post its results, which are described in the following subsections.

### 4.1 Applications and Projects

According to PG&E's first Annual Advanced Energy Rebuild Advice Letter<sup>7</sup> filed with the CPUC in June of 2019, program performance between May 1, 2018 through May 31, 2019 resulted in:

- 105 applications comprising 207 dwelling units, which represents approximately 6% of the 3,246 fire rebuild related building permits that were issued in the Sonoma and Mendocino areas in the first 13 months of the program.
- Of the 105 applications, 101 applicants (96%) selected the flexible performance path, while 4 (4%) opted for the simple menu-based path.
- Of the 105 applications, one was for a multifamily complex with 96 units. While 104 were for single-family residences, 7 of which included accessory dwelling units.
- Of the 104 single-family home projects, 33 (32%) chose to build an all-electric home, while 71 (68%) chose to build a dual fuel home. The multifamily project is dual fuel.
- Of the 105 applications, 66 projects are enrolled and have received the initial 50 percent incentive.
- The 66 enrolled projects represent 161 dwelling units: 59 single-family homes, 6 ADUs, and 96 multifamily dwelling units in one multifamily complex project.
- Of the 66 enrolled projects, 28 (42%) are all electric homes
- Of the 66 enrolled projects, 4 have completed construction and received the remaining 50% of the incentive.
- Of the 66 projects, 40 include heat pumps for space heating, 31 include heat pump water heaters, and 12 include solar and batteries
- More than 490 community members have taken advantage of the various workshops offered for homeowners, contractors, CEAs, and raters.

<sup>7</sup> Advice 4115-G/5578-E, June 28, 2019

## 4.2 Energy Savings

In terms of energy savings, PG&E's first Annual Advanced Energy Rebuild Advice Letter<sup>8</sup> filed with the CPUC in June of 2019, reported the following:

- Because solar production is excluded from the savings calculations, the enrolled projects represent 9,620 kWh of energy savings, with an average of 60 kWh per dwelling unit.<sup>9</sup> If the kWh associated with the solar systems are included in savings calculations, this average rises to 4,369 kWh per dwelling unit. Single-family all-electric homes with PV average over 15,000kWh savings and nearly 20,000kWh for all electric homes with PV and storage.
- Because so many homes are all electric, the enrolled projects represent a savings of 62,780 therms, with an average of 387 therms per dwelling unit.
- The enrolled projects averaged a 24% energy efficiency improvement above 2016 Title 24 code, with actual project efficiency improvements ranging from 10% to 53% above 2016 Title 24 code requirements.
- An average home is estimated to be 26% more efficient than a standard home, saving \$650 on electricity bills, offsetting 14 metric tons of CO<sub>2</sub>.<sup>10</sup>
- Combined, the enrolled projects are contributing 340 total tons of GHG savings.<sup>11</sup>

#### 4.3 Incentives

PG&E also reported on the use of incentives in the Annual Advanced Energy Rebuild Advice Letter<sup>12</sup> filed with the CPUC in June of 2019, including:

- Of the \$18 million in combined funds made available for the Advanced Energy Rebuild program, as of June 2019 \$985,000 in incentives have been reserved for program applicants. This represents an average of \$6,118 per enrolled dwelling unit.
- When considered by home type, single family homes receive an average of \$9,615 each, with SCP paying \$4,950, PG&E contributing \$3,188, and BAAQMD providing \$1,476.
- The one multifamily complex in the program received \$3,750 per unit, with SCP paying \$2,830 and PG&E paying \$920 per unit. Because that project was not all electric, it did not receive funding from BAAQMD.

<sup>&</sup>lt;sup>8</sup> Advice 4115-G/5578-E, June 28, 2019

<sup>&</sup>lt;sup>9</sup> According to PG&E's June 2019 advice letter, "Many of the 33 all-electric projects enrolled demonstrated negative savings. This negative arises from the unavailability of an all-electric baseline in the CEC-approved Title 24 energy modeling software California Building Energy Code Compliance-Residential and Energy Pro), which generated a significantly low magnitude of kWh savings for the program. The current estimate for kW savings is negative 15.19 kW."

<sup>&</sup>lt;sup>10</sup> Note that these carbon savings are calculated based on CPUC-allowed energy efficiency savings claims, and carbon savings would be higher if solar and generation were included in the calculation.

<sup>&</sup>lt;sup>11</sup> Note that these carbon savings are calculated based on CPUC-allowed energy efficiency savings claims, and carbon savings would be higher if solar and generation were included in the calculation.

<sup>&</sup>lt;sup>12</sup> Advice 4115-G/5578-E, June 28, 2019

# 5. Barriers and Opportunities

With over 6,000 structures destroyed during the fires, the AER team initially hoped to see more than 1,000 new homes participating in the program, but that forecast has proven overly optimistic. Kuykendall attributes the relatively lower program uptake to the fact that the program is first and foremost a fire recovery effort. Unlike the California Advanced Homes Partnership program that deals with production builders, the Advanced Energy Rebuild program deals primarily with individual homeowners in the midst of disaster recovery, the majority of whom are facing timelines and financial decisions that don't prioritize energy related matters.

To better understand the reasons for low uptake, the AER team fielded a survey of customers in fire-affected neighborhoods, including program participants as well as those who did not participate in the program. Survey responses reinforced the importance of reaching customers early in the rebuild process and the importance of explaining how the program fits within the larger rebuild process. With feedback now in hand, the team is improving its marketing collateral and outreach efforts. For example, the program team is developing home builder guides and planning to increase the number of webinars and online videos. They're also increasing coordination with PG&E Energy Watch and local government officials.

Despite these planned improvements, it's worth noting that prior to program launch the AER team went to considerable lengths to eliminate as many barriers as much as possible for each of the main constituencies the program touches. Efforts to streamline the program's processes began with the simple step of digitizing the paper form that PG&E used for its CAHP program so that all program materials can be managed online. That level of thinking continues a year later as SCP and TRC conduct periodic program implementation debriefs to determine how to further modify their processes, be that simplifying steps for builders or working on the nitty gritty details of the stock email messages that TRC sends to program participants.

While SCP and PG&E have made efforts to provide educational classes and resources for contractors, they've been challenged to simplify the program requirements to a basic list of requirements, such as levels of attic insulation and measures that need to be installed. "Contractors, especially production builders, don't want to do one-off interventions to meet the needs of the program," Kuykendall says "I think there's a perception in the contractor world that utility programs are notoriously not worth the effort to deal with. So, we spend a lot of time combatting that notion and making it as easy for them as possible."

The challenge with certified energy analysts has primarily been the number of CEAs available to help the cohorts of homeowners in the rebuilding process, and the amount to time needed on each project. For a start, there were not enough CEAs in Sonoma County for the number of jobs to be done. To help alleviate the backlog of work, SCP partnered with the California Association of Building Energy Consultants to host local CEA trainings to get more people certified. But even with more CEAs available, few of them have the time to run half a dozen model iterations. So, SCP has ended up doing the necessary energy modelling for many of them to ensure that homeowners have viable scopes of work.

For HERS raters, the AER program runs like a standard utility program, so any barriers have been low and easy to overcome, such as ensuring that the documentation is correct in the project registry. However, the program has also sought to help HERS raters to better do their jobs by educating homeowner about what a HERS rater does and explaining that they're required by law on all construction projects regardless whether the homeowner participates in the AER program or not.

Although each of these improvements has contributed to a better customer experience, according the Kuykendall, the largest kudos for removing barriers go to PG&E and TRC for their efforts to change, rearrange, and work around the limitations of the existing CAHP program that serves as the backbone for SCP's Advanced

Energy Rebuild program. "I think PG&E has been very open and collaborative with us in terms of streamlining that program and making it something that's really usable for customers in this situation," she says.

## 6. Next Steps

As the program wrapped up a successful first year of operation and entered its second year of implementation, the turning point presented a natural opportunity to inquire about next steps for the program. Interestingly the program's success has brought the trio of funders both closer together and moved the program beyond some of their service territories.

## 6.1 What's Next for Sonoma Clean Power

While the wildfires that spawned the program were an undeniable tragedy, the AER effort has provided opportunities beyond simply advancing building energy efficiency and ZNE construction. It has also afforded SCP the chance to promote demand response and load shaping activities through a sister aggregated demand response program called the GridSavvy Community that is designed to dispatch electric vehicle chargers, grid interactive heat pump water heaters, and smart thermostat -controlled heat pumps. "Load shifting and load shaping are extremely important to us. As a load-serving entity, the 5:00 to 8:00 PM hours are extremely expensive to procure for, and they're extremely carbon-intensive compared to our general portfolio mix. We've done what we can to get rid of the carbon in our supply, with the exception of that evening ramp. So, we see fuel switching and demand response being fundamental in all our programs," Kuykendall says. "Whenever we talk about energy efficiency, we're always thinking how to pair it with load management. So, we're basically setting up all the new homes in our rebuild program to be participants in the GridSavvy program."

Aside from working on the GridSavvy integration and responding to the suggestions received from the recent customer survey, SCP continually responds to customer feedback. For instance, after a customer complained that their review was taking too long, SCP worked with TRC to better set expectations by explaining each step in the review process and sending emails to ensure customers know the status of their reviews.

Another area for potential improvements involves the value proposition of all electric homes and ZNE construction. Because a majority of homeowners are choosing dual fuel homes, SCP may reconsider its incentive levels and other ways to make the all-electric pathway more attractive. On a similar note, batteries have proven to be a stumbling block for customers due to their overall pricing. "I think there's some work to be done there to make sure there's a value proposition to the customer," she says. Of course, incentives don't work in a vacuum, so SCP also plans to sharpen its educational messaging to better communicate the benefits of electrification.

While incremental changes like these can be addressed in the short term, for SCP the most important next step is addressing long term program design. This necessitates updating program requirements to align with changes in building codes. While any projects that are accepted into the program in 2019 will fall under the current program requirements, any new homeowners seeking to file rebuild applications after December 31, 2019, would be subject to more stringent building codes. "The current program pays incentives based on having people exceed current codes by 20%. Since those higher levels will be normal codes and standards after this year, we have to rethink our whole model for a potential 2020 program," says Kuykendall. How the program will look in the future has yet to be finalized. PG&E filed an advice letter<sup>13</sup> on July 15, 2019 and was awaiting comment from the CPUC at the time of this case study.

<sup>13</sup> Advice 4119-G/5588-E, July 15, 2019

## 6.2 Looking Beyond Sonoma Clean Power

While Sonoma Clean Power continues to work on evolving the program and improving its local implementation effort, the overall success of the Advanced Energy Rebuild program has enabled PG&E to expand the program well beyond the bounds of SCP's service territory in Sonoma and Mendocino counties. After just a few months in operation in Sonoma County, in the summer of 2018, PG&E reteamed with BAAQMD on a similar AER program effort that also combined forces with Marin Clean Energy (MCE), the Bay Area Regional Energy Network (BayREN), and Napa County to help rebuild communities in Napa County that were damaged by fires around the same time as the fires in neighboring Sonoma County. Then on March 19, 2019, the CPUC approved PG&E Advice Letter 4068-G/5479-E, which requested approval to expand the program yet again to serve other communities in PG&E's territory that were impacted by the Camp, Carr, and other fires of 2018, in Lake, Solano, Butte, Yuba, Plumas and Nevada counties. Because SCP does not serve any of these counties TRC manages customer communications and marketing in those areas.

Although shifting the marketing and customer communication functions of the program from SCP to TRC was reasonably straightforward, redesigning the funding apparatus has been more involved. "We wanted to support the Napa area as well, and since SCP isn't in that area, we worked with BAAQMD and MCE to put together something similar," explains Asper. "The catch was that we didn't have an independently funded CCA partner like SCP, since MCE was mostly limited to using resource funds, and those would be viewed as double-dipping in combination with PG&E's funds, so we had to work around that with other funds to match the incentive levels set with SCP." (Figure 8)

Funding grew even more challenging when PG&E wanted to help in fire damaged communities in parts of the state that are not served by BAAQMD or any community choice aggregator. To backfill the financial shortfall without SCP or an alternate source of funding, PG&E sought and received approval from the CPUC to use internal non-resource dollars. "Now we have two buckets of money, but both are coming from PG&E. They're just separately accounted for. One is the bucket for the resource program we were using before, and the second is the backfill bucket of non-resource dollars to get levels to a similar amount, with \$7,500 for dualfuel and an extra \$5,000 for all-electric homes," Asper explains.

Figure 8 Advanced Energy Rebuild Funding in Napa and Other Counties



As the Advance Energy Rebuild program grows and spreads so do accolades for the program. In fact, the program's reputation received a prominent boost in June of 2019, when it received the Grand Award from the Bay Area Metro Awards, which recognize people, projects, organizations, and local governments that are making a difference in the Bay Area. The AER program was honored for its innovative collaboration in helping the North Bay to rebuild after the fires.

Interestingly, the AER program has proven so successful that the program concept is now expanding beyond PG&E's service territory, as Southern California Edison recently filed an advice letter with the CPUC to offer a similar program to wildfire victims within its service territory. Such expansions of the Advanced Energy Rebuild program would appear to be good news for advocates of energy efficiency, electrification and GHG reductions, and even better news for residents in fire-prone areas of California, particularly given that fires may be more prevalent in the years ahead as summers seem to grow hotter, drier, and windier with each passing year.

## 7. Key Takeaways

Sonoma Clean Power's Advanced Energy Rebuild program represents an innovative example of how community choice aggregators, utilities, and other interested stakeholders can work together to create meaningful programs that promote energy efficient and zero net energy homes. Best practices and lessons learned from this program include the following:

#### **Best Practices**

- Utilize existing program infrastructure. Rather than create a new program from scratch, the AER team made creative use of pre-existing efforts and allocated responsibilities according to the strengths of each participating entity. At its core, the AER program is built upon PG&E's California Advanced Homes Partnership infrastructure as implemented by TRC. SCP leverages its local presence and existing marketing and social media networks for outreach and face-to-face customer service. While BAAQMD uses its numerous social media and messaging networks to help promote awareness.
- Layer multiple funding sources. One of the most pivotal program design elements has proven to be its layered funding stack. Each entity contributes funds for different measures based on that organization's goals and requirements. PG&E covers program implementation costs and provides resource funding for dual fuel or all electric homes, through the CAHP program's existing structure, based on the home's modelled improvement in energy efficiency beyond code requirements. BAAQMD provides deemed funds for solar and electrification measures in all electric homes. SCP pays for carbon-reducing measures in both home types, with contribution amounts varying depending on customer equipment choices and the resulting contribution from PG&E.
- Present one forward-facing program to customers. While the AER program is an amalgam of parts contributed by multiple entities on its back end, from the customer perspective it is presented as a single program that is designed to increase customer interest, ease participation, and maximize access to program resources. The hybrid program design creates larger incentives that make the program more enticing, while also allowing for more stringent participation requirements. Likewise, the program offers one easy-to-access program application, a streamlined review process, a unified set of customer messages, and a single customer rebate check drawn from a shared funding pool.
- Study your customers and design your program accordingly. At the start of the program design phase, the AER team took the time to speak with homeowners, builders, energy consultants, and other stakeholders to learn what was really needed for a fire rebuild program. Their research yielded key findings that contributed directly to the program design. Among other things, they concluded that production homebuilders and individual homeowners, particularly those participating in a fire rebuild, have different interests, needs, and program processing requirements. Production builders submit plans for large housing developments in one application with a handful of home models. This makes energy modeling and incentive processing easier. Conversely, individual homeowners present custom home models that must be reviewed on a one-off basis. Additionally, production builders are primarily concerned with low construction costs rather than long-term efficiency. While individual homeowners can be more interested in energy savings since they want comfort, resiliency, and a balance between upfront costs and life-cycle operating expenses. Moreover, while developers may be content to wait until project end for incentive payments, homeowners are often cash-strapped, so paying 50% of incentives upon application approval is extremely helpful to keep smaller contractors paid and projects moving forward.

- Prewire new homes for future all electric and solar panel installations. Customer preference for gas appliances represents a sizable barrier for the adoption of all electric homes. While many customers are interested in building more efficiently, fewer of them are ready to give up natural gas service and live in all electric homes. The AER program addresses this by requiring any participating dual fuel home to be prewired to accommodate future installations of all electric equipment for HVAC, water heating, cooking, and laundry. Likewise, roof designs must accommodate the structural loads associated with solar panels and they must have conduit for panel installation, even if panels are not included at the time of construction. These requirements increase the likelihood of converting dual fuel homes to all electric homes in the future by significantly reducing homeowner financial hurdles if and when such upgrades are considered.
- Establish an induction cooking lending program. Customer desire for natural gas cooktops ranks high among the reasons for opting for a dual fuel rather than all electric home. To overcome this barrier to customer acceptance, SCP offers an induction cooktop program that lends interested homeowners a portable induction cooktop and associated cookware for a free 30-day trial so they can become familiar and comfortable with the speed and convenience of induction cooking. All that is required of the homeowner is a commitment to respond to a survey at the end of the trial. Survey results can provide insights into customer experiences, hesitations, preferences, and customer testimonials to promote induction cooking. A similar cooktop lending effort could be incorporated into other types of new construction programs and used as a familiarization tool to build customer interest in induction cooking.
- Educate all stakeholders involved in the construction process. Encouraging wider acceptance of ZNE construction requires educating all of the groups involved in the construction process, including architects, builders, homeowners, certified energy analysts, HERS raters and others. The AER program design includes educational elements directed at each of these groups, including numerous public workshops and webinars to explain the program to homeowners, training courses offered to architects and builders through a regional builders' association to familiarize them with electrification and ZNE principles; hosted local training sessions and paying testing costs to encourage local people to become certified energy analysts (CEAs), as well as uncounted one-on-one conversations with homeowners, CEAs, and HERS raters to help them appreciate the many benefits of increased efficiency and electrification and their place within the construction process.
- Align program strategies and implementation tactics with larger goals. While energy efficiency and
  electrification are the primary objectives of the AER program, SCP has also taken steps to further
  leverage the program to help meet its bigger picture carbon-reduction goal. To that end, SCP is using
  the program as an opportunity to recruit participating homeowners into its GridSavvy load shifting
  and demand management program that will dispatch electric vehicle charging, grid interactive heat
  pump water heating, and smart thermostat-controlled heat pumps—all of which are already installed
  in the homes and poised to offset carbon-intensive electric loads during on-peak hours.
- Work with "block captains" in each neighborhood. SCP credits neighborhood advocates called "block captains," who represent groups of neighbors who are rebuilding, as being among the most effective of the program's marketing tools. Block captains are loosely akin to the energy champions that are used in other energy efficiency programming efforts. Their extensive social networks, relatively greater knowledge of the program, and comfort with the rebuild process combine to make them well suited to speaking with PG&E, SCP and local government officials to discuss the rebuilding effort and then relaying those messages back to their friends and neighbors. SCP indicates that the role of block captains has been unique to the AER program and recommends their use in other efforts.

#### **Lessons Learned**

- Connect with customers as early as possible in the building process. Customer participation rates, as well as feedback from both program participants and nonparticipants, reveal the importance of early marketing to ensure that the program is top of mind for customers as they begin making their home design decisions. The AER program missed the opportunity to work with a few fast-moving homeowners because they learned of the program's existence after they were already committed to less efficient, dual fuel home plans. Early outreach to make people aware of program offerings gives customers a greater opportunity to explore and model the best options, while also affording program implementers a greater chance to explain the program and influence decisions.
- Be prepared to handle waves of applications. While a fire rebuild program requires the processing of individual applications for each custom home, participating homeowners tend to apply to and proceed through the program in cohorts. While each homeowner is individually responsible for their own decisions, they tend to apply in groups because it takes approximately the same amount of time to move through the various stages of the rebuilding process, such as removing debris from their lots, settling with their insurance companies, finding contractors, and developing building plans. As a result, it is essential to have a sufficient number of certified energy analysts and program staff on hand to help with applications, review energy models, and process in order to avoid bottlenecks that slow down the rebuild process.
- Allocate sufficient time and funding to recruit, educate and incentivize certified energy analysts. CEAs are essential for developing the standardized energy models needed for the program since CEAs submit higher quality energy models than untrained persons and thus the models require less back and forth to meet program standards. Yet despite the program's numerous efforts to recruit, educate, inform and motivate CEAs, the program fell short in the number of local CEAs available to help homeowners and in their willingness to prepare high quality models to assess differing equipment and design considerations. As a result, SCP staff were sometimes required to shoulder the burden of some of the energy modeling needed to properly prepare homeowner applications in a timely manner. Future efforts will need to allocate more resources to this facet of the program.
- Promoting high efficiency is easier than promoting fuel switching. The program's \$5,000 incentive for upgrading to an all electric home has enticed one third of customers to forgo natural gas service. While electric heat pumps and water heaters are readily accepted measures in dual fuel homes, fireplaces and cooktops have proven to be more challenging for customers to relinquish. While SCP's cooktop lending program has helped, other concerns, such as the home's resale value, remain as barriers. To further increase adoption of all electric homes, additional education and higher financial incentives may be necessary.

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