

BUILDING DECARBONIZATION JOINT ACTION PLAN

November 2020



SILICON VALLEY
CLEAN ENERGY

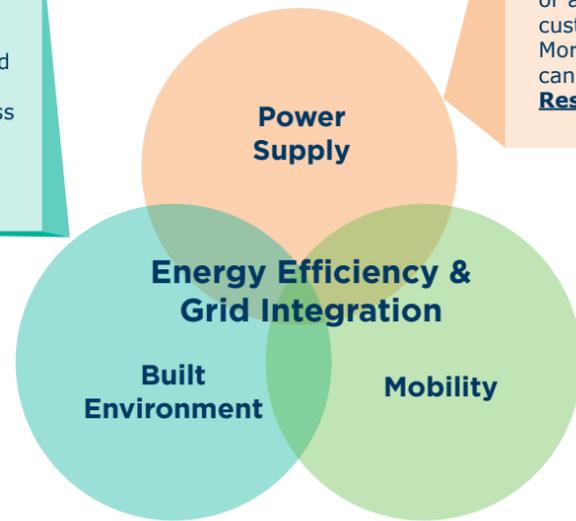
The Future is Electric

ABOUT SILICON VALLEY CLEAN ENERGY

Silicon Valley Clean Energy (SVCE) was formed as a Joint Powers Authority in 2016 by thirteen local governments to take bold action to address climate change. SVCE is working closely with Member Agencies to pursue a comprehensive approach to address the climate crisis. To date, the SVCE Board of Directors has committed over **\$1B to new renewable energy projects** and more than **\$25M for innovative programs** that reinvest in the community while helping to achieve local climate goals.

The Decarbonization Strategy & Programs Roadmap was adopted in December 2018, which codified the overarching approach for achieving deep decarbonization: 1) maintain a clean, affordable and reliable power supply; 2) electrify mobility and the built environment; and 3) support energy efficiency and grid integration.

In November 2020, this plan – the Building Decarbonization Joint Action Plan – was adopted along with \$6M for implementation to address pollution from buildings through community partnerships.



As its core service, SVCE offers renewable and carbon-free electricity at competitive rates to 270,000 residential and commercial accounts, or approximately 96% of electricity customers in the SVCE service area. More information on our power supply can be found in the **2020 Integrated Resource Plan**.

In September 2019, the **Electric Vehicle Infrastructure Joint Action Plan** was adopted, which directs \$14M in funding toward Electric Vehicle charging across the thirteen member communities.

Given the recent, increasing intensity of climate change impacts, including wildfires, heat waves, and flooding, SVCE and Member Agencies are working together to develop a joint energy resilience plan. The plan will be brought forward for board review in 2021, and will help direct \$5M in planning and capital funding to local resilience projects.

For more information on SVCE, please visit: <https://www.svcleanenergy.org/>.

ABOUT THIS PLAN

Building operations are currently responsible for approximately one-third of greenhouse gas emissions in SVCE communities. Rapidly reducing emissions from energy usage in the built environment is critical to meet science-based reduction targets to address the climate crisis. SVCE and the thirteen Member Agencies developed this Building Decarbonization Joint Action Plan ('the Plan') that builds off of the 2018 Decarbonization Strategy & Programs Roadmap ('the Roadmap') that identified building sector decarbonization – here defined as removing greenhouse gas emissions from energy use in buildings – as a key priority in meeting the region's climate goals, and the recent reach code effort ('Reach Code Initiative') that resulted in eleven of the thirteen Member Agencies adopting decarbonized building and electric vehicle charging infrastructure codes. The purpose of the Plan is to articulate a shared vision for how SVCE and Member Agencies can build on this progress, to continue to work to decarbonize the built environment. It establishes a set of priorities and actions that joint parties have committed to advancing, with a continued focus on activities where local agencies such as SVCE and Member Agencies have highest leverage and influence. It was created through a joint planning process designed to facilitate the emergence of new solutions, cultivate community buy-in, and coordinate peer-to-peer learning. Goals and actions were developed using a combination of research and prior program experience, as well as stakeholder workshops, interviews, and feedback, and filtered through SVCE's Board-adopted strategic framework from the Roadmap.

ACKNOWLEDGMENTS

The Plan was created by Silicon Valley Clean Energy with support from Integral Group. It was informed by a robust stakeholder engagement process that included community members, subject matter experts, industry stakeholders, and staff from member jurisdictions. A series of workshops, surveys, and interviews held between April and August formed the basis for the strategies included in this Plan, and we are grateful for the contributions of the following individuals. Please note that acknowledgement of their contributions does not imply their endorsement of the Plan or its contents.

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1 BACKGROUND

In December 2018, the SVCE Board of Directors adopted ambitious goals for GHG emission reductions across the service territory, including the 2025 target of achieving a 40% reduction below 2015 levels, and 50% by 2030, as shown in Figure 1.



These goals are aligned with the level of action needed to contain global temperature rise to within 2 degrees Celsius as outlined in the Paris Agreement.¹ California has further ramped up the timeline, calling for a goal of carbon neutrality by 2045, in acknowledgment of the need to avoid the worst impacts of a warmer climate.² Although important progress has been made to date – specifically in the electricity sector – massive and rapid additional reductions must be further achieved, including reductions within the built environment.³

Neither SVCE and Member Agencies nor California can meet 2030 GHG targets without massive reductions in natural gas use through extensive electrification.⁴ Since natural gas is primarily used for space and water heating, emissions from those uses will increase with population growth no matter how efficiently natural gas is used. While cost-effective energy efficiency measures such as improvements to windows or insulation are fundamental to the decarbonization transition, electrifying the underlying technology is ultimately both necessary and more cost effective than efficiency alone. Finally, GHG inventories and targets customarily only consider emissions at the point of use, but the natural gas extraction, transmission and distribution systems create additional climate and public health risks through the widespread leakage of methane before it even gets to a point of use, which by some estimates amounts to almost 4% of all natural gas produced.⁵

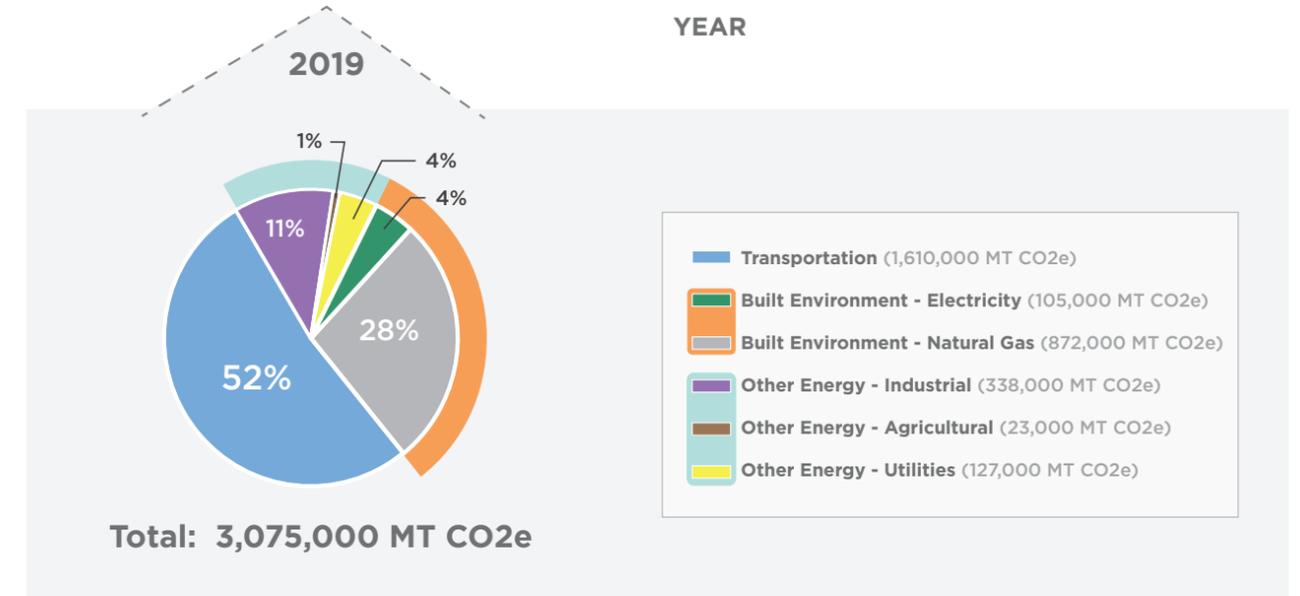
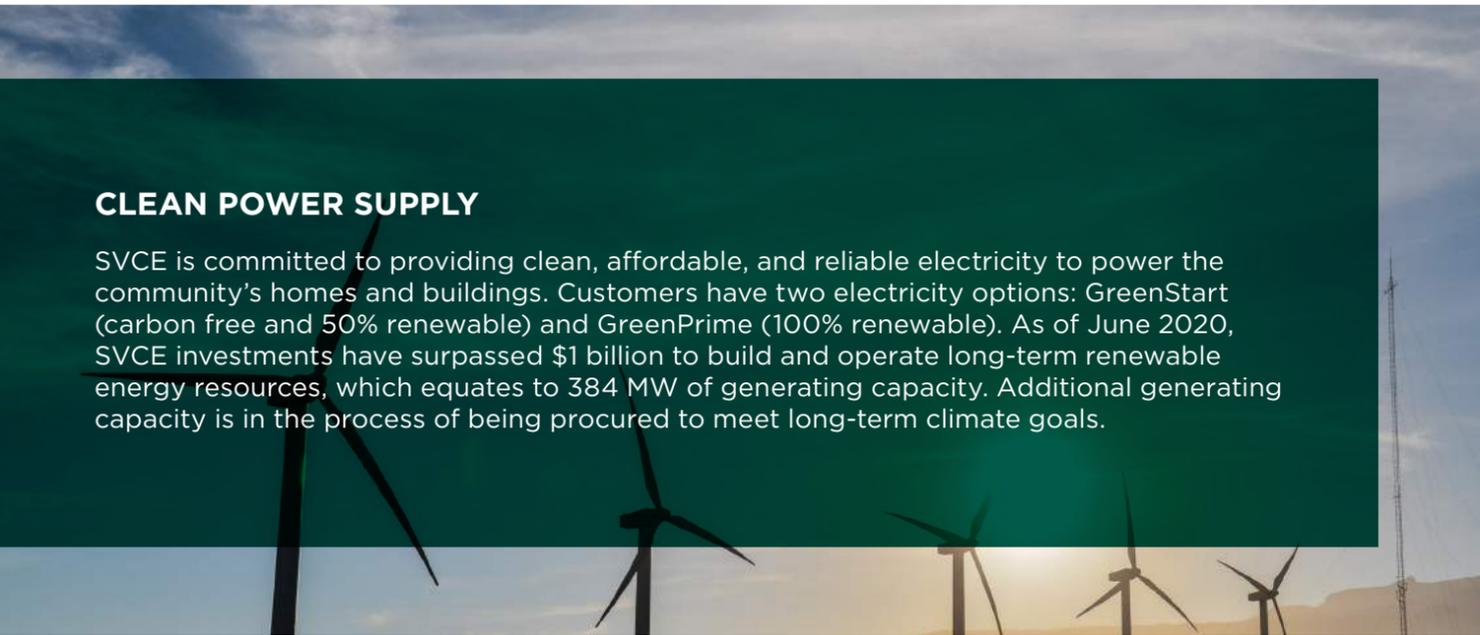


Figure 1: SVCE historical emissions and goals

CLEAN POWER SUPPLY

SVCE is committed to providing clean, affordable, and reliable electricity to power the community's homes and buildings. Customers have two electricity options: GreenStart (carbon free and 50% renewable) and GreenPrime (100% renewable). As of June 2020, SVCE investments have surpassed \$1 billion to build and operate long-term renewable energy resources, which equates to 384 MW of generating capacity. Additional generating capacity is in the process of being procured to meet long-term climate goals.



¹ United Nations Climate Change. "The Paris Agreement". <https://unfccc.int/process-and-meetings/the-paris-agreement/the-paris-agreement>

² State of California, Executive Department. 2018 "Executive Order B-55-18 to Achieve Carbon Neutrality". <https://www.ca.gov/archive/gov39/wp-content/uploads/2018/09/9.10.18-Executive-Order.pdf>

³ Mahone, et al. 2018. "Deep Decarbonization in a High Renewables Future: Updated Results from the California PATHWAYS Model." California Energy Commission. Publication Number: CEC-500-2018-012

⁴ Williams, et al. November 2014. "Pathways to deep decarbonization in the United States." Prepared for the Deep Decarbonization Pathways Project of the Sustainable Development Solutions Network. <https://usddpp.org/downloads/2014-technical-report.pdf>

⁵ See <https://www.scientificamerican.com/article/methane-leaks-erase-some-of-the-climate-benefits-of-natural-gas/>.

DECARBONIZING BUILDINGS

Building operations account for approximately one-third of total emissions in the SVCE service territory.⁶

The majority of building emissions are from natural gas combustion (83%), primarily for space and water heating as seen in Figure 2. As electricity supplies become cleaner, driven by local and statewide renewable energy targets, the percentage of emissions attributed to natural gas will continue to grow.

Electrification refers to the replacement of fossil fuel appliances with advanced electric alternatives that run on clean electricity (see examples in Figure 3). Although all-electric construction is common in other markets both internationally and in multiple regions of the United States,⁷ in the SVCE service territory, the vast majority of homes and buildings use natural gas heating. In commercial buildings, gas usage intensity varies significantly by sector, with food service establishments being some of the most gas-intensive commercial buildings in the SVCE service territory.⁸

Electric heat pumps – the primary technology for space and water heating – work like a refrigerator, using a refrigerant to move heat or cooling from one area to another. While not a new technology, and used throughout the US and internationally for decades, heat pump technology continues to advance with even greater efficiency in very cold climates and improved refrigerants with low or no global warming potential.

Newer induction cooktops use electromagnetic technology to generate heat, consistently outperforming gas cooktops on Consumer Reports.⁹ In contrast to outdated electric resistance technology, induction boils water in half the time, can get to much lower simmer temperatures than gas, is safer in terms of burn risk and indoor air quality, and is cost competitive, making it an increasing trend even in the US.¹⁰

Building electrification yields numerous additional benefits for the customer and the grid that make it a high-value climate solution: improved health outcomes,¹¹ increased energy efficiency, cost effective replacement of heating and cooling in one piece of equipment,¹² and supply and demand management with smart technologies.¹³ In short, electrifying everything and using SVCE’s clean electricity supply means that going all-electric is not only better for the climate, but can yield multiple benefits for the customer and community, as well.

The sheer speed and scale of building electrification required to address climate change is unprecedented. It is anticipated that 50% of new water heaters and space conditioning equipment sales needs to be all-electric by 2030 in order to meet climate goals without requiring early removal of functioning systems.¹⁴ In contrast, heat pump technologies in SVCE territory are estimated to have less than 5% of market penetration today, meaning that meeting this rapid market transformation will require retrofitting 7,500 homes per year – or 20 homes every day – for the next 10 years, in addition to similar rates of retrofit for commercial and multi-family. This is assuming there is no further expansion of natural gas infrastructure.

⁶ “Building decarbonization” throughout this Plan is referring to reducing energy emissions from the building’s energy usage. These emissions are often referred to as “operational carbon”, given they refer to emissions associated with operating a building. “Embodied carbon”, which are emissions associated with all other stages of a buildings life cycle (e.g. materials, manufacturing, construction, maintenance, demolition/recycling), while important, are not within the scope of the analysis and actions in this Plan.

⁷ Deason, et al. March 2018. “Electrification of buildings and industry in the United States: Drivers, barriers, prospects, and policy approaches.” Lawrence Berkeley National Laboratory. <http://ipu.msu.edu/wp-content/uploads/2018/04/LBNL-Electrification-of-Buildings-2018.pdf>

⁸ Silicon Valley Clean Energy. 2020. “Buildings Baseline Study”. https://www.svcleanenergy.org/wp-content/uploads/2020/02/SVCE-Buildings-Baseline-Study_FI_NAL_share.pdf

⁹ <https://www.consumerreports.org/electric-cooktops/the-best-induction-cooktops/>

¹⁰ <https://www.reviewed.com/ovens/features/induction-101-better-cooking-through-science>

¹¹ Brady, et al. 2020. “Health Effects from Gas Stove Pollution.” Rocky Mountain Institute, Physicians for Social Responsibility, Mothers Out Front, and Sierra Club. <https://rmi.org/insight/gas-stoves-pollution-health>.

¹² Price, et al. 2020. “SVCE DER Electrification Adoption Potential”. Energy + Environmental Economics for Silicon Valley Clean Energy.

¹³ Carew, et al. 2018. “Heat Pump Water Heater Electric Load Shifting: A Modeling Study.” Ecotope Consulting, Research, Design. https://ecotope-publications-data-base.ecotope.com/2018_001_HPWHLoadShiftingModelingStudy.pdf

¹⁴ Mahone, et al. 2019. “Residential Building Electrification in California: Consumer economics, greenhouse gases and grid impacts.” Energy and Environmental Economics. https://www.ethree.com/wp-content/uploads/2019/04/E3_Residential_Building_Electrification_in_California_April_2019.pdf

¹⁵ SVCE Buildings Baseline Study

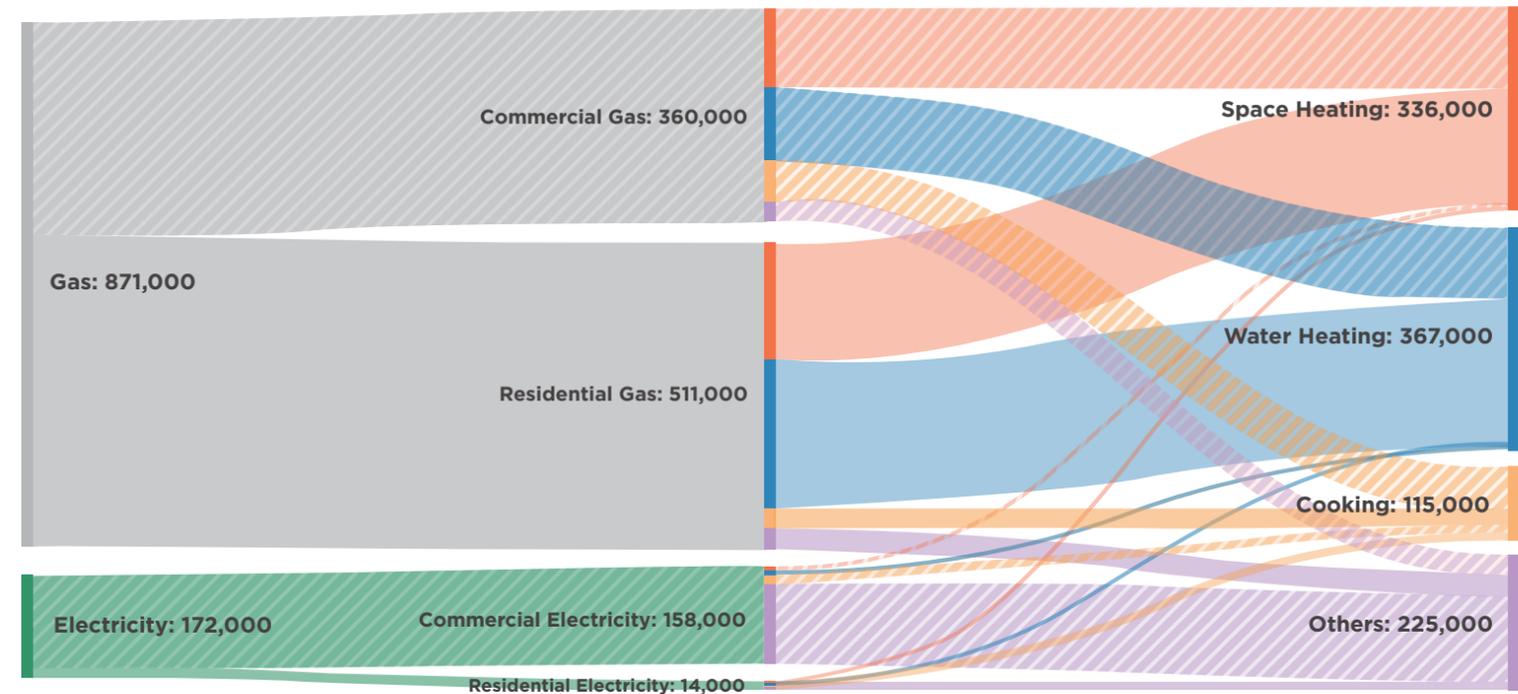


Figure 2: 2018 emissions from the built environment disaggregated by fuel source, sector, and end use (Units: MT CO2e)

ENERGY RESILIENCE

Electrification is the key for building decarbonization, and it will mean more reliance on the electricity system. SVCE has been and continues to explore novel approaches to energy resilience at the micro and macro levels. SVCE is sponsoring grants to Member Agencies to upgrade community facilities to enhance resilience. SVCE is also leading the development of a community-wide resilience plan. Meanwhile, community members can take advantage of SVCE’s online resources to get solar and storage quotes or receive a rebate for installing a backup system and participating in an SVCE program to help reduce peak demands on the grid. Energy resilience upgrades must work hand-in-hand with electrification activities to jointly make homes and businesses more prepared for future challenges.

ELECTRIC VEHICLE INFRASTRUCTURE JOINT ACTION PLAN

Emissions from transportation comprise the largest source of GHG emissions within the SVCE service territory. Vehicle electrification plays an important role in transportation emissions reductions that also aligns with SVCE’s core mission and business. In 2019, the SVCE Board of Directors adopted an Electric Vehicle Infrastructure Joint Action Plan and approved \$8 million in charging infrastructure incentives and investments over the FY 2020 – FY 2023 period. That plan identified several initiatives synergistic with those necessary for building electrification, including customer education, reach codes, and permit streamlining. The already-launched electric vehicle infrastructure programs will help provide building-relevant information and tactics to inform the buildout of the initiatives in the Plan. Going forward, there may be further opportunities to combine efforts that benefit both transportation and building decarbonization.

FUTUREFIT HOME

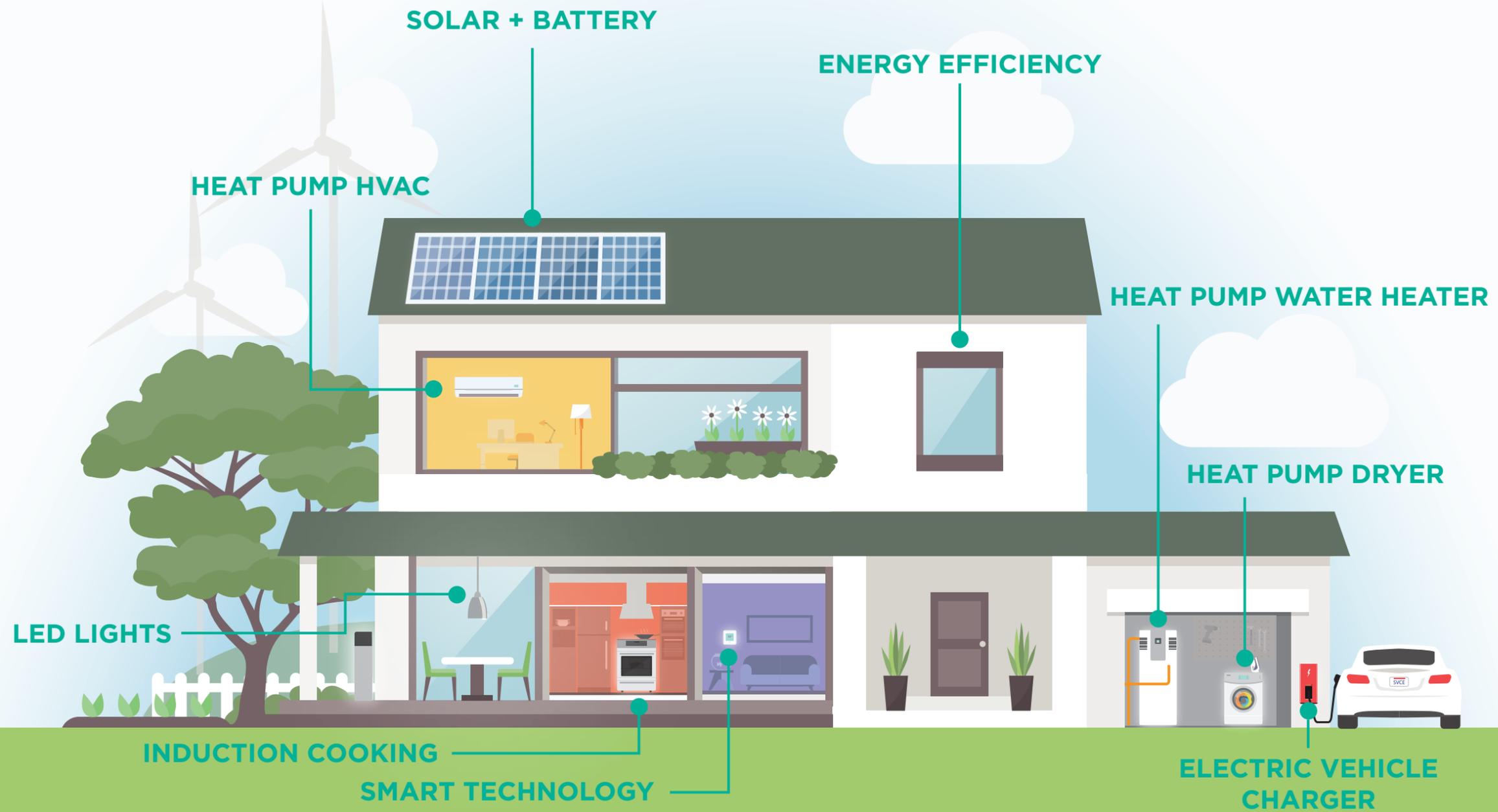


Figure 3: All-electric technologies of a "FutureFit" home

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BARRIERS TO ELECTRIFICATION & OPPORTUNITIES FOR INTERVENTION

All-electric buildings are common in other parts of the world and even other parts of the United States. One in four homes are all-electric nationally and almost half in the south do not use gas.¹⁶ By comparison, saturation of electrification technologies in the SVCE territory is less than 4%.¹⁷ Given that market adoption is still in its infancy, accelerating building electrification will require tackling a broad set of barriers with a variety of types of interventions beyond incentives alone.

The following list of barriers were identified and developed during the stakeholder engagement process and have been influenced by the Building Decarbonization Coalition's (BDC) Building Decarbonization Roadmap, which describes five primary barriers: low awareness & interest, low perceived customer value, low perceived contractor & builder value, low availability, and misaligned policy.¹⁸

BARRIERS



Low Awareness & Interest:

Customers, contractors and other stakeholders do not know what electrification means nor do they understand the benefits

Consumer preference drives opinion rather than technological limitation (e.g. cooking)



Low Perceived Customer Value:

Cost and access to affordable financing is a challenge

Current incentives and other support programs do not bridge the gap to make electrifying existing buildings cost-competitive, especially for low-income customers



Low Perceived Contractor & Builder Value:

Lack of consumer demand to incentivize contractors to promote electrification

Lack of coordination and support from permitting offices and processes



Low Availability:

Lack of adequate supply of available technologies

Lack of adequate electrical capacity in existing buildings¹⁹



Misaligned Policy:

Policies that continue to allow for new gas infrastructure do not align with climate goals

Lack of relevant, supportive appliance and efficiency standards²⁰

Changes to policy, codes and standards are needed to help bring down the cost of electrification²¹

¹⁶ Deason, 11.

¹⁷ Price, 30.

¹⁸ The structure of the barriers in the BDC Roadmap influenced those described here and were validated and reinforced through stakeholder surveys and workshops carried out in the development of this Plan.

¹⁹ Three-quarters of homes in SVCE territory were built before 1970, indicating that many of these residences will require electrical panel upgrades in order to accommodate electrification. See Building Decarbonization Coalition. January 2020. "Decoding Grid Integrated Buildings Report. https://gridworks.org/wp-content/uploads/2020/02/Decoding-Grid-Integrated-Buildings_WEB.pdf

²⁰ Until recently, energy efficiency standard requirements prevented rebates for fuel-switching. A recent update to 1990s era policy regulating funding for energy efficiency - commonly known as the "three prong test" - has opened the door to using public energy efficiency dollars for technologies that also allow for fuel switching.

²¹ Mahone, 3.

California is in the early stages of building decarbonization, and all strategies from incentives to education to research and development are needed to accelerate market adoption. Interventions described in this plan fall into the following four categories, drawn from SVCE's Strategic Framework described in greater detail in the following chapter.

INTERVENTIONS



Retail Products & Services:

Develop and support **innovative new products and services** to meet customer needs and decarbonize

Increase equitable access to quality building electrification retrofits through **accessible financing and incentives** as well as drive down first costs

Building-grid integration can enable grid services such as capacity, resiliency, load balancing, and carbon reduction to unlock new value streams



Education & Outreach:

Increase **public awareness and education** on electrification and actions to reduce emissions

Shift **consumer preference** and establish demand by communicating the positive benefits of building electrification for health and the climate



Public Policy:

Expand state and local policy activity on decarbonization, while strengthening local and regional agency coordination

Align policies to maximize awareness of and interest in building decarbonization, the value proposition, and the industry's ability to meet rising demand



Market Transformation:

Catalyze market transformation through **coalitions and partnerships** with actors in industry and the innovation ecosystem

Build industry capacity through **workforce development** to deliver and value electrification

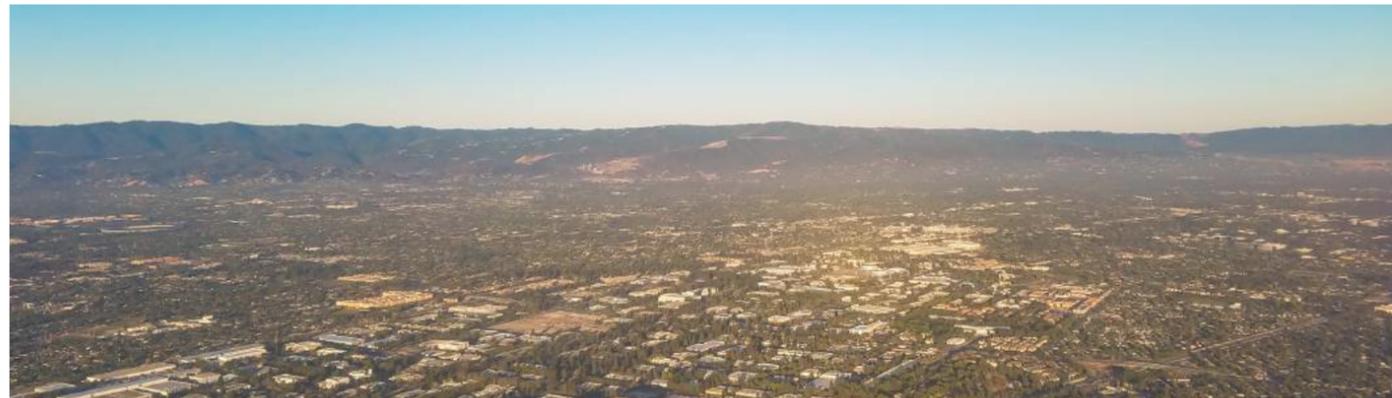
Foster **regional coordination** to share information and develop a regional approach to collective action

Support **innovation** to address key technical, market and policy barriers to achieving building decarbonization

STATE & REGIONAL CONTEXT

Countering decarbonization barriers requires a multi-pronged, coordinated approach that incorporates a variety of types of interventions carried out by multiple agencies and stakeholders. While much more needs to be done, there has and continues to be tremendous activity at the state and regional level on building decarbonization. The actions in this Plan have been developed with these activities and context in mind, to recognize where SVCE and Member Agencies are best suited to intervene given their respective areas of control and influence. Key activities taken into consideration include the following.

- **ALIGNING THE STATE BUILDING CODE:** The California Energy Commission (CEC) updates Title 24 - California Building Energy Efficiency Standards - every three years and the 2022 code cycle is anticipated to address several of the current code barriers to electrification.
- **ASSESSING PATHWAYS TO DEEP BUILDING DECARBONIZATION IN CALIFORNIA:** AB 3232 - Zero-emissions buildings and sources of heat energy requires that by January 2021, the State Energy Resources Conservation and Development Commission will issue a feasibility assessment of the potential for the state to reduce GHGs in the residential and commercial building stock by at least 40% below 1990 levels by 2030.
- **STATEWIDE FUNDING FOR BUILDING ELECTRIFICATION:** SB 1477 - Low-emissions buildings and sources of heat energy requires the development of two new pilot programs that will direct \$200 million in funding over the next four years towards building decarbonization: the Building Initiative for Low Emissions Development (BUILD) and the Technology and Equipment for Clean Heating (TECH).
- **TRANSITIONING OFF NATURAL GAS:** The California Public Utilities Commission has launched a 3-phase *Natural Gas Planning Proceedings* to anticipate and plan for a long-term strategy for transitioning away from natural gas in order to meet California's climate goals in such a way that it maintains safety, reliability, and affordability. PG&E has also signaled its support for electrification through a letter to the CEC regarding the 2022 code update²²
- **EXPANDED ACCESS TO FUNDING FOR ELECTRIFICATION:** Incentives are primarily rate-payer funded energy efficiency programs, which after recent changes to state regulation now allow for fuel substitution²³ BayREN, PG&E, BAAQMD, and others are now offering rebates and incentives for all-electric technologies in addition to traditional energy efficiency measures.



²² PG&E recently issued a letter to the CEC in support of promoting electrification in the 2022 code update. See <https://www.utilitydive.com/news/a-critical-milestone-pge-first-gas-electric-iou-to-publicly-support-cal/580598/>

²³ Often referred to as the "three-prong test", the 1990 era policy required that any energy efficiency measures using public benefits funds would reduce energy use, benefit the environment, and be cost-effective. This resulted in customers only being able to receive rebates for more efficient versions of existing appliances (e.g. a better gas furnace) but not for fuel-switching. In August 2019, the CPUC approved a decision to modify the test, which stood as a barrier to funding electrification measures.

THE ROLE OF SVCE & MEMBER AGENCIES

SVCE and Member Agencies can play a role in the larger building decarbonization effort by catalyzing local adoption of building electrification and demonstrating the viability of different strategies to help influence and support external stakeholder efforts. SVCE's core role includes its ability to develop, craft, and fund retail products and services that raise awareness, bring down the costs of electrification, and bring together stakeholders to collectively catalyze market transformation. Member Agencies can accelerate the transition through key policy initiatives as well as remove barriers to electrification inadvertently embedded in local codes and standards. The Reach Code Initiative is an excellent example of the power of partnership between SVCE and Member Agencies.²⁴ Through SVCE's technical and financial support and regional collaboration, twelve of the thirteen Member Agencies have adopted or are in the process of reviewing proposals for reach codes.

SPHERE OF CONTROL

SVCE

- Clean Energy Supply
- Electricity Generation Rates
- Grid Integration
- Regional Coordination
- Financing & Incentives
- Innovation
- Public Education

MEMBER AGENCIES

- Local Codes, Standards & Policies
- Permitting
- Land Use Planning
- Municipal Buildings
- Public Education

SPHERE OF INFLUENCE

OTHER STAKEHOLDERS

- State & Regional Codes, Standards & Policies
- Electric Grid Service, Rates & Modernization
- Industry Associations & Coalitions
- Environmental NGOs
- Manufacturers
- Labor & Workforce Associations
- Other CCAs, Local Governments & Utilities

Figure 4: Spheres of control and influence for SVCE & Member Agencies

²⁴ Reach codes are local amendments to the building code that go above and beyond the state's minimum requirements.

2 STRATEGIC FRAMEWORK

The actions in this Plan have been developed using the strategic framework outlined in the Decarbonization Strategy & Programs Roadmap (Roadmap), which was adopted by the SVCE Board of Directors in 2018. The strategic framework sets the parameters for achieving SVCE’s ambitious climate goals, articulating what we will do, how we will leverage, and what priorities will guide us.

This Plan builds upon the Roadmap, identifying specific actions to decarbonize the built environment guided by the same three-part strategic framework described below. Actions are identified under the four primary activity categories: retail products & services, education & outreach, public policy, and market transformation. Each action leverages innovation, data, and partnerships and has been evaluated to make sure that they meet SVCE’s five priorities: customer & community value, emissions impact, scalable & transferable, equity in service, and core role for SVCE.

What will we do?



Retail Products & Services: Develop and support innovative new products and services to meet customer needs and decarbonize



Education & Outreach: Increase public awareness and education on electrification and actions to reduce emissions



Public Policy: Expand state and local policy activity on decarbonization, while strengthening local and regional agency coordination



Market Transformation: Catalyze market transformation through coalitions and partnerships with actors in industry and the innovation ecosystem

How will we leverage?



Innovation: Harness innovation to continuously improve service to our customers and community, and to accelerate “bending the carbon curve”



Data: Unlock the tremendous value of utility and other data to guide development, implementation, measurement and evaluation of all program activities



Partnerships: Form and leverage partnerships to support activities addressing our decarbonization mission

What priorities will guide us?



Customer & Community Value: Deliver value to our customers and larger community through program offerings and ongoing initiatives



Emissions Impact: Prioritize activities with greatest emissions reduction potential to achieve alignment with our mission



Scalable & Transferable: Pursue solutions that can be expanded and adapted by others, to ensure impact both within and beyond our borders



Equity in Service: Balance activities to reflect the diversity of our customer base and geography



Core Role for SVCE: Recognize activities where we can and must play a key role given our unique position of community-owned electricity provider



3 ACTION PLAN

This action plan is designed to be flexible and adaptable given the rapidly changing landscape of climate action and building decarbonization in California and in the region.

The objective of these sets of actions is to strategically deploy limited resources to address the barriers described previously by shifting consumer preference and establishing demand; driving down costs; fostering supply chain and quality installations; and cultivating supportive policy. Each action aims to leverage external funding and partners where available to amplify the effectiveness of every dollar spent.

The Plan is organized into three focus areas: New Construction, Existing Buildings, and Market Development. Each focus area includes one or more cornerstone actions that are a strategic focus both in terms of impact and anticipated level of resource investment. For each individual action, the category of activity is specified, which is one of the following from the Decarbonization Roadmap Strategic Framework: Products & Services; Education & Outreach; Public Policy; and Market Transformation. Furthermore, the specific barrier(s) that each action is intended to address are also noted.

The action plan includes an additional section describing existing & supportive actions, which are priority programs that have already been approved by the SVCE Board of Directors and are in various stages of development, as well as supportive actions that enable larger initiatives but may require less effort.



New Construction

Electrifying new construction is critical to limit or prevent increasing emissions from the building sector. Stopping further development of fossil fuel infrastructure in our communities is fiscally prudent, in that gas infrastructure and appliances are stranded assets that will be difficult and expensive to retrofit later. Studies have demonstrated that all-electric new construction is cost-effective for most building types²⁵ but changes to policy, codes and standards are needed to help drive market adoption.²⁶ Policies have the benefit of providing long-term market certainty about a collective direction and can also drive adoption at scale in a way that education and incentives cannot. Policies like reach codes advance building decarbonization cost-effectively by building demand, while expanding market awareness and readiness to be able to address existing buildings as well.

SVCE and Member Agencies will work to further advance building codes and standards development and embark on a second reach code initiative to address broader aspects of the built environment.

ACTIVITY TYPE	BARRIERS ADDRESSED	CORNERSTONE ACTIONS
 Public Policy	 Misaligned Policy	<p>REACH CODE INITIATIVE 2.0: Evaluate the initial Reach Code Initiative in the 2019 building code cycle, assess gaps in application, and develop a second wave of Reach Code support that includes all new construction types as well as renovations (remodels and additions), regional alignment in approach, and potential new technology focus areas (e.g. energy storage). Assess the 2022 code (when released) and evaluate opportunity for new reach codes relative to the updated state baseline. Similar to the initial effort, SVCE will support by developing model policies; providing enhanced technical assistance; supplying background information and educational materials for architects and designers, contractors, elected officials, staff, and the general public; and facilitating stakeholder engagement. Member Agencies will participate in the stakeholder engagement, as well as bring reach codes forward for adoption within their jurisdictions. SVCE may also provide Member Agencies with an incentive to defer costs of Member Agency staff participation.</p>

²⁵ See cost-effectiveness studies developed by the California Codes and Standards Reach Codes Program in 2019: <https://localenergycodes.com/content/2019-local-energy-ordinances/>

²⁶ Mahone, 3.



Existing Buildings

While reach codes are a critical step in avoiding new gas emissions, existing buildings pose the biggest challenge for decarbonization given the cost and complexity of retrofits. Emissions from existing buildings make up one-third of service territory wide emissions, the vast majority of which is from natural gas. Almost all single-family homes and the majority of commercial, multi-family and condo buildings are mixed fuel - that is, they have both electricity and fossil fuel utility service - and will need to be retrofitted to achieve climate targets.²⁷

Single-family homes make up 82% of residential square footage in SVCE territory and are, on average, the least efficient gas users in the residential sector. Newer single-family homes, especially those built after 1980, tend to be more energy efficient than their older counterparts. Therefore, pre-1980 homes, which make up two-thirds of single-family homes in SVCE territory, will be an important focus area for decarbonization in the residential buildings sector. Furthermore, around half of single-family homes in SVCE territory were built before 1970, indicating that many of these residences will require electrical panel upgrades in order to accommodate new loads.^{28,29} In addition, existing electrical distribution may need to be improved in order to allow for large-scale electrification. Socioeconomically disadvantaged census tracts in the SVCE territory have a disproportionately higher share of older single-family homes, lower rates of single-family home electrification, and a higher percentage of residents living in multi-family units.³⁰

Whole-home electrification retrofits are highly unlikely to occur without intervention, but incentives alone are not sufficient.³¹ Specifically, HVAC heat pumps while economical, are low on the adoption curve. Cost effectiveness in commercial building retrofits is also challenging and further measures will be needed to encourage adoption in this sector, as well.³² Given the wide range of gas usage intensities across commercial sectors, sector-specific analyses may also need to be carried out to assess the cost-effectiveness and emissions reduction potential of electrifying different types of commercial buildings. Additionally, low-income communities, renters, condominium owners, and landlords may have lower access to traditional financing, lower ability to pay any upfront costs, less control over building upgrades, and less ability to navigate complex and time-intensive incentive application processes. Ensuring an equitable transition for these communities is a key priority for SVCE and was amplified during the stakeholder engagement process.

SVCE will support Member Agencies in assessing, developing, adopting, and implementing policy measures to address existing buildings. SVCE will further develop and support products and services including incentives and financing measures to increase equitable access to electrification measures.

ACTIVITY TYPE	BARRIERS ADDRESSED	CORNERSTONE ACTIONS
 Public Policy	 Misaligned Policy	FEASIBILITY ASSESSMENT FOR NATURAL GAS PHASE OUT BY 2045: Carry out a feasibility assessment to identify technical, legal and economic barriers and opportunities for phasing out natural gas service by 2045, in the SVCE service territory. The results from the assessment may inform future evaluation of potential future SVCE programs and local policies and regulations.

²⁷ SVCE Buildings Baseline Study

²⁸ BDC, 3.

²⁹ SVCE Buildings Baseline Study

³⁰ SVCE Buildings Baseline Study

³¹ Price, 25.

³² Additional cost-effectiveness studies for residential and non-residential buildings were developed by the California Codes and Standards Reach Codes Program in 2019: <https://localenergycodes.com/content/2019-local-energy-ordinances/>

ACTIVITY TYPE	BARRIERS ADDRESSED	CORNERSTONE ACTIONS
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 Public Policy	 Misaligned Policy	LOCAL POLICY TO DECARBONIZE EXISTING BUILDINGS: Retrofit or replace-on-burnout, time-of-sale, differential utility users tax, energy audits and benchmarking, and building emissions caps are all potential policy levers Member Agencies can explore to mitigate emissions from existing buildings. Modeled off the structure of the reach code effort, support Member Agencies in evaluating the feasible pathways to regulate existing building emissions and help develop model policy approaches and supportive programs to enable compliance.
 Retail Products & Services	 Low Perceived Customer Value	
	 Low Perceived Contractor & Builder Value	FUTUREFIT HOMES & BUILDINGS: Provide comprehensive assistance to SVCE customers in navigating and accessing the many existing and forthcoming, non-SVCE led energy programs providing financial assistance for building decarbonization and energy efficiency, including HVAC, water heating, cooking, and electrical panel upgrades. Identify and address incentive gaps and layering opportunities as well as participation barriers, providing precise and targeted additional financial resources, where needed. Prioritization will be on low-income residents, affordable housing providers, and small businesses, as well as customers with high-heat vulnerabilities. SVCE's FutureFit Heat Pump Water Heater Program will be integrated into this broader program going forward.
	 Low Availability	
 Retail Products & Services	 Low Perceived Customer Value	
	 Low Perceived Contractor & Builder Value	ACCESSIBLE FINANCING: Assess feasibility of financing mechanisms to unlock equitable financing for energy efficiency and electrification across the region, particularly for low-income communities. Potential strategies to be evaluated include tariffed or more standard on-bill financing, electrification-as-a-service business models, or other opportunities to help overcome financial barriers (first costs, access to credit, etc).



Market Development

Transitioning away from natural gas will require an unprecedented cultural, technical, and economic shift, but lack of awareness, low perceived value, and low availability are significant barriers to adoption. Market transformation will require a proactive and coordinated effort to increase awareness and demand for building electrification as well as workforce capacity to deliver on that demand. Building community support and interest will in turn develop political will for even deeper decarbonization efforts.

A recent survey of contractor attitudes towards electrification revealed the specific challenges to market transformation. In general, contractors lack awareness and understanding of the benefits and reasons why all-electric technologies are needed and are viable.³³ Recommendations from the report include providing incentives to bring down the cost of retrofits; promoting manufacturer trainings to installers; communicating to contractors the business case for electrification; developing marketing materials for sales staff and installers; and offering low or no-interest financing options for low-income customers. These issues were also echoed as a barrier in the stakeholder surveys and workshops for this Plan.

In response, market development initiatives in this Plan focus on expanding regional coordination and workforce development.

ACTIVITY TYPE	BARRIERS ADDRESSED	CORNERSTONE ACTIONS
 Market Transformation	 Low Awareness & Interest	<p>REGIONAL COORDINATION: SVCE will initiate regular regional stakeholder convenings to coordinate program alignment; streamline access to incentive funds; identify strategies to lower costs; inform the development of the positive messaging campaign and general building decarbonization communication needs; leverage other collective activities around building decarb; and reveal and address barriers to workforce development. Regional coordination will be used to build off existing and forthcoming programs such as TECH and BUILD to develop additional programs to support workforce development. Stakeholders include Member Agencies, local community groups, architects, designers, contractors, labor, affordable housing providers, business community, BAAQMD, BayREN, other CCAs, PG&E, healthcare agencies, educational institutions, and non-governmental organizations.</p>
	 Low Perceived Contractor & Builder Value	
	 Low Availability	

³³ Building Decarbonization Coalition. 2020. "BDC Presents: Contractor Needs Assessment Results Webinar". <https://emiconsulting.com/events/bdc-presents-contractor-needs-assessment-results-webinar/>.

Existing & Supportive Actions

SVCE has a range of existing complimentary decarbonization programs in various stages of development and implementation. In addition, supportive actions have been identified as part of this Plan that represent ways in which SVCE can leverage its leadership and role as regional convener to bring together external partners around key issues.

ACTIVITY TYPE	EXISTING & SUPPORTIVE ACTIONS
 Retail Products & Services	<p>VIRTUAL POWER PLANT INITIATIVE: Leverage SVCE's "virtual power plant" (VPP) program to pilot grid-interactive efficient buildings, integrating multiple customer resources such as energy efficiency, storage, heat pump water heaters and electric vehicles to provide grid services. Through the pilot, identify and address key technical, market, and/or economic barriers for leveraging buildings for demand flexibility and achieving broad-based deployment.</p> <p>RETAIL RATES ASSESSMENT: Assess retail rates to develop a multi-phase plan for improvements and development of pilot rates that will remove barriers to building electrification. Evaluate new time-of-use periods, alternative baselining calculations, dynamic pricing, and subscription models.</p> <p>ELECTRICAL DISTRIBUTION & PANEL CAPACITY ASSESSMENT: Assess electrical distribution and electrical panel capacity limits to accommodate scaled-up building and vehicle electrification as well as novel retrofit solutions for managing increased load, particularly for multi-family and commercial.</p>
 Education & Outreach	<p>CUSTOMER RESOURCE CENTER: Leverage SVCE's eHub to support building decarbonization. The eHub is an online resource center to enable engagement and awareness-building, education and action related to understanding clean energy use for transportation, homes and appliances. Carry out outbound engagement and proactive communication with our customer base to advance our decarb mission. Please see: svcleanenergy.org/ehub/.</p> <p>POSITIVE MESSAGING CAMPAIGN: Participate in the Building Decarbonization Coalition's "The Switch is On" marketing campaign with other regional partners. Using the lessons learned from "The Switch is On" and the eHub roll-out, continue to cultivate regional partnership for an ongoing regional marketing effort to promote awareness and public education around electrification.</p> <p>SVCE'S "WATTS FOR LUNCH": Continue to leverage SVCE's "Watts for Lunch" program to educate the commercial and industrial community about building electrification and solicit feedback on needed industry support.</p>



4 NEXT STEPS

Meeting climate goals requires rapid and expansive action from a variety of stakeholders to accelerate building decarbonization. Implementation of this Plan is scheduled for the 2021-2023 timeframe.

ACTIVITY TYPE EXISTING & SUPPORTIVE ACTIONS



Public Policy

STREAMLINING COMMUNITY-WIDE ELECTRIFICATION: Survey and review local city policies (codes, permitting, inspection, incentives, etc.) to support the development of model policies and processes to better enable electrification. Develop a best practice guide for streamlining community-wide decarbonization.

STATE POLICY COORDINATION & ADVOCACY: Participate as a stakeholder in state policy proceedings to advocate for the continued advancement of building decarbonization policies, particularly the 2022 Title 24 energy code update, but also AB 3232, SB 1477, and the natural gas planning proceedings. Also advocate for accelerated statewide action to bring down costs of electrification and scale up conversions to meet climate targets.

REGIONAL POLICY COORDINATION: Coordinate with BAAQMD to advance building decarbonization through, for instance, appliance standards, land use planning, innovation and public awareness campaigns.



Market Transformation

FUTUREFIT FUNDAMENTALS CONTRACTOR TRAINING: Provide COVID-driven workforce relief by expanding awareness of electrification technologies and offering valuable virtual training. Provide immediate financial relief to contractor workforce through installation incentives for relevant technologies.

INNOVATION PARTNERS & INNOVATION ONRAMP: Leverage SVCE's innovation programs to explore key solutions to building decarbonization including "smart panels" and other demand flexibility innovations, district energy solutions, electrification-as-a-service business models, and carbon-free backup power.

RESEARCH & DEVELOPMENT SUPPORT: Advocate to state regulators for additional research on technology development and fuel-switching solutions, as well as research on the co-benefits of building decarbonization including improved health and reduced health care costs. Participate and contribute to research conducted by others on building decarbonization, including R&D priorities identified by the Building Decarbonization Coalition.

Progress will be measured and monitored in several ways. First, SVCE will continue carrying out an annual GHG emissions inventory by source and sector, and will evaluate sector-specific reduction targets for both buildings and transportation in the coming two years. Second, SVCE will identify and track several key performance indicators (KPIs) for monitoring progress in the built environment, which may include energy use and emissions intensity by square footage, square footage of new construction and existing buildings that is all-electric, and distributed energy resource deployment (storage, rooftop solar, EV charging, etc.). Consistent with existing program practice, program development for each of the actions in this Plan will include more detail on specific quantifiable outcomes; time-bound targets; required resources; and development of an evaluation, measurement and verification plan.

Progress on Plan implementation will be reported regularly to the SVCE Board of Directors and community. The Plan will be reassessed in approximately three years to determine the next suite of transformative actions.



5 APPENDIX: ACTION PLAN SUMMARY



FOCUS AREA	CORNERSTONE ACTIONS	ACTIVITY TYPE						
 NEW CONSTRUCTION	<p>REACH CODE INITIATIVE 2.0: Evaluate the initial Reach Code Initiative and develop a second wave of reach code support that includes all new construction types, renovations, regional alignment, and new technologies. Evaluate the 2022 baseline code and provide additional support.</p>		<p>Partnership with Member Agencies to further advance building codes, particularly for existing buildings, expanding on success from initial program.</p>	●	●	●	●	●
 EXISTING BUILDINGS	<p>FEASIBILITY ASSESSMENT FOR NATURAL GAS PHASE OUT BY 2045: Carry out technical, economic and legal feasibility assessment of pathways to phasing out natural gas service by 2045 in the SVCE service territory.</p> <p>LOCAL POLICY TO DECARBONIZE EXISTING BUILDINGS: Support Member Agencies in evaluating feasible pathways to regulate existing building emissions and help develop model policy approaches.</p> <p>FUTUREFIT HOMES & BUILDINGS: Provide comprehensive assistance to SVCE customers in navigating and accessing non-SVCE led energy programs and identify and address incentive gaps and layering opportunities.</p> <p>ACCESSIBLE FINANCING: Assess feasibility of financing mechanisms to unlock equitable financing, particularly for low-income communities.</p>	   	<p>Partnership with PG&E, other CCAs, and Member Agencies to evaluate feasible regional solutions to enable an equitable transition off natural gas by 2045 using a technical and economic analysis.</p> <p>Partnership with Member Agencies and regional agencies like BAAQMD to evaluate feasible policy strategies to decarbonize existing buildings.</p> <p>Partnership with Member Agencies and other regional entities like BayREN to leverage external funding to maximize access to building decarbonization for customers.</p> <p>Partnership with PG&E and other CCAs to evaluate effective and scalable equitable financing solutions to enable electrification across the region.</p>	●	●	●	●	●
 MARKET DEVELOPMENT	<p>REGIONAL COORDINATION: Initiate regular regional stakeholder meetings to coordinate program alignment; streamline access to incentive funds; identify strategies to lower costs; inform messaging and communication needs; and assess barriers and opportunities for workforce development.</p>		<p>Stakeholders include Member Agencies, local building industry stakeholders, business community, BAAQMD, BayREN, other CCAs, PG&E, healthcare agencies, educational institutions, and non-governmental organizations.</p>	●	●	●	●	●

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