CALIFORNIA ENERGY COMMISSION

California Energy Commission

PROGRAM DOCUMENT

Advanced Energy Center Education and Outreach Plan

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Prepared for**: California Energy Commission**
Prepared by: **Sonoma Clean Power Authority**

Sonoma Clean Power

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ABSTRACT
(REQUIRED FOR ALL COMMISSION REPORTS/PAPERS)

Continuing Northern California's tradition of leadership in modernizing our energy infrastructure, Sonoma Clean Power's (SCP) Lead Locally project offers California electric ratepayers a collaborative laboratory to develop and deploy scalable game changing technologies and strategies to double the efficiency of existing buildings.

As part of the Lead Locally project, the Advanced Energy Center will service as a location for customers to more directly participate in energy efficiency programs, learn about new technologies, purchase efficient and electric technologies, as well as to attend classes to increase their knowledge on everything related to energy, efficiency, and climate.

SCP's Advanced Energy Center will promote most promising technologies through multiple channels and provide classes and training to the general public and key stakeholders.

The Advanced Energy Center Education and Outreach Plan includes the goals and key performance indicators to achieve. The Plan lists the group of key stakeholders, outlines activity types and highlights training and education offerings that the Advanced Energy Center will host.

Keywords: Energy efficiency, electrification, electric technologies, building energy, energy education, building energy training, energy efficiency training, energy efficiency outreach, induction cooking, HVAC, customer outreach, building professionals, education offers, carbon saving, energy incentives

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TABLE OF CONTENTS

EXECUTIVE SUMMARY

The Advanced Energy Center is an important new offering to Sonoma Clean Power (SCP) customers. The educational and training opportunities to be provided by the Advanced Energy Center will build upon the proven brand and customer experience that SCP has cultivated over the last five years.

Leading with SCP's mission of turning the tide on the climate crisis through bold ideas and practical programs, the Advanced Energy Center's multi-faceted education plan encompasses customer and building professional educational offerings regarding energy-efficient and carbon-saving strategies and technologies and related incentives, and ongoing events to drive SCP customers to Advanced Energy Center's downtown Santa Rosa location as well as the Advanced Energy Center website.

Promotion of the Advanced Energy Center and its offerings will include a variety of approaches to capture the attention of today's busy consumers, with the goal of engaging them at the Advanced Energy Center, fostering trust in the Center as a valuable and accessible resource to learn about the innovative technologies and proven methods that are or will be available to reduce their energy use, save money, and shrink their greenhouse gas footprint.

As specific techniques and technologies will change over time, this training plan will evolve in tandem with them.

CHAPTER 1: Background

About Sonoma Clean Power and its Customers

Sonoma Clean Power (SCP) is a public power provider operating as a community choice aggregator (CCA) and is the default electricity provider for Sonoma and Mendocino Counties. SCP exists to provide broad public benefits relating to affordability, reliability, climate change and sustainability; coordination with local agencies; customer programs; and support for the local economy. The default service for SCP customers is CleanStart, of which 49% is renewable power and 91% is carbon-free (2018 Climate Registry certified values). SCP customers also have the option to select EverGreen service, which is 100% renewable power produced entirely within the SCP service area. SCP serves just over 220,000 accounts, 86% of which are residential. The residential load accounts for about 50% of SCP's total annual delivered energy.

About Lead Locally and the Advanced Energy Center

SCP's "Lead Locally" project, funded via the California Energy Commission (CEC) GFO-17-304, aims to identify strategies and technologies that can assist with the State's goals of doubling the efficiency of existing buildings by 2030. Lead Locally includes applied research and technology deployment activities focused on investigating innovations that have the potential to be integrated into existing program models. Lessons learned from the applied research will be disseminated locally to consumers, contractors, real estate professionals, and building officials through SCP and its partner organizations. This work will be driven in part through the SCP Advanced Energy Center, a physical storefront where consumers can directly procure energy-efficient products and services. The Advanced Energy Center will:

- Demonstrate the appeal, impact, and efficiency of multiple advanced energy technologies through showcases and displays, educational offerings, and performance data results from Lead Locally demonstration sites.
- Speed deployment of energy efficiency, make energy efficiency and carbon reduction programs, knowledge, and resources more accessible to all customers, and increase customer familiarity with energy code requirements while addressing myths or misunderstandings about electric appliances and electrification.
- Provide customer education on the upcoming shift to time-of-use rates, how to access California Alternate Rates for Energy (CARE) and Family Electric Rate Assistance (FERA) rates, and general benefits and opportunities of these rate plans.
- Provide a Contractor Matching Tool that customers will use to select an installer after purchasing a product via the Advanced Energy Center.

The Advanced Energy Center will be located in a 9,400 square foot space in downtown Santa Rosa. It will be staffed by SCP employees. Contractors and suppliers of energy efficiency technologies also will be encouraged to participate in the Advanced Energy Center through

trainings and equipment displays and demonstrations; suppliers may staff their displays as needed.

CHAPTER 2:
Purpose

Training Plan Goals and Key Performance Indicators

The Advanced Energy Center educational effort will be robust, but as with any project, must be focused to make efficient use of limited resources. Thus, the team will use the following major goals to determine whether a planned activity supports this Advanced Energy Center Education Plan. Additionally, the team will track the key performance indicators (KPIs) below – numbers and growth, month-over-month and year-over-year – to evaluate progress toward each goal. Although specific quantitative targets for KPIs have not been included in this plan, actual performance during the first year will be used to inform targets for future years.

Goal 1. Create awareness of and drive attendance at the Advanced Energy Center and at Advanced Energy Center-scheduled program offerings. KPIs:

a. visitors to the Advanced Energy Center (unique; one-time; repeat)
b. visitors at community events
c. numbers of educational events and programs
d. educational institutions/community organizations and educators utilizing Advanced Energy Center resources
e. number of students, including kindergarten through grade 12 (K-12), vocational, community college, and university exposed to Advanced Energy Center resources, either at the Advanced Energy Center or in classroom settings
f. online store/resource usage

Goal 2. Educate SCP customers about energy efficiency, decarbonization, and advanced energy technologies. KPIs:

a. types of community actors visiting Advanced Energy Center and/or Advanced Energy Center website, e.g., architects, builders, restaurateurs, real estate agents, students, teachers, etc.
b. number of events
c. numbers of event participants
d. specific technologies deployed through the Advanced Energy Center
e. referrals made to participating contractors and suppliers via the Advanced Energy Center and/or website

Goal 3. Increase builder/contractor participation in Lead Locally installer certification programs. KPIs:

a. email requests for information
b. enrollments in certification programs
c. number of classes held
d. fraction of enrolled participants who achieve certification
e. number of certified installer contractors who then participate in Lead Locally programs
f. hours of training

Goal 4. Decrease in natural gas use. KPIs:

a. natural gas appliances & equipment items replaced with electric by SCP customers
b. households and businesses converted from mixed fuel to all-electric
c. new all-electric homes built (number and fraction of all)
d. existing homes converted to all-electric (number and fraction of all)
e. SCP customers electing EverGreen service (number and fraction of all)

Some activities and events may fall outside of these major goals and KPIs but may still support other strategic initiatives of SCP and the Advanced Energy Center.

CHAPTER 3:
Target Stakeholder Groups

Below are described the stakeholder groups for whom we are developing educational offerings. For each group we provide a basic description, the value of targeting these stakeholders, the implementation phase (1 or 2), and the educational needs we have identified for them. The stakeholder groups identified as Phase 1 are those for whom the first educational offerings will be developed, based on SCP's short-term access to appropriate education resources as well as to the targeted stakeholder groups. Later offerings will be prioritized based on the size of the stakeholder groups and the degree to which they are perceived as being able to influence Scopes 1 and 2 greenhouse gas (GHG) emissions in SCP's territory. This approach will ensure the highest impact achieved for the available project budget.

Building Practitioners

Description: Developers, general contractors, trade contractors [electricians, plumbers, heating, ventilation and air conditioning (HVAC), insulators, etc.], architects, home energy rating system (HERS) raters, energy analysts, engineers, and other design professionals.

Value of Targeting: Building practitioners in both design and construction occupations heavily influence the energy and emissions performance of buildings, both in new construction and in remodeling, retrofits, and rehabilitation projects. Due to their strong influence on performance, a better-educated community of building practitioners offers one of the greatest opportunities to reduce the adverse climate and human health impacts of our building stock. General and trade contractors are a relatively large group, and the most likely to have short-term and significant impacts through their everyday practices.

Phase: 1

Needs: The needs of this community vary somewhat by occupation, as well as based on the individual's background. However, the following areas of knowledge are generally insufficiently understood and/or not widely implemented:

- Full array of benefits of energy efficiency, electrification, high performance design and construction — financial savings, comfort, durability, & health
- 'How to win friends and influence people' — based on the individual's role in the building ecosystem and sphere(s) of influence
- Passive design principles and techniques
- 'House (or building) as a system' principles
- Integrated design and delivery principles, practices, and implementation resources
- Key integration issues based on area(s) of design/construction responsibility
- High performance design practices (general, and discipline-specific)
- High performance construction practices (trade-specific)

- How to retain and grow high-skilled employees with knowledge of advanced energy systems

Real Estate Community

Description: Developers, real estate agents and brokers, finance institutions, and appraisers.

Value of Targeting: The real estate community, although not the largest stakeholder group, exercises a major influence over consumer perception of what constitutes a valuable property; members of this group have potential for both short- and long-term impact, depending on how rapidly they embrace and begin to promote advanced energy features.

Phase: 1

Needs: The value of – and how to sell – both energy and non-energy benefits, including "total cost of ownership" (and how to calculate savings over the life of a mortgage), reduced operating costs, and resiliency. Familiarity with the various programs and tools available to help communicate value. The value of differentiating themselves as sellers of distinguished properties. Firsthand knowledge of advanced energy technologies; for example, familiarity with induction cooktops would enable them to host cooking demonstrations during open house events. Connections with energy-savvy building professionals with whom they can collaborate.

Building/Planning Departments

Description: County and city building and planning department staff include those who handle public counter permitting operations, plan review, and building inspections to verify construction compliance with building codes and with approved planning entitlements.

Value of Targeting: Energy efficiency technologies and construction practices are increasingly important and rapidly evolving, and it is important for building and planning departments to be familiar with the technologies, their benefits, code requirements for installation, and how to complete Title 24, Part 6 compliance forms.

Phase: 1

Needs: Knowledge of heat pump water heater technologies and requirements, heat pump space heating and cooling technologies and requirements, and the proper uses and requirements for innovative product introductions such as phase change materials. Understanding of commercial dishwasher heat recovery technologies and the interactive effects of heat load reduction with the HVAC system as well as water heating load reduction.

Public Officials

Description: County supervisors, town and city council members, planning commissioners, school boards, and other elected and appointed committee and commission members.

Value of Targeting: Public and elected officials provide a key interface with the community and serve as thought leaders in their various capacities – including providing direction to staff and leading new initiatives in their jurisdictions.

Phase: 1

Needs: High level understanding of the Advanced Energy Center and the value that it offers to residents and businesses – including effective messaging to communicate the value of Advanced Energy Center programs, technologies, and services to residents, business owners, and local government staff. Non-technical product overviews offer familiarity with advanced energy practices and technologies to enhance their ability to communicate the pathway to a positive future with reduced risks, better health, and lower emissions.

General Public

Description: Homeowners and renters.

Value of Targeting: Homeowners — as buyers, remodelers, maintainers, and occupants of homes — are the largest stakeholder group, with substantial market influence; some will exercise influence over design and construction practices in the shorter term, others in the longer term. Virtually all members of this group exercise influence in the marketplace for energy-using devices and appliances. Familiarity with advanced energy practices and technologies will remove barriers to adoption.

Phase: 2

Needs: Non-technical product overviews, product discounts, hands-on demonstrations and tours, neighbor and expert (e.g., chef) testimonials, certified installers, interactive events, financial benefits.

Commercial Building Owners

Description: Owners of non-residential and multifamily residential buildings.

Value of Targeting: Commercial building owners, like homeowners, buy, remodel, maintain, and occupy their buildings and thus also have substantial market influence. Virtually all members of this group exercise influence in the marketplace for energy-using devices and systems. Familiarity with advanced energy practices and technologies will remove barriers to adoption.

Phase: 2

Needs: Both technical and non-technical product overviews, product discounts, hands-on demonstrations and tours, peer and expert testimonials, certified installers, interactive events, financial benefits.

Educators and Students

Description: Educators and students at all levels and types of institutions, both public and private: pre-school, grade school, middle school, high school, vocational, community college, college/university. Administrators, teachers/professors, school board members, facility managers, summer camp leaders, after-school education providers.

Value of Targeting: Inspiring future leaders, providing science, technology, engineering, and math (STEM) focused learning opportunities, enriching student environments, connecting with families, targeting specific communities, and maintaining a positive, active presence in the

community. Educators and students represent large numbers of individuals with potentially very high impact over time, albeit with difficult-to-quantify results.

Phase: 2

Needs: Curriculum, field trips, and STEM learning support focused on advanced energy and decarbonization practices, technologies, and occupational opportunities.

Food Service Industries

Description: Commercial kitchen designers, architects and engineers, equipment dealers and manufacturers' reps, owners and operators, managers, staff, and students from all sectors of commercial foodservice operations including restaurants, wineries, hotels, schools, businesses, healthcare facilities, grocery stores, cafes, and bars. In addition, food service specific training should be available for crucial decision makers such as local government officials and environmental health professionals.

Value of Targeting: Commercial kitchens are complex, diverse, and challenging environments. They are also among the most energy-intensive commercial spaces. The combination of low margins and high risk, and the requirement for expensive, robust, equipment have created an industry that is conservative with regards to new technologies and extremely slow to change behavior. It's not unusual for commercial kitchens to install equipment that has not changed substantially since the 1960s. Additionally, there are cost challenges related to switching from traditionally low-cost natural gas to more expensive electricity as a primary fuel source. While this is not a dramatic cost differential in residential applications, in commercial applications converting to all-electric could drive the overall energy bill up substantially – a no-go proposition for smaller and independent food service operators.

In order to displace natural gas as a primary fuel for cooking, space heating, and water heating in commercial food service, a wide variety of decision makers and influencers will need to be educated on the high performance, potential labor savings, and other benefits of all-electric commercial kitchens. In addition, training will need to include more than just one-for-one swaps from gas to electric. Deep efficiency will have to be part of the program in order to make all-electric kitchens viable for most operators. Finally, many decisions that food service operators can make are governed by local codes and standards and environmental health experts. Training will need to include these stakeholders so that they can feel comfortable allowing kitchens to evolve and employ equipment and design techniques that are necessary to go electric. The payoff for training this market segment will be worth the effort. Commercial kitchens are one of the biggest energy users in Sonoma County, and food service in general is an economic backbone for the region as well as a driver for change and a center of influence.

Phase: 2

Needs: The needs of this community vary by occupation, level of professional status, and responsibility. The following areas of knowledge are generally insufficiently understood and/or not widely implemented: benefits and features of induction cooking, exhaust ventilation control strategies, kitchen layout, and daylighting.

- The benefits of induction-based cooking and electric holding technologies including range tops, holding wells, soup wells, griddles, and woks

- The economic benefits and cost challenges related to all-electric kitchens including cost to operate, labor savings, heat reduction, service needs, water and space heating
- Deep energy-efficiency design techniques and cooking process strategies necessary to make all-electric kitchens cost effective
- The positive business case for purchasing high-efficiency cooking, holding, dishwashing and refrigeration equipment and how to find and specify that equipment
- Effective all-electric hot water system design
- Energy-efficient operations and maintenance practices
- Efficient and effective lighting strategies

Agriculture

Description: Agriculture business executives, owners, and managers.

Value of Targeting: Displacing natural gas uses with electric and reducing peak loads in an industry that is an economic backbone for the region, a driver for change, and center of influence. Additionally, reaching these audiences may open opportunities to target water conservation and other water-energy nexus issues.

Phase: 2

Needs: How to reduce energy-, carbon-, and water-intensive process loads.

Food and Beverage Production Industry

Description: Food and beverage production industry executives, owners, and managers.

Value of Targeting: Displacing natural gas uses with electric and reduce peak loads in an industry that is an economic backbone for the region, a driver for change, and center of influence. Additionally, reaching these audiences may open opportunities target water conservation and other water-energy nexus issues.

Phase: 2

Needs: How to reduce energy-, carbon-, and water-intensive process loads. Understanding of gas boiler steam heating processes and power requirements to be offset with electric heating. Ability to find ways to recover heat in and reuse energy in different processes. Finding a balance between mechanical cooling energy increase and water consumption reduction in brewing processes. Understanding of new refrigerant technologies and associated energy impacts in walk in coolers, freezers and warehouses.

CHAPTER 4:
Activity Types

Certification Courses

Objectives: The objective of the certification courses is to broaden the number of local contractors with demonstrated competency in implementing specific energy- and carbon-saving technologies, in order to give these individuals the skills to succeed in the market and to connect customers with trustworthy service providers. This activity will also create a base of certified installers who will participate in the Contractor Matching Tool.

Planned Activities: Initially, certification courses will focus on training local contractors to correctly install key technologies, such as mini-split heat pumps and phase change materials. Training instructors may be SCP staff, manufacturer or vendor staff, or manufacturer-certified installers. In the future, the Advanced Energy Center may host other energy-related certification courses offered by third parties.

Technical Seminars / Workforce Development

Objectives: The purpose of the technical seminars is to provide local building professionals and college/vocational institution students with the knowledge to integrate energy efficiency and decarbonization principles, strategies, and technologies into their work and interactions with customers and clients. Moreover, seminars should enable participants to explain technology benefits to customers and increase their confidence in recommending and implementing the target technologies.

Planned Activities: Technical seminars will encompass a range of topics such as zero net energy and zero carbon buildings, energy efficiency best practices, and in-depth coverage of electrification and key low-carbon building technologies. The Advanced Energy Center will offer both in-person and online learning opportunities.

Stakeholder Engagement

Objectives: Stakeholder engagement objectives include providing high-level education to professional groups about methods of reducing carbon emissions, familiarizing influential community members with SCP, and building relationships between stakeholder groups. The real estate community, builders, and public officials will be the first segments targeted by these efforts, with other groups addressed over time.

Planned Activities: Activity format and content will differ by audience, as relevant to their roles in influencing the energy/carbon decisions and impacts of homeowners, home buyers, property managers, and others. Activities may include presentations, professional mixers, information fairs, and workshops.

Energy Technology Literacy

Objectives: Energy technology literacy courses will be designed to raise awareness of and comfort with energy- and carbon-saving technologies among the public, including

homeowners, renters, building owners, and businesspeople. A major barrier to wider adoption of these technologies is lack of familiarity with the products and their benefits.

Planned Activities: The focus will be to increase awareness and facilitate interaction of SCP and Advanced Energy Center within the broader community. As a result, most events will likely be in-person, but some online content may also be developed. The Advanced Energy Center plans to offer "101" introductions to induction cooking, heat pumps, etc., including hands-on demonstrations and peer testimonials.

K-12 STEM Education

Objectives: STEM learning is critical to prepare students for future careers and create the next generation of energy and civic leaders. The purpose of kindergarten to 12th grade (K-12) education activities is to engage students in STEM-based research, games, and hands-on experiments focused on energy efficiency and decarbonization practices and technologies. These efforts will focus on students from disadvantaged communities.

Planned Activities: K-12 activities at the Advanced Energy Center will feature engaging, age-appropriate experiences that spark curiosity. Hands-on demonstrations are planned to play a large role. In time, the Advanced Energy Center also plans to offer access to science and engineering software platforms and literature and to develop or acquire curriculum for integration into classroom lessons, and/or to provide guest lecturers to schools on energy and climate topics. We expect to partner with a range of other organizations in order to link to and feature their resources; examples include public libraries, The Tech Interactive, Khan Academy, etc.

CHAPTER 5:
Training and Education Offerings

The educational offerings described below have been developed based on the stakeholder group needs described above. In all cases where relevant, information will be included on Title 24-2019 changes, permit issues, financial assistance, incentives, etc. SCP plans to offer a selection of classes in Spanish.

Air Sealing & Quality Insulation Installation (QII)

Description: Thermal enclosure integrity is the bedrock of a highly efficient, comfortable building – one that will ride out high and low temperatures while minimizing spikes in utility costs and allow its occupants to survive power outages with minimal discomfort or health compromises. The keys to achieving this level of integrity are rigorous air sealing and a quality insulation installation. Although these responsibilities are addressed in the energy code, they have historically received scant attention in the field, or from inspectors, and often fall prey to the low-bid pressures facing trade contractors. Therefore, the built results often fall far short of the performance they can and should achieve. This class will cover WHAT needs to be done, WHO needs to do it, and WHEN during construction intervention is needed to ensure that all the relevant work is done HOW and WHERE it should be.

Audience: Contractors & home performance professionals.

Potential Resources & Partners: Measured Home Performance (Chitwood, et al.), Zero Net Energy (ZNE) Primer (AIA-CC, Edminster), ZNE Builder Resource Guide (PG&E, Edminster & Chitwood); instructors Terry Nordbye, Chris Condon, Ann Edminster, Peter Waring, and other well-qualified candidates.

Benefits & Economics of Electrifying for Homeowners

Description: What does it cost, and what are the steps, to electrify a mixed-fuel home? What triggers a panel replacement and at what stage should it be done? Describe various scenarios, including adding photovoltaics (PVs), installing solar-ready measures when reroofing, replacing an old gasoline engine car with an electric vehicle (EV), etc.

Audience: Homeowners & building professionals.

Potential Resources & Partners: TBD.

Building New All-Electric Homes for Building Professionals – How & Why

Description: What's different about building an all-electric home? Why do it? Benefits and costs of PV, battery, & EV-ready options. Costs and savings associated with all-electric vs. mixed-fuel homes – lines from the street, meters/panels, in-house distribution, equipment. Discussion of reach codes as appropriate to the locale.

Audience: Building professionals & homeowners.

Resources & Partners: SCP Advanced Energy Rebuild contractors, Clean Coalition.

Climate-Smart Opportunities for Renters

Description: Actions available to community members who don't own their homes – EverGreen, portable electric and solar cooking options, heat-the-body-not-the-space, reduced-impact mobility options, lobbying for onsite improvements such as EV charging, buying local, food/community gardening, etc.

Audience: House and apartment renters.

Potential Resources & Partners: SCP, County of Sonoma Energy and Sustainability Division (ESD), Sonoma Water, and Sonoma County Library along with the Do-It-Yourself (DIY) Toolkit resource; Daily Acts.

Demand Controlled Commercial Kitchen Ventilation

Description: As electrification becomes a design imperative in commercial kitchens, it will become ever more important to design those kitchens for maximum efficiency. Commercial kitchens exhaust hoods consume a lot of energy and are expensive to operate, and almost every kitchen hood runs full speed all the time, regardless of the amount of ventilation that is actually needed. Demand controlled kitchen ventilation (DCKV) systems, which vary the amount of exhaust air needed based on the amount of cooking, are proven energy savers that can reduce the cost of operation by 50% or more. But DCKV systems can be expensive, don't work in all situations, and, once installed, require commissioning and maintenance in order to maximize savings. This class will teach the basics of DCKV as well as the more advanced details required to evaluate the effective application of this technology.

Audience: Building professional audience, food service designers, food service operators.

Potential Resources & Partners: Richard Young and Denis Livchak, Frontier Energy.

Designing the All-Electric Commercial Kitchen

Description: Almost all commercial kitchens are mixed-fuel owing to gas and electricity pricing and the traditional bias of many cooks towards open flame cooking. While removing the open flame from the commercial kitchen presents a challenge, the real challenge is the increased cost to operate an all-electric kitchen. This can only be overcome by thinking outside the box and designing kitchens that are smaller, faster, and more flexible and integrating deep efficiency into the entire process. This class will introduce the equipment, systems, and design approaches that are necessary to create a cost-competitive all-electric kitchen. In addition, the class will share cooking techniques and menu strategies that can reduce overall energy use, as well as labor costs and food waste.

Audience: Restaurant owners and operators, food service designers, chefs, kitchen staff, environmental health professionals, culinary and hospitality students, institutional and educational foodservice operators, architects, engineers, energy efficiency professionals.

Potential Resources & Partners: Frontier Energy Food Service Technology Center.

Efficient Electric Water Heating

Description: This class will cover steps to designing a water-, energy-, and time-efficient hot water system. The system includes not just the water heater itself, but also the distribution piping, plumbing fixtures, appliances, and the capture of waste heat from drain water. Water heating has changed considerably in the past 20 years, with increased adoption of on-demand and heat pump technologies. Distribution systems also have been rethought and occupant expectations have evolved, while the basic approach to delivering hot water has lagged these trends. The instructor will describe an updated approach that reduces the energy and carbon used in water heating while also reducing water waste and improving occupant satisfaction.

Audience: Building professional audience.

Potential Resources & Partners: Gary Klein, PG&E.

Efficient Hot Water System Design for Commercial Kitchens

Description: Commercial kitchens have very intense hot water load requirements and unique distribution systems that must be considered in order to utilize heat pump water heaters as part of an all-electric facility. This class will cover the challenges related to dish washing machine requirements, effective distribution topologies, the design and control of recirculation lines, heat recovery, and distributed water heating strategies – all relating specifically to commercial food service.

Audience: Building professional audience.

Potential Resources & Partners: Michael Slater, Frontier Energy.

Electric Vehicles 101

Description: EV basics – range, battery types, charging requirements, available incentives, pros/cons as compared to gasoline cars; up-front embodied emissions. Use of EV as home battery and. control strategy options, including utility rate arbitrage, maximizing self-utilization, and backup power. Electric panel types, limitations & outlet sharing devices (Dryer Buddy, Neocharge).

Audience: Sonoma County car shoppers, EV curious, electricians.

Potential Resources & Partners: Sonoma County Regional Climate Protection Authority (RCPA) and The Climate Center (TCC), including “EV 101” online resource (http://ev101.driveev.org), Golden Gate Electric Vehicle Association, North Bay Electric Auto Association.

Healthy Home Ventilation Options for Building Professionals

Description: Technical training for mechanical ventilation system selection, sizing, installation. Code requirements for field verification and diagnostic testing.

Audience: HVAC installers, builders, home performance contractors, building inspectors, HERS raters.

Potential Resources & Partners: PG&E, John Proctor, PE, Home Ventilating Institute, heat recovery ventilation (HRV) vendors.

Healthy Home Ventilation Retrofits for Homeowners

Description: Introduction to mechanical ventilation strategies, balanced ventilation systems with heat recovery vs. exhaust-only ventilation systems, importance of local exhaust ducted to the outside for moisture and pollution control.

Audience: Building professionals and homeowners.

Potential Resources & Partners: PG&E, John Proctor, PE, Home Ventilating Institute, HRV vendors, local Sonoma County Energy Independence Program (SCEIP) contractors (e.g., Applied Building Science), Balance Point Construction.

Homeowners: Getting It Done Right

Description: Getting your home built or remodeled to a high level of energy performance and resiliency *should* be easy, because the individual tasks are not that complicated. The real challenge is in getting all the professionals you work with – who typically have little experience with high-performance projects – to change what they normally do just a little bit. This class will describe what you should ask for, when, and from whom … and then how to make sure your project will achieve your energy, comfort, climate, and resilience goals.

Audience: Homeowners.

Potential Resources & Partners: Ann Edminster.

How Does Construction Affect the Climate?

Description: Overview of sources of greenhouse gas emissions with an emphasis on the built environment.

Audience: K-12 and junior college audiences; another version for homeowners/design professionals.

Potential Resources & Partners: TBD.

Operating the Energy Efficient Restaurant

Description: Even an all-electric, zero carbon restaurant must use energy effectively to maintain business sustainability. In fact, the higher cost of electricity over natural gas means that all-electric restaurants will have to be even more diligent in making sure they are getting the maximum value and productivity out of each kilowatt-hour (kWh) they purchase. This class will teach operators how to cut energy waste and use energy effectively in the five main energy-using areas of every restaurant: cooking, refrigeration, lighting, sanitation, and ventilation. Based on years of site energy survey experience by the Frontier Energy Food Service Technology Center, this knowledge is essential to the business success of any all-electric food service operation.

Audience: Restaurant owners and operators, chefs, kitchen staff, environmental health professionals, culinary and hospitality students, institutional and educational foodservice operators, energy efficiency professionals.

Potential Resources & Partners: Frontier Energy Food Service Technology Center.

Planning for Electrification in Existing Homes for Building Professionals

Description: What does it cost, and what are the steps, to electrify a mixed-fuel home? What triggers a panel replacement and at what stage should it be done? Alternatively, what are the strategies to avoid panel replacement (e.g., lower-amperage equipment options)? Are there wiring access constraints at key locations (stove, dryer, water heater, HVAC)? Are there strategic changes that can flip the economics, such as adding PVs (including on lease/power purchase agreement basis) or an EV? Discussion of using an EV as a battery.

Audience: Contractors & home performance professionals.

Potential Resources & Partners: TBD.

Resilient, Climate-Smart Home Remodeling

Description: The value of a high-performance enclosure vis-a-vis fire, power outages, thermal comfort, indoor air quality, load reduction benefits. Include continuous insulation, thin triple windows, phase change materials, etc., in addition to traditional enclosure measures. Electrification needs, benefits, process, and options.

Audience: homeowners & design professionals.

Potential Resources & Partners: Insurance Institute for Business and Home Safety (IBHS), SCEIP

Right-sizing HVAC Systems

Description: The higher-performing enclosures that will be standard practice beginning in January 2020 – if done right – will reduce heating and cooling loads substantially below what the HVAC industry is used to. This class will cover the variables that influence HVAC capacity sizing, and to what extent; ensuring that load calculations are done *correctly*; guideline specifications for high-performance HVAC systems; quality management processes to ensure correct installation; and appropriate *in-construction* performance testing timing and protocols. Use of Air Conditioning Contractors of America (ACCA) Manuals D, S and J.

Audience: Contractors & home performance professionals.

Potential Resources & Partners: *Measured Home Performance* (Chitwood, et al.), *Zero Net Energy Primer* (AIA-CC, Edminster), *ZNE Builder Resource Guide* (PG&E, Edminster & Chitwood); instructor John Proctor, PE.

Selling and Marketing Modern Homes

Description: How to promote highly efficient and zero-carbon (all-electric) homes. Understanding the value of a high-performance enclosure vis-a-vis fire, power outages, thermal comfort, indoor air quality, and load reduction benefits. Understand and effectively promote the value of energy and non-energy benefits, including resiliency, reduced operating costs, and “total cost of ownership” (and how to calculate savings over the life of a mortgage), plus programs and tools available to help communicate value. The value to real estate

professionals of differentiating themselves as sellers of distinguished properties. Familiarization with advanced energy technologies, e.g., induction ranges and heat pump water heaters.

Audience: Real estate agents and brokers.

Potential Resources & Partners: Debra Little, Build It Green.

Solar Plus Battery Storage for Homeowners

Description: Strategies for incorporating solar and battery storage – including electric vehicle-to-home technology – into new and existing homes.

Audience: Building professionals and homeowners.

Potential Resources & Partners: Chris Calwell, Ecos Consulting, and local SCEIP contractors with relevant expertise.

Sticky Business: Getting Liquid Sealants, PSA Tapes, and Membranes to Stick and Stay Stuck (High Performance Buildings)

Description: The final mile in high-performance assemblies and enclosures is getting adhesive products in high-performance building enclosures to reduce risk; this means they can't fail a few weeks, months, or years downstream. We are so dependent on adhesives in our building enclosures but often don't have a clue about how individual materials integrate into high performance building assemblies and how they will hold up over time. This workshop details the science and the craft of getting stuff to stick – and stay stuck – as well as how to evaluate new products for specific applications.

Audience: Building professionals (architects, builders, building enclosure trade contractors).

Potential Resources & Partners: Peter Yost, Building-Wright.

The What and Why of Commercial Induction Technologies

Description: Commercial induction range tops, woks, griddles, hot wells, heated servers and soup warmers are proven, next-generation technologies that can increase kitchen productivity and safety while saving energy, cutting operating costs, and reducing kitchen heat gain. These efficient, effective and highly controllable technologies have proven track records but only limited adoption in American commercial kitchens due to lack of knowledge and bias towards natural gas cooking. This class will demystify commercial induction applications and explain why induction is better-performing and safer than electric resistance or gas cooktops. The class will also share field data and case studies from the California Energy Commission's Electric Plug Load Study, as well as lab testing performed at the Food Service Technology Center. "Hands-on changes hearts and minds", so this class will include demonstrations of commercial induction technologies to provide real-world, first-person understanding of this powerful technology.

Audience: Restaurant owners and operators, food service designers, chefs, kitchen staff, environmental health professionals, culinary and hospitality students, institutional and educational food service operators, architects, engineers, energy efficiency professionals.

Potential Resources & Partners: Frontier Energy Food Service Technology Center, Santa Rosa Junior College, Culinary Institute of America, Sonoma Academy, Silver Oak Winery, French Laundry, appliance vendors, celebrity chefs.

The What and Why of Residential Induction Cooking

Description: Residential induction range tops and woks are proven, next generation technologies. These efficient, effective and highly controllable cooktops are the future of home kitchens, but they remain a mystery to most American consumers and too often are equated with the low-performing resistance electric elements that most cooks dislike. This class will demystify induction cooking and explain why induction is better performing and safer than electric resistance or gas cooktops. “Hands on changes hearts and minds” so, this class will include demonstrations of residential induction cooking to provide real-world, first-person understanding of this powerful technology.

Audience: Homeowners, multi-family developers, architects.

Potential Resources & Partners: Frontier Energy Food Service Technology Center, Santa Rosa Junior College, culinary institutes, Sonoma Academy, Silver Oak Winery, French Laundry, appliance vendors, celebrity chefs.

Upgrading Commercial Buildings

Description: Promote energy audits and retro-commissioning to identify energy and demand reduction strategies, including proper equipment sizing and regular service scheduling for HVAC equipment, envelope improvements for solar control and improved thermal performance, daylighting, and energy management systems. Highlight benefits of electrification and enhanced zonal control with variable refrigerant flow (VRF) heat pump technology including safety and indoor air quality benefits. Other topics covered demand management with grid integrated control, mechanical ventilation strategies with high minimum efficiency reporting value (MERV) filters and air sealing and solar PV with battery storage for continued operation during wildfire smoke, public safety power shutoff (PSPS) events, etc. EV charging station installation, clean commute programs, and building operator trainings.

Audience: Business owners, facilities staff.

Potential Resources & Partners: Green Business Certification (no cost; ESD), Building Operator Certification (BOC) training, and SCEIP financing for energy efficiency, renewables, seismic and construction hardening.

CHAPTER 6:
Key Milestones

The timeline below is based on the implementation phases and on the lead times necessary to create the respective educational offerings described in the preceding section. These key milestones are subject to change. SCP will evaluate educational offerings to create an effective and engaging education and training program. SCP will ask participants for feedback about the training content and design, and has developed a survey.

Survey questions will include:

- What is your occupation?
- How relevant did you find the materials presented?
- How effective was/were the presenter(s)?
- How knowledgeable was/were the presenter(s)?
- How effective were the handouts and/or other resources?
- Was the class length appropriate, or should it be shorter or longer?
- Did the time of day work well for you?
- What would be your ideal class length and time of day?
- Was there anything you particularly liked, or disliked, about the class format?
- How do you expect to use the information from this class in the next 6 months?
- What other topics or events would you like us to offer?
- Do you have any other comments you would like to share?

SCP will improve instructional design and delivery through feedback received. Through the process of launching education offerings, SCP will develop knowledge of topic demand, desired frequency and what audiences truly want to know. SCP and partners will continue to develop additional topics and audiences to engage to add to the training calendar.

Q2 2020

Solar + Battery Storage for Homeowners

Electric Vehicles 101

Air Sealing and Quality Insulation Installation

Resilient, Climate-Smart Home Remodeling

Q3 2020

Homeowners: Getting It Done Right

Healthy Home Ventilation Options for Building Professionals

The What and Why of Residential Induction Cooking

Selling and Marketing Modern Homes

Sticky Business: Getting Liquid Sealants, PSA Tapes, and Membranes to Stick and Stay Stuck (High Performance Buildings)

Q4 2020

Climate-Smart Opportunities for Renters

Building New All-electric Homes for Building Professionals -- How & Why

Benefits & Economics of Electrifying for Homeowners

Operating the Energy Efficient Restaurant

The What and Why of Commercial Induction Technologies

Q1 2021

Demand Controlled Commercial Kitchen Ventilation

Designing the All-Electric Commercial Kitchen

Efficient Electric Water Heating

Efficient Hot Water System Design for Commercial Kitchens

Q2 2021

Climate-smart Upgrades for Commercial Buildings

Homeowners: Healthy Home Ventilation Retrofits

Q3 2021

How Does Construction Affect the Climate?

Q4 2021

Right Sizing HVAC Systems