

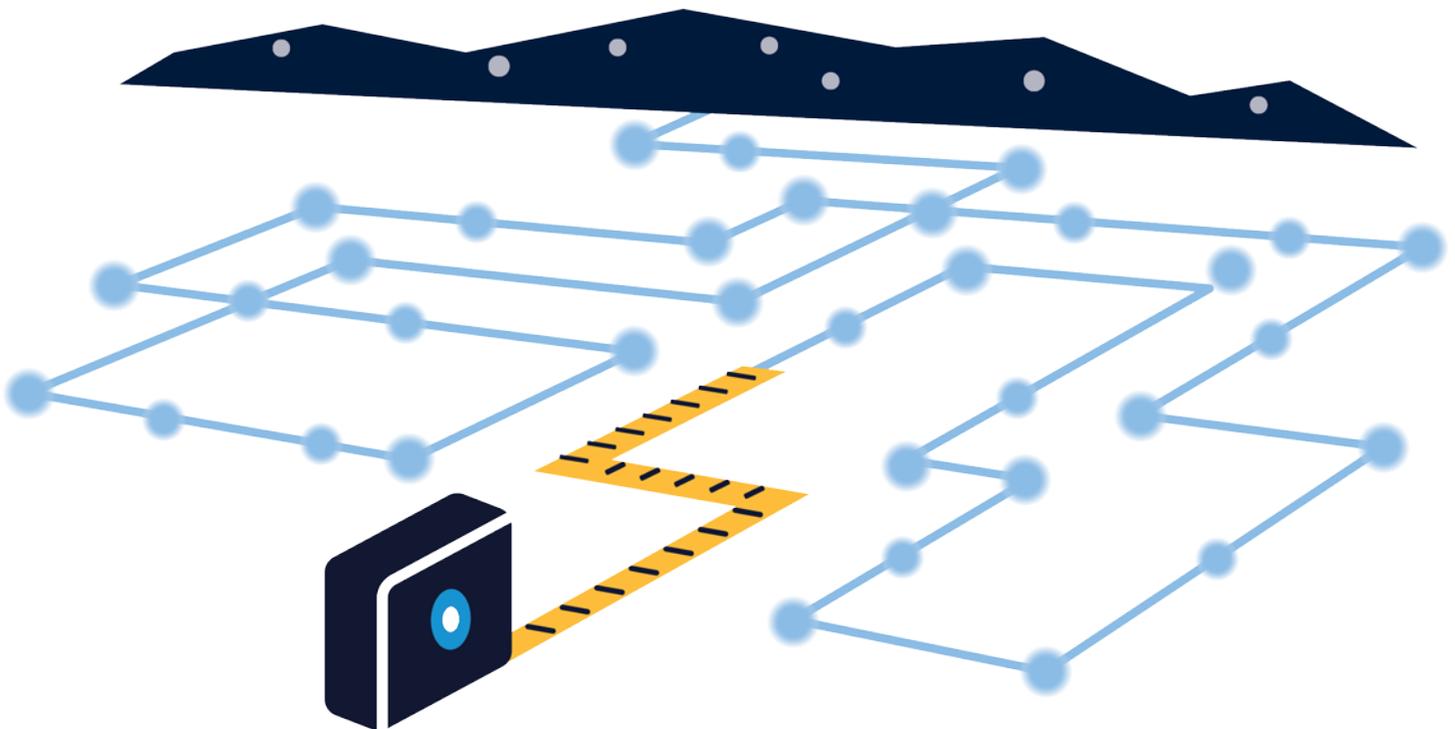


Opinion **Dynamics**



Silicon Valley Clean Energy Decarbonization Strategy Roadmap

Group B, Deliverable 33 Case Study 4



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1. Executive Summary

This case study documents the creation and implementation of the Silicon Valley Clean Energy (SVCE) Decarbonization Strategy and Programs Roadmap. The roadmap outlines a comprehensive and integrated set of decarbonization strategies to reduce SVCE GHG emissions to half of their 2015 levels by 2030 by procuring a carbon-free power supply, electrifying buildings and transportation, encouraging energy efficiency and grid integration, and promoting innovation and active customer engagement.

The SVCE decarbonization roadmap reflects an increasing drive toward decarbonization, decentralization and digitization. The strategies are the result of an extensive process of customer and community engagement to obtain feedback on a suite of initiatives, pilots, and partnerships. These initiatives will empower the local municipalities and customers served by SVCE to achieve their individual emissions and sustainability targets as they collectively strive to meet California's ambitious carbon reduction goals. Most importantly, the SVCE decarbonization roadmap is replicable and scalable for use in other regions.

To guide planning and decision-making, SVCE created a three-part decision-making framework to identify and pursue strategic approaches to reduce carbon emissions throughout its service territory. The first component of the framework identifies the primary activities that SVCE will implement. The second component highlights the strengths that SVCE can leverage to increase its effectiveness and impact. The third component establishes five criteria for evaluating and prioritizing the decarbonization strategies and program concepts under consideration.

The next significant outcome was the roadmap itself. While the decision-making elements of the framework provide guidance for SVCE to make decisions and set priorities, the heart of the decarbonization roadmap focuses on a series of interrelated strategies for achieving objectives that will help SVCE to accomplish its carbon reduction goals. SVCE groups these strategies into six primary categories: 1) carbon-free power supply; 2) electrification of the built environment; 3) electrification of transportation, referred to as "mobility;" 4) energy efficiency and grid integration; 5) innovation; and 6) outreach and education.

The third significant outcome was a series of programs and initiatives designed to accomplish SVCE's goals and objectives. As with the roadmap itself, these programmatic efforts were developed and refined through direct consultation with customers, stakeholders, and implementers. Most of the efforts address objectives in more than one of the six categories. For instance, SVCE's joint Electrification Reach Code with neighboring community choice aggregator (CCA) Peninsula Clean Energy encourages local municipalities to pass building electrification and EV charging ordinances that exceed California's Title 24 statewide building energy efficiency and green building standards by encouraging or requiring the use of all electric appliances in buildings, prohibiting natural gas end uses, and specifying enhanced requirements for electric vehicle charging.

Moreover, many of the programs are also additive, with the first effort laying the foundation for a larger, more advanced effort that follows. For example, SVCE's FutureFit Heat Pump Water Heater program provides rebates to encourage the installation of grid interactive heat pump water heaters in lieu of natural gas water heaters. Yet, that program is just one part of SVCE's larger FutureFit Home initiative that focuses on creating all-electric homes with solar panels and battery storage, heat pumps for heating and cooling, heat pump water heaters, induction cooking, electric clothes dryers, and electric vehicle charging—all under grid interactive control, so that customers can better manage their energy use and SVCE can aggregate and dispatch the devices for load shifting and other grid benefits.

For CCAs and other organizations who may try to pursue a similar decarbonization roadmap initiative, the main components include: 1) clear and ambitious goals, 2) a stakeholder driven process to identify desired

outcomes, 3) a decision-making framework that includes criteria for inclusion and guidelines for prioritization, 4) a cohesive set of interrelated strategies; and 5) an appropriate budget to support implementation. Although this list encapsulates the main ingredients necessary for an effective decarbonization roadmap, additional best practices and lessons learned from this initiative include the following:

Best Practices

- **Act like you own the problem.** The first step to achieving a goal is accepting responsibility for its completion. California's carbon reduction mandates are so big that they can be overwhelming. But SVCE and its member agencies are partnering with customers and stakeholders to take ownership of their individual emissions and sustainability targets as they collectively strive to meet California's ambitious goals.
- **Try to get everyone on one page.** Literally. One of the keys to SVCE's success has been its ability to visualize their carbon reduction goals and the pathways for achieving them in a single graphic that succinctly conveys the urgency of the task and the most appropriate paths for accomplishing it. Doing so made it possible for SVCE board members, customers, member agencies, and other stakeholders to align with a shared vision and timeline, and to see their own roles in accomplishing it.
- **Do not focus on decarbonization alone.** While decarbonization of SVCE's power supply, built environment, and transportation systems was the centerpiece of what SVCE was targeting, it was not the only goal of its new customer programs. Other important factors included promoting energy efficiency and grid integration, delivering value to customers and community, and stimulating innovation.
- **Remain open to new possibilities.** SVCE engaged in the roadmap development process without preconceived notions about outcomes or the means of achieving them. SVCE's willingness to invite feedback, scrutiny, and criticism fostered more effective collaboration by making participants feel their thoughts were taken into consideration. As a result, the roadmap that emerged was more comprehensive, better integrated, more responsive to market needs, and ultimately more achievable.
- **Craft coordinated strategies to increase their effectiveness.** With six primary categories and 25 different strategic initiatives and programs, the SVCE decarbonization roadmap is a complex set of distinct, yet interrelated efforts that reinforce and build upon each other. For example, individual initiatives, such as the All-Electric Showcase and the FutureFit heat pump water heater program, generated awareness and support for the larger electrification reach code initiative for new construction. Moreover, the heat pump water heater effort also served as a forerunner for the FutureFit home concept that will encourage decarbonization in existing buildings. This innovative concept will promote the installation of all-electric grid-interactive distributed energy resources that can be monitored and controlled by individual customers and dispatched by SVCE or a third-party provider in order to drive time-dependent carbon reductions.
- **Establish clear criteria to guide decision making.** A strategic roadmap provides guidance on how to reach a desired endpoint, but the journey cannot begin until the path is chosen. SVCE needed a framework to guide its strategic planning and decision-making process. The CCA created a three-part framework to help decide which options to prioritize and how to leverage its strengths. SVCE places the greatest emphasis on efforts that: 1) reduce emissions, 2) deliver value to customers, 3) align with the CCA's core role as community-owned provider of carbon-free electricity, 4) strive

for equity of service, and 5) demonstrate scalability and transferability within its service territory and beyond.

- **Build consensus.** SVCE has a large and diverse customer base, and not every entity has the same goals for sustainability or decarbonization. To increase cooperative participation, SVCE gathered feedback from a wide variety of stakeholders, including residential and commercial customers, local government representatives, experts, and advocates. They also took steps to circulate a penultimate draft among key stakeholders for refinements before final approval by the SVCE Board of Directors.
- **Know your role.** One of SVCE's guiding principles is to stay true to its core role as a CCA providing carbon free electricity. As a public entity chartered to serve the greater good, its voice carries significant weight with customers, stakeholders, and local community leaders. Nonetheless, SVCE recognizes that one of its main strengths lies in coordinating and advising others, while the ultimate purview for decision-making often resides at the local or individual level.
- **Expand your reach and your budget with strategic partnerships.** Due to the broad, encompassing nature of the decarbonization roadmap, it overlaps with the projects, activities, and service territories of local, regional, and state entities. Those overlaps present opportunities for SVCE to partner, collaborate, or alter their decarbonization efforts relative to the initiatives of the respective overlapping entities. SVCE has established strategic relationships with its member agencies and neighboring municipal utilities. These include Peninsula Clean Energy, San Jose Clean Energy, BayREN, Bay Area Air Quality Management District, Building Decarbonization Coalition, Joint Venture Silicon Valley, and others.
- **Plan to iterate.** Treat the roadmap as a living document with periodic updates. Since the initial adoption of the roadmap, SVCE has continued to update it based on new information, new opportunities, and changing market conditions. Such iterations demonstrate the strength of the overarching vision and the underlying strategic framework that facilitate consistent focus on the end goals while revising the modular programmatic components to adapt to changing circumstances.
- **Be deliberate about driving innovation.** SVCE emphasizes innovation and partnerships across its varying initiatives. One especially effective approach is to broadly frame the problem and invite bright ideas for forward-thinking solutions. While this crowdsourcing approach can yield innovative approaches anywhere, it is particularly apropos in Silicon Valley given the high number of technology and service companies engaging with the issues that SVCE is addressing.

Lessons Learned

- **It is difficult to predict pilot enrollments.** SVCE set modest enrollment targets for some of its pilot initiatives because it can be challenging to predict interest and participation, particularly when it comes to new technologies. Sometimes pilots can be quickly oversubscribed, while other times careful marketing and education may be needed to ensure customers realize they are SVCE customers and that the CCA was created to serve the public good. Fortunately, once people recognize SVCE's position as a public entity, the CCA's advocacy for decarbonization can dispel skepticism about any for-profit motivations.
- **Hire the help you need.** Crafting a comprehensive decarbonization strategy and programs roadmap is an extensive and time-consuming initiative. SVCE staff members recommend that sufficient

budgets be set aside to hire consultants to support the initiative, lighten the workload, minimize the time to completion, improve the work product, and increase the likelihood of success.

- **Do not be afraid to fail.** Thinking big and being daring are essential for innovation, but not every effort works out as planned. SVCE recognized this and established a culture that allows for course corrections and rapid iterations to adjust to unanticipated situations or undesirable outcomes. In doing so, the SVCE Board of Directors empowered SVCE staff to pause and alter individual initiatives, as necessary. The board also saw the wisdom in allowing updates to the roadmap to occur as needed, rather than only doing so on a fixed annual cycle. For instance, rather than waiting until the first of the year, they are actively working on preparing and finalizing a Building Decarbonization Joint Action Plan that will address and align all SVCE's building decarbonization efforts.

2. Introduction

“Climate change is the most important challenge of our time, and we’ve devoted considerable thought to how we can reduce carbon emissions in our service territory,” said Girish Balachandran, CEO of Silicon Valley Clean Energy (SVCE). That vision is encapsulated in the SVCE Decarbonization Strategy and Programs Roadmap.¹ The roadmap outlines a comprehensive and integrated set of decarbonization strategies to reduce GHG emissions to half of 2015 levels by 2030. It does so by advancing beyond SVCE’s efforts to ensure a carbon-free power supply to also deliver programs that electrify buildings and transportation, encourage energy efficiency and grid integration, actively engage customers, and promote innovation.

The SVCE decarbonization roadmap reflects the intersecting and increasingly comprehensive approaches to decarbonization, decentralization, and digitization. The roadmap strategies are the result of more than a year of extensive customer and community engagement to obtain feedback and achieve consensus on a coordinated suite of initiatives, pilots, and partnerships. This suite of approaches is designed to empower the local municipalities and customers served by SVCE to achieve their own emissions and sustainability targets as they work together to meet California’s ambitious carbon reduction goals.

2.1 Setting Goals and Making Plans

Silicon Valley Clean Energy is a community choice aggregator² (CCA) formed by a consortium of local governments, including 12 municipalities and Santa Clara County,³ who came together in 2016 with a shared regional vision of providing their collective 270,000 customers with clean energy and supporting their individual and collective decarbonization efforts. “Our mission is to provide affordable clean energy and innovative programming to our customers with an overall goal of reducing emissions. To do that we need to address the three major sectors of power supply, transportation, and buildings,” said Balachandran.

To accomplish its mission, SVCE first needed to establish clear and achievable goals. To do that, SVCE hired DNV-GL to perform an original GHG emissions inventory and clean energy asset baseline study for 2015 emissions, with a follow-up study conducted for 2017 emissions.⁴ Next, SVCE staff carried out an in-house modeling effort to consider a business as usual (BAU) forecast through 2030 with varying scenarios based on factors such as electric vehicle sales growth, housing growth, job growth, etc. They then conducted a sensitivity analysis to gauge the range of potential outcomes.⁵ Using the 2015 levels as a baseline, SVCE set its 2021 GHG reduction target to be 30% below 2015 levels (2.82 MMT CO₂E), 40% below 2015 levels by 2025 (2.42 MMT CO₂E), and 50% below 2015 levels by 2030 (2.01 MMT CO₂E) as shown in Figure 1.

¹ https://www.svcleanenergy.org/wp-content/uploads/2019/02/Decarbonization-Strategy-Programs-Roadmap_Dec-2018.pdf

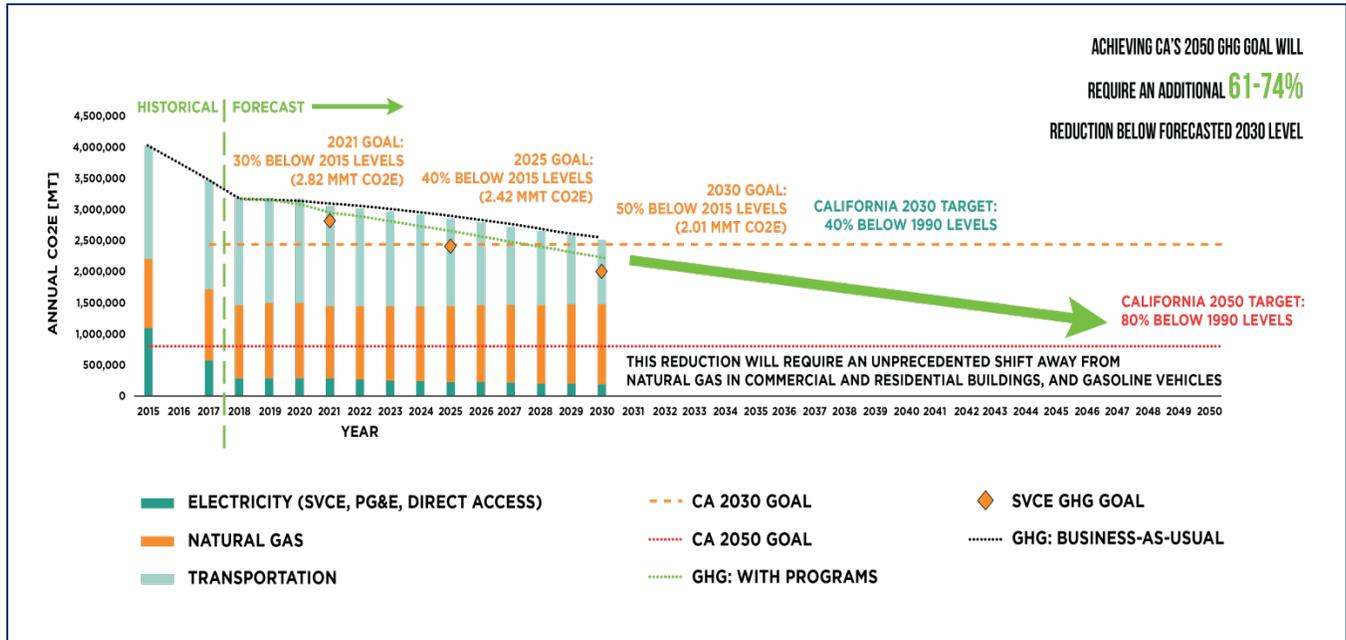
² Community Choice Aggregators (CCAs) are local, not-for-profit public agencies that pool or aggregate local community electric load in order to purchase clean energy and develop local projects and programs on behalf of their residents and businesses. Aggregators set up governing boards composed of local elected officials from constituent jurisdictions who make decisions regarding power supply purchases, electric rates, programs and initiatives. CCAs work in partnership with the region’s existing Investor-Owned Utility (IOU), which continues to deliver power and maintain the grid.

³ Member jurisdictions include Campbell, Cupertino, Gilroy, Los Altos, Los Altos Hills, Los Gatos, Milpitas, Monte Sereno, Morgan Hill, Mountain View, Saratoga, Sunnyvale and unincorporated Santa Clara County.

⁴ “SVCE GHG and Energy Asset Baseline Data” was presented July 2018 at the SVCE Board of Directors meeting. See presentation slides 10-33 from <https://www.svcleanenergy.org/wp-content/uploads/2018/07/2018-0711-Presentations-Items-4-and-6.pdf>; as well as agenda on pg. 1-2 and staff report on pg. 190 from <https://www.svcleanenergy.org/wp-content/uploads/2018/07/2018-0711-SVCE-BOD-Agenda-Packet-071118-F.pdf>

⁵ Ibid

Figure 1 SVCE GHG emissions goals and forecast



Source: Silicon Valley Clean Energy, Decarbonization Strategy & Programs Roadmap, 2018, p 14.

Ninety percent of SVCE’s costs are associated with clean power supply. Consequently, SVCE focused first on establishing a carbon-free power supply since that was essential to operations and meeting its targets. However, greening its electric supply was only their first step. SVCE also knew it needed to tackle emissions from other sources including internal combustion engines and natural gas-fired appliances and processes in buildings. “We knew we needed to take the next step and there was a big push from the advocacy community to get started on programs right away,” said Balachandran. “But we have ambitious long-term goals, and we knew we would be more successful if we had a cohesive strategy in place, so we decided we were not going to jump into things until we were ready.”

3. Roadmap and Customer Program Development

Once its clean power supply procurement and service delivery to 270,000 customers was underway, SVCE began to focus on developing customer-facing programs. Howard Miller, Mayor of Saratoga and SVCE board member, explained the Board’s thinking. “When we decarbonized the City of Saratoga’s power supply, we reduced our carbon footprint by 17% and we were really proud” he said. “No other city was much better or worse than us, so we paused and said ‘Wait a minute. We only solved 20% of the problem. What about the other 80%?’ We knew we needed customer programs if we were going to bend the carbon curve.”

SVCE organized an internal team led by Don Bray, Director of Account Services and Customer Relations, and charged them with developing a set of program ideas to be socialized amongst its stakeholders. SVCE staff began by working with the CCA’s Member Agency Working Group (MAWG), which is a collection of city staff representatives from each of the local jurisdictions served by SVCE. The MAWG members provide input on ideas and opportunities. SVCE highly values this input since its 13 local jurisdictions serve as the primary implementation partners for many of SVCE’s customer programs and decarbonization initiatives. In this case,

the MAWG team considered the needs of different communities and prepared a set of program concepts for consideration by the SVCE Board of Directors.

After reviewing these initial program concepts, the Board approved a peak day electricity pricing program that was designed to protect customers who were transferring their service from PG&E to SVCE. However, beyond this one program with its singular and immediate benefit, the board members had some pointed feedback regarding the rationale for the remaining set of proposed programs. "They asked, why these programs and not others?" said John Supp, Manager of Account Services for SVCE. "The feedback we got was that we needed a framework by which SVCE could decide which programs to implement and when. We had already developed internal scoring criteria, but without an overarching framework we could not design programs that would work together to help meet our bigger picture goals."

"We had probably two dozen ideas, including thermostats, water heating, rebates for heat pumps, electric vehicle charging, and electric panel upgrades, but there was no rhyme or reason to how it would actually help us change the world. It all seemed like whack-a-mole," added Miller. "The hodgepodge approach was not going to get us to the 20%, 30% or 50% carbon reductions we were going to need. We knew we needed a roadmap and a timeline" (Table 1).

Bray, the MAWG, and the rest of the SVCE team went back to the drawing board to develop a roadmap and a comprehensive set of customer programs. According to Supp, the SVCE Board's feedback was pivotal. "Without being asked that big picture question, I imagine we would have incrementally built a portfolio of programs sector by sector without considering how they all work together," he said. "Instead we stepped back and asked ourselves to develop a comprehensive approach for achieving our goals and a delivery timeline that prioritizes and sequences of what to do when, so we can have the biggest impact."

The reset by the Board of Directors also led to the creation of the Customer Program Advisory Group (CPAG) to gather input from residential customers. The CPAG was tasked with preparing a set of program recommendations based on customer insights. The only specific requirement for joining the CPAG was that advisory group members live in a community receiving residential electric service from SVCE. The resulting 16-member panel included engineers, energy consultants, business consultants, a CPA, a physics professor, and people with marketing and software backgrounds.

"Decarbonization was the centerpiece of what the Board was looking for, but we pushed hard to have that not be the only focus customer programs were built around. We were looking for something richer," said Peter Evans, President of New Power Technologies and Chair of the CPAG. "We asked ourselves if there was a way for SVCE, or a CCA in general, to change the typical hands-off dynamic between electric providers and customers, and get customers sufficiently engaged in their energy use that they become active participants. So, rather than proposing program concepts that a utility might have done somewhere before, we looked for new ways to deliver outcomes like GHG reductions, customer empowerment, cost savings, and demand and supply alignment."

Evans and his CPAG colleagues embarked on a process of program concept development that moved incrementally forward with each monthly meeting. The process included: 1) envisioning desirable program outcomes and customer benefits; 2) brainstorming potential program ideas; 3) matching program ideas to desired outcomes; 4) noting associated costs, likely participation levels, scalability, implementation timelines, and potential metrics; 5) voting to rank the program concepts, in order to reduce the original 11 ideas to a more manageable four; and 6) preparing program briefs to be presented to the SVCE Board of Directors in June 2018.

CPAG members also played another important role in program development by providing personal accounts of their experiences buying and installing electric vehicle chargers, solar panels, battery storage, heat pumps,

heat pump water heaters, and more. “When someone on the committee was in the midst of installing one they would talk about it and we would ask ourselves if the programs we were proposing would actually address the challenges that real customers face,” said Evans. This first-hand knowledge affected their program recommendations and informed SVCE’s strategy and program design decisions. “Our approach was based on the premise that creating programs that will theoretically lead to greenhouse reductions won’t actually be effective unless they are built around real customer needs and interests,” he added. “So, I think the CPAG’s work was of lasting value because it brought real customer voices into the concept of program design.”

Table 1. SVCE Decarbonization Roadmap Major Milestones

Date/Timeline	Primary Activity/Milestone
March 2016	SVCE formed as CCA
April 2017	SVCE begins providing clean electric service to 270,000 customers
April 2017	SVCE forms Member Agency Working Group (MAWG) and brainstorms program ideas
August 2017	SVCE Board of Directors (BOD) requests framework for strategic planning and program decision-making
August 2017	SVCE BOD requests formation of Customer Program Advisory Group (CPAG)
August 2017	SVCE BOD requests first GHG inventory to establish baselines and goals
December 2017	SVCE conducts first Watts for Lunch (WFL) Commercial & Industrial (C&I) customer forum
January 2018	SVCE formally launches CPAG to gather customer feedback for program ideas
April 2018	SVCE conceives decarbonization roadmap
June 2018	CPAG provides initial program recommendations to SVCE BOD
June 2018	SVCE hires Director of Decarbonization and Grid Innovation
July 2018	2015 and 2017 GHG inventory presented to SVCE BOD
July 2018	MAWG provides recommendations to SVCE Staff
August 2018	SVCE staff compilation of C&I customer recommendations
August 2018	Rocky Mountain Institute (RMI) reviews and critiques draft roadmap
September 2018	SVCE staff deliver high-level draft roadmap to SVCE BOD
September 2018	SVCE combines input from MAWG, WFL and CPAG with SVCE staff roadmap strategy and hosts design charrette with RMI for additional stakeholder feedback
October-November 2108	SVCE staff revise roadmap and circulate penultimate draft among key stakeholders for refinements
December 2018	SVCE staff submit final roadmap to SVCE BOD
December 2018	SVCE BOD approves decarbonization roadmap
January 2019	Roadmap implementation begins
February 2020	Decarbonization roadmap annual update

SVCE also engaged with commercial and industrial (C&I) customers. SVCE began conducting Watts for Lunch roundtables in December of 2017 to serve as a peer-to-peer forum for soliciting C&I customer feedback on electric vehicles, building electrification, energy storage, and other decarbonization efforts. “It’s a very engaged group and they are an important part of our customer base. We really value their perspective,” said

Supp. “We meet quarterly for two or three hours to discuss different topics and their feedback was incorporated into our roadmap.” This increased communication was built on preestablished lines of communications. While the residential-focused CPAG was a new effort for SVCE, the CCA’s engagement with C&I customers started before SVCE was created. As early as 2015, Bray began working with leading C&I customers and representatives from various local governments who worked together to form SVCE.

“SVCE has a large and diverse customer base and not every entity has the same goals for sustainability or decarbonization. Many businesses are primarily looking at their bottom line so decarbonization isn’t something they necessarily care about compared to making changes that will cost more. So, these forums help to talk through what everybody’s concerns are,” said Asim Tahir, District and Renewable Energy Lead for Google. “In the sessions that Google participated in, we presented our perspective and other businesses presented their perspectives. We discussed a whole spectrum of values and goals, and I think it helped SVCE to balance it all and communicate things not just through the lens of decarbonization, but also through additional concerns their customer base has.”

Concurrent with the CPAG and Watts for Lunch C&I efforts, the Member Agency Working Group continued to meet to flesh out their own set of ideas. “We had several meetings for brainstorming, consolidating, and voting to decide which ones we found most valuable. The communities represented in our group were of varying sizes and in different stages of their own local climate planning. We had a wide perspective on what people felt would be most attractive and beneficial to their communities,” said MAWG representative Melody Tovar, Regulatory Programs Division Manager for the City of Sunnyvale. “When we talked about these things, SVCE was very good about helping to set timeframes for us. As much as we were talking about a strategic plan, they were also sensitive to understanding it as a dynamic landscape and they wanted our input about what to do next as we worked on figuring out what to do within the next three years to move in the direction of our own climate action playbooks.”

Meanwhile, Balachandran, Bray, and their colleagues were laying the groundwork for creating an overarching decarbonization roadmap. The keystone of their efforts was recruiting Aimee Bailey to serve as Director of Decarbonization and Grid Innovation to lead the endeavor starting in June 2018. “When I joined, our overall strategic plan called for developing customer programs and for creating a framework for describing why we would offer some programs and not others, but it wasn’t necessarily fully decided whether or how to include emission reduction targets,” said Bailey. Her primary task was to weave the feedback and outputs from the concurrent advisory group efforts into a comprehensive and coherent strategy for achieving SVCE’s emission reduction targets alongside its other big picture goals.

Bailey quickly began to engage with stakeholder groups one at a time to establish relationships and to integrate their feedback. While she recognized the value generated by these parallel and independent efforts, she also saw the importance of reaching out to a broader stakeholder community and bringing everyone together with a common vision. To advance that objective Bailey and her SVCE colleagues organized a design charrette⁶ in September 2018, facilitated by Rocky Mountain Institute’s (RMI) e-Lab group, which brings together thought leaders and decision-makers to address critical challenges requiring collective action through multi-stakeholder workshops. The meeting was an all day, hands-on, rapid ideation and problem-solving workshop involving SVCE and RMI representatives as well as a select group of 30 academics, industry thought leaders, entrepreneurs, community stakeholders, residential and commercial customers, regional agencies, and clean energy practitioners (Figure 2). Participants offered feedback and coaching on the draft

⁶ Charrettes are facilitated meetings with a variety of stakeholders to discuss goals and outcomes, concerns, potential issues, and other considerations.

decarbonization roadmap, assessed emerging trends, created conceptual designs for future customer programs, and identified important stakeholders for potential working relationships.

Figure 2. Roadmap charrette workshop participants



“We’ve had a really good relationship with SVCE from day one. They’ve been very open to suggestions and eager to help decarbonize our corporate operations. So, when they came up with the idea of doing the design charrette, we were happy to participate,” said Rolf Schreiber, Energy Strategy Program Manager for Real Estate and Workplace Services at Google. “In terms of execution of the charrette, it was well done. They got together a large, diverse set of stakeholders and gave us a lot of latitude to brainstorm ways in which SVCE could have impact. Out of that brainstorming on different tracks, they distilled down what their roadmap is going to be and how they’re going to approach it. Throughout the process I’ve felt SVCE has an open-door policy and they engage stakeholders without preconceived notions about what outcomes should be. That really helped a lot.”

Schreiber’s colleague from Google, Asim Tahir, agreed. “I liked how they focused not on just technologies or programs, but on meaningful solutions that don’t necessarily need a lot of funding or changes in technology,” he said, while also giving a nod to the way the charrette was facilitated. “Sometimes when an organization that’s creating a program runs its own workshop it can stifle the creativity of the participants. So, I liked the way they brought in a third party to facilitate the workshop since it allowed participants to point out things that perhaps SVCE was prioritizing that the customers didn’t necessarily feel were valuable. The fact that they were willing to open up some of their goals to feedback, scrutiny, and criticism made it a stronger working group since all the participants felt that their perspectives were taken into consideration even if it wasn’t on the agenda.”

With feedback from the different stakeholder groups in hand, Bailey and her SVCE colleagues synthesized the roadmap and disseminated it among stakeholder groups during October and November 2018 to solicit further input and refinement prior to presenting it to the SVCE Board for review. On December 12, 2018, the SVCE Board formally adopted the Decarbonization Strategy and its Programs Roadmap along with an accompanying

budget of \$6,025,000 for the 2019 and 2020 fiscal years. They also adopted accompanying revisions to SVCE’s CCA-wide Strategic Plan that established 2025 and 2030 GHG reduction targets based on the 2017 GHG inventory.

Since the initial adoption of the roadmap, SVCE has continued to update the document. “While it guides our overall strategic approach to meeting our targets, we treat it as a living document. We added programs in 2019 and more in 2020, and we briefly revisited the entire portfolio,” said Bailey. “We’re learning a lot as we’re deploying programs in the field, so iteration and course correction are a part of how we operate.” Those iterations emphasize the strength of the initial document. Both the overarching vision and the underlying strategic framework of the roadmap make it possible to remain focused on the end goals, while revising the modular programmatic components to adapt to changing conditions.

4. Roadmap and Decision-Making Framework

The process of creating the decarbonization roadmap resulted in three significant outcomes: 1) a framework for strategic decision-making, 2) the strategic roadmap itself, and 3) a series of programs and initiatives designed to accomplish SVCE’s goals and objectives. The decision-making framework and the roadmap are discussed below, while some of the programs and initiatives associated with the decarbonization roadmap are discussed in the Roadmap Implementation section that follows.

4.1 Decision-Making Framework

To guide strategic planning and decision-making, SVCE created a three-part framework to help the CCA to determine what to do, how to leverage, and what to prioritize. The first component of the framework identifies the primary types of activities that SVCE will pursue as it implements the strategies and efforts outlined in the decarbonization roadmap (Table 2).

Table 2. Primary Types of Activities

	Developing products and services to decarbonize and meet customer needs
	Increasing awareness of electrification and actions to reduce emissions
	Coordinating with local and regional agencies to promote and improve local, regional, and statewide decarbonization policies
	Partnering with industry actors and others to encourage innovation and market transformation

The second component of the framework highlights the most important strengths that SVCE can leverage to increase its effectiveness (Table 3).

Table 3. Points of Leverage

 <p>Partnerships</p>	<p>Forming partnerships with member agencies, fellow CCAs, regional and statewide agencies, customers, and others</p>
 <p>Innovation</p>	<p>Encouraging innovation to accelerate carbon reductions and improve customer community service</p>
 <p>Data</p>	<p>Using data driven analysis to guide planning, implementation, and measurement and evaluation</p>

The third component of the framework establishes five criteria for evaluating and prioritizing the decarbonization strategies and program concepts under consideration (Table 4).

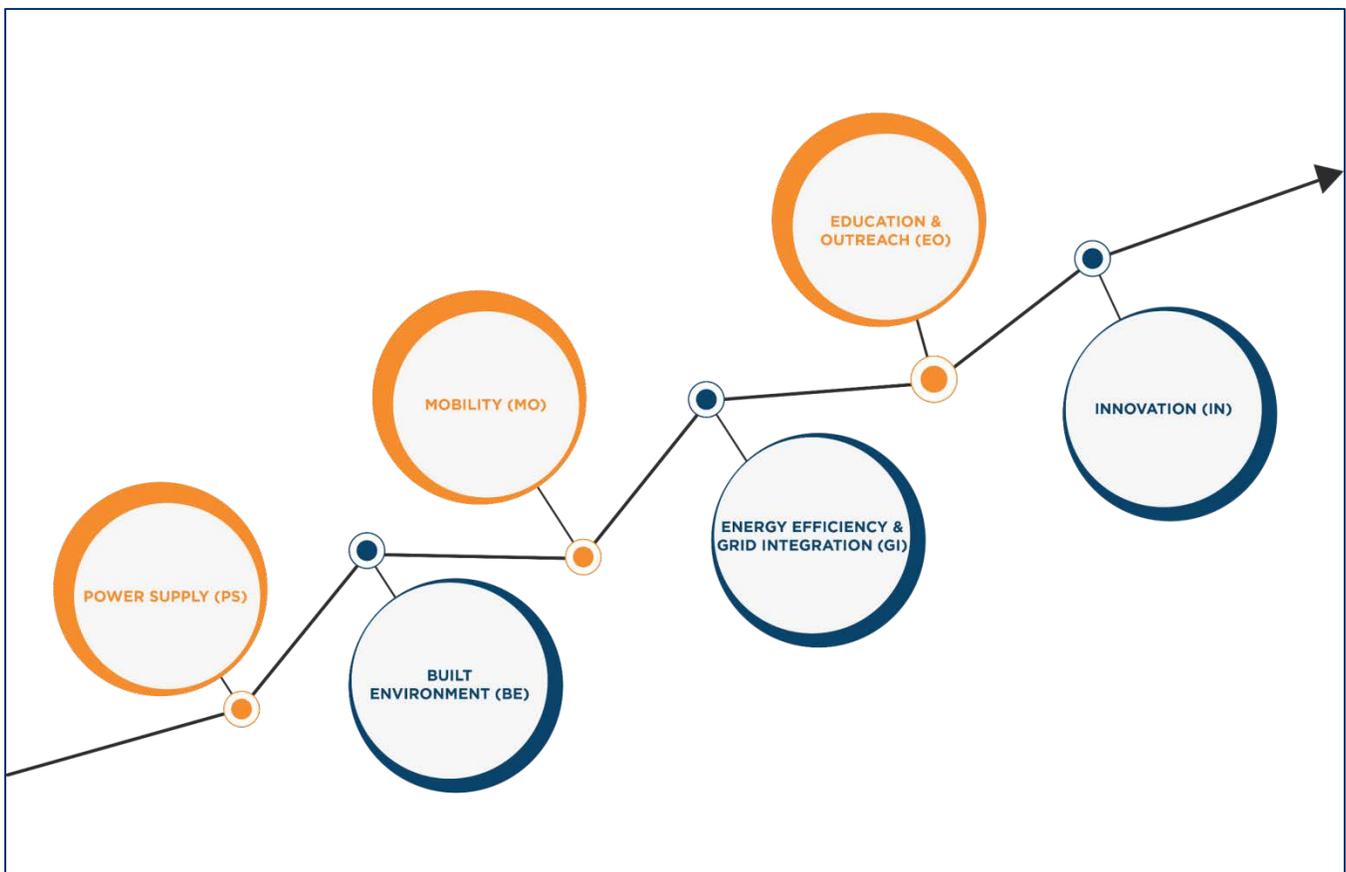
Table 4. Criteria for Evaluating and Prioritizing

 <p>Emissions Impact</p>	<p>Reducing emissions: Prioritize activities with greatest emissions reduction potential</p>
 <p>Customer & Community Value</p>	<p>Providing value: Deliver value to customers and community through programs and initiatives</p>
 <p>Core Role for SVCE</p>	<p>Aligning with core role as CCA: Recognize opportunities play a key role as community-owned electricity provider</p>
 <p>Scalable and Transferable</p>	<p>Having scalability and transferability: Ensure impact within and beyond service territory</p>
 <p>Equity in Service</p>	<p>Striving for equity of service: Balance activities to reflect the diversity of customer base and geography</p>

4.2 Strategic Roadmap

While the decision-making elements of the framework provide guidance for SVCE to make decisions and set priorities, the heart of the decarbonization roadmap focuses on a series of interrelated strategies for achieving objectives that will help SVCE to accomplish its big picture goal of carbon reductions. SVCE initially grouped these into four primary categories: 1) carbon-free power supply; 2) electrification of the built environment; 3) electrification of transportation, referred to as “mobility;” and 4) energy efficiency and grid integration. Before long, SVCE recognized that it wanted to include additional objectives that did not fit neatly into its original four categories. So, it expanded the initial categories to address two more cross-sector areas: 5) innovation; and 6) outreach and education (Figure 3). An overview of each of the roadmap’s primary categories, including objectives and the strategies for achieving them, is provided below.

Figure 3. SVCE Decarbonization Roadmap Strategies



4.2.1 Power Supply (PS)

The power supply component of SVCE's decarbonization roadmap focuses on two main objectives: achieving a sustainable, affordable, and carbon-free power supply; and aligning SVCE's clean power pricing with economic and environmental costs to encourage smart investments that support decarbonization and the grid. To accomplish this, the roadmap outlines four strategies:

- 1) **PS1: C&I Clean Power Offerings** - Develop, market, and sell additional SVCE power offerings to address large C&I customers seeking to buy clean power at competitive rates.
- 2) **PS2: Retail Rates Assessment** - Carry out comprehensive assessment of retail rates to develop a multi-phase plan for improvements and developments of pilot rates.
- 3) **PS3: Integrated Resource Plan** - Develop a comprehensive strategy for supply portfolio (for example, percent of renewable portfolio standard, short- vs. long-term contracts, local resource carve-out, etc.).
- 4) **PS4: Local Renewables** - Research the availability and price for local resources and evaluate the costs and benefits of procurement.

4.2.2 Built Environment (BE)

The primary objective for the built environment component concentrates on accelerating high-efficiency, all-electric new construction and retrofits. It sets forth seven strategies for accomplishing this, including:

- 1) **BE1: Reach Codes** - Hire a technical consultant to support a joint reach code initiative between SVCE and Peninsula Clean Energy (PCE) to facilitate the development, adoption, and implementation of reach codes calling for building electrification and EV charging infrastructure.
- 2) **BE2: All-Electric Showcase Awards** - Incentivize and showcase all-electric commercial and residential building projects.
- 3) **BE3: FutureFit Heat Pump Water Heater** - Provide rebates to fuel-switch natural gas water heaters to heat pump electric water heaters, funded through a Bay Area Air Quality Management District grant.
- 4) **BE4: Streamlining Community-Wide Electrification** - Survey and review local city policies (codes, permitting, inspection, incentives, etc.) and develop model policies and processes.
- 5) **BE5: Workforce Training & Development** (approved April 2019) - Support workforce training and development to encourage the transition to all-electric buildings and EV charging infrastructure development in the built environment.
- 6) **BE6: Building Decarbonization Joint Action Plan** (approved Jan 2020) - Work with member agencies to create an SVCE-wide building decarbonization joint action plan that prioritizes future incentives, permitting, codes, rates, and other activities.
- 7) **BE7: Resilience at Community Facilities** (approved Jan 2020) - Work with member agencies to analyze and develop a program to support energy resilience at community facilities.

4.2.3 Mobility (MO)

The primary objective of the mobility component of the roadmap is to accelerate the electrification and transformation of transportation in SVCE's member communities to reduce emissions and provide other benefits such as reduced congestion. This section of the roadmap calls for eight different efforts. It also overlaps with the EV component of the joint reach code initiative discussed under Built Environment above. The mobility strategies include:

- 1) **MO1: EV Charging Infrastructure Strategy and Plan** - Create an SVCE-wide EV readiness and infrastructure strategy that considers permitting practices, ordinance/reach code integration, siting, technology types, public versus dedicated access, and rate design.

- 2) **MO2: California Electric Vehicle Infrastructure Project (CALeVIP)** (awarded Aug 2019) - Work with the California Energy Commission and local partners to launch a regional incentive program with \$12M in funds committed to SVCE territory for shared Level 2 and public DC fast charging.
- 3) **MO3: Priority Zone DC Fast Charging (DCFC) Incentives** (approved Sept 2019) - Competitive application to receive an additional incentive (on top of CALeVIP) for DCFC in “priority zones” that support nearby SVCE-designated multifamily housing clusters.
- 4) **MO4: Multi-Unit Residential Charging Technical Assistance** (approved Sept 2019) - Technical assistance and help applying for pertinent CALeVIP rebates for charging at multifamily housing properties.
- 5) **MO5: Small/Medium Workplace Charging Technical Assistance** (approved Sept 2019) - Technical assistance and help applying for pertinent CALeVIP rebates for charging at small and medium workplace properties.
- 6) **MO6: Fleet Electrification Grants** (approved Sept 2019) - Competitive applications for SVCE’s fleet electrification planning support and funding for site upgrades. Targeting a broad set of fleet types to create widely applicable fleet electrification planning templates.
- 7) **MO7: Silicon Valley Transportation Electrification Clearinghouse** (approved Sept 2019) - Regional group of key stakeholders focused on information sharing, solving critical issues, and attracting external funding to the SVCE community in support of EV infrastructure deployment.
- 8) **MO8: Regional EV Leadership Recognition** (approved Sept 2019) - Recurring recognition for best practices in EV infrastructure deployment, and support for local organizations in taking next steps.

4.2.4 Energy Efficiency and Grid Integration (GI)

The Energy Efficiency and Grid Integration portion of the roadmap focuses on educating the community about energy efficiency, electrification, and renewables, as well as on promoting the integration of new and existing electric loads into the grid. To accomplish this, SVCE plans on pursuing two distinct strategies:

- 1) **GI1: Virtual Power Plant** - Support “virtual power plants” made up of cloud-based collections of customer-sited distributed energy resources (DERs) to support grid integration and monetize value from connected, controllable loads.
- 2) **GI2: Non-SVCE Programs** - Promote existing, non-SVCE led energy programs through the Customer Resource Center and other channels.

4.2.5 Innovation (IN)

To accomplish SVCE’s objective of encouraging innovation to accelerate decarbonization, the CCA is working on two strategies:

- 1) **IN1: Innovation Partners** - Engage with key strategic partners to participate in the local innovation ecosystem to prototype novel program ideas and provide a voice for SVCE customers and the decarbonization mission.
- 2) **IN2: Innovation Onramp** - Provide small grants to support innovation through pilot projects with external partners.

4.2.6 Education & Outreach (EO)

SVCE is working on two strategic efforts to educate and engage customers and member agencies about specific ways to manage their energy usage and electrify their vehicles, homes, and businesses:

- 1) **E01: Customer Resource Center** - Develop a customer resource center to raise awareness and enable engagement, education, and action related to understanding energy usage as well as vehicle and building electrification.
- 2) **E02: Community Engagement Grants** - Partner with local organizations in under-reached customer segments to promote SVCE accomplishments and programs.

5. Roadmap Implementation: Programs and Initiatives

With its six primary categories and 25 different strategic initiatives, the SVCE decarbonization roadmap is a complex plan that organizes and communicates SVCE's preferred approaches, while recognizing SVCE's position as an influential yet singular actor in a rapidly evolving ecosystem. "It's an incredibly interrelated and interconnected approach. We tried to apply holistic systems thinking to hone in on what is really needed to achieve our climate targets," said Bailey.

The depth of thinking behind the roadmap becomes apparent when you notice the many ways the seemingly distinct strategic efforts support and reinforce each other. "Some of the efforts when looked at individually might not seem like the best investments since they don't appear to return anything on carbon savings immediately, but they are foundational to unlock the next thing that will actually yield the results we're seeking," explained Supp.

5.1 Program Examples

The All Electric Showcase Awards (BE2), one of SVCE's early efforts, focused on education and outreach by providing financial awards ranging from \$3,000 to \$6,000 to showcase existing all-electric commercial and residential building projects. This allowed SVCE to compile case studies with photographs, narratives, and associated information about cost, energy, and carbon savings. Paying people who have already made the effort to decarbonize might seem counterintuitive at first glance. However, the photos, stories, and home and building details gathered through the showcase awards were highlighted in a variety of marketing and education materials, including a prominent section of the SVCE website⁷ to provide ideas and inspiration to municipalities, developers, and other stakeholders who SVCE was cultivating to advance its joint electrification reach code effort with PCE.

⁷ <https://www.svcleanenergy.org/all-electric-award/>

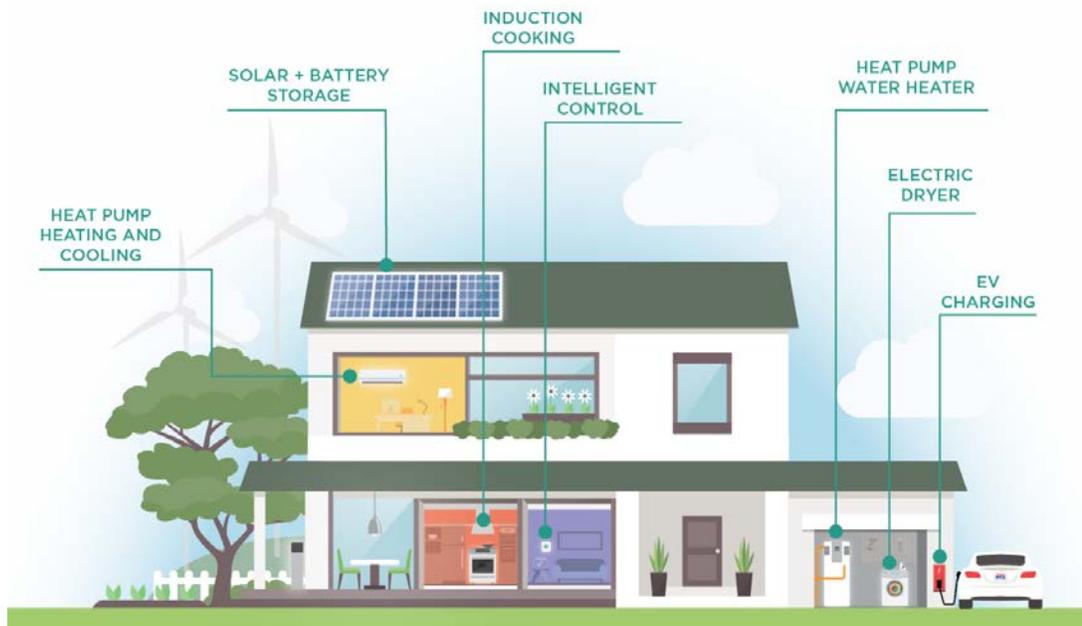
Figure 4. Sampling of All Electric Showcase Award Winners



Likewise, the SVCE FutureFit Heat Pump Water Heater program (BE3) provides higher rebates than neighboring entities with similar programs. It offers 90 market rate customers and 10 California Alternate Rates for Energy Program (CARE)/Family Electric Rate Assistance (FERA) customers incentives of \$4500 and \$6000 respectively to fuel-switch natural gas water heaters to heat pump electric water heaters by paying for the installation of the water heater and a 200-amp service panel upgrade. These generous incentives reflect a deliberate decision to speed participation and help local contractors, homeowners, and political allies to obtain practical experience with the new technology and gain the confidence necessary to support the electrification reach code effort. The program has other goals as well, including stimulating market demand and supply chain participation, and serving as a research opportunity to collect data on hourly customer usage patterns to prepare new innovative rate designs and demand management solutions.

Encouraging the installation of grid interactive heat pump water heaters also fits within SVCE's larger FutureFit Home initiative (Figure 5), which supersedes the installation of singular end-use technologies with a vision of a comprehensive whole home approach. The initiative is focused on creating all-electric homes with solar panels and battery storage, heat pumps for heating and cooling, heat pump water heaters, induction cooking, electric clothes dryers, and electric vehicle charging — all under grid interactive control, so that customers can better visualize and manage their energy use. These intelligent control capabilities will also be rolled up into a Virtual Power Plant (G11) pilot program that will create FutureFit communities with fleets of distributed energy resources that can be aggregated and dispatched to shift load, optimize energy usage, reduce emissions, and lower customer bills.

Figure 5. SVCE FutureFit All-Electric Home



These strategic initiatives also overlap with the mobility portion of the decarbonization roadmap. Both the built environment and the mobility sections of the roadmap emphasize reducing market barriers to electric vehicle adoption, particularly in multifamily and low-income housing communities. They also overlap with an Innovation Onramp (IN2) effort that focuses on developing new models for EV charging stations in multifamily dwellings. Likewise, an energy storage partnership with Sunrun (GI1) concentrates on affordable multifamily housing projects.

The multifamily EV charging efforts demonstrate how SVCE strives to incorporate innovation into as many program elements as possible. Its Innovation Partners (IN1) and Innovation Onramp efforts are specifically designed to encourage entrepreneurs and industry leaders to pitch ideas on how to address technical, economic or policy risks and achieve decarbonization targets. “Rather than always deciding in advance what solution we want, we find it helpful to broadly frame the problem and then solicit potential solutions for how to address it,” said Bray. “It’s a deliberate way to welcome new ideas and cultivate new partnerships.” While this crowdsourcing approach to problem-solving can work anywhere, it is particularly apropos in Silicon Valley given the high number of technology companies focusing on areas relevant to the issues SVCE is addressing.

For example, SVCE recognized the crucial need to expand access to electric vehicle charging in multi-unit housing complexes. Bray describes the problem as an equity issue since 39% of SVCE customers live in multi-unit housing, yet only 9% of EV drivers live in multi-unit housing. SVCE called for innovative pilot solutions to provide reliable, affordable EV charging to multifamily residents and decided to offer funding for two pilots. Ecology Action, an implementer based in Santa Cruz, is installing 10 EV charging ports at two multifamily properties that rent to low- and moderate-income residents. They are using trained workers from underrepresented communities to do the installations and encouraging more EV ownership by reaching out to tenants to inform them of EV incentives that can help reduce costs. Meanwhile, EVmatch, a peer to peer network that connects EV drivers with charging opportunities, will fund the installation of four WiFi-enabled Level 2 EV charging stations at multifamily properties. The charging stations will be listed on the EVmatch platform, making them reservable by tenants for at home charging as well as for charging by the public. The EVmatch software will also enable different charging schedules and pricing according to customer type.

While these represent a handful of SVCE decarbonization initiatives and customer programs, almost every element of the roadmap relates to other elements. “Everything we're doing on the built environment and mobility strives to incorporate connectivity and control, so it's not just helpful for advancing decarbonization,” said Bailey. “It's also important for customers to better manage their retail bills, and for forming a virtual power plant.”

5.2 Coordinating with Other Entities

Because the decarbonization roadmap is so broad it also overlaps with the projects, activities, and service territories of other entities. This includes municipal utilities, PG&E, BayREN, nearby CCAs, the Bay Area Air Quality Management District (BAAQMD), the Building Decarbonization Coalition, Joint Venture Silicon Valley, and many others. Those overlaps present opportunities for SVCE to partner, collaborate, avoid, or alter their decarbonization efforts in relation to the efforts of the overlapping entities.

“If you look at our strategies for energy efficiency, you will notice they are rather sparse. That was deliberate because there are a lot of energy efficiency programs out there that our customers are already paying for and are eligible to participate in. Likewise, there are other actors who are providing products and services to our customers,” said Bailey. “When we spoke with our stakeholders about programs that they wanted, we also talked with them about what we should *not* be doing, since it did not make sense for us to duplicate those efforts.”

SVCE studied the programs PG&E, BayREN, and others were offering to avoid overlap, but they also looked for opportunities to cross-promote the programs of other entities. For instance, SVCE's heat pump water heater program aligned with efforts by BAAQMD, so the air quality district awarded SVCE a climate action grant that provides one-for-one matching funds to increase customer incentives and drive participation. Moreover, SVCE's heat pump water heating program overlaps with a program recently started by BayREN. As a result, the two entities have been coordinating to ensure customers participating in the BayREN program are not double dipping to take advantage of SVCE incentives. Further coordination is also being discussed for a regional midstream incentive program focused on contractors, rather than residential customers.

Recently SVCE joined with Peninsula Clean Energy and San Jose Clean Energy to secure a State of California block grant through the California Electric Vehicle Infrastructure Project (MO2, MO3, MO4, MO5) worth \$33 million. The block grant will supplement \$26 million in co-funding from the three CCAs to launch a regional EV incentive program in conjunction with the California Energy Commission and local partners. The block grant yields \$12 million in additional incremental financial support to fund the installation of shared Level 2 and public DC fast charging within SVCE territory.

One of the most successful decarbonization partnerships SVCE has conducted is the 2019 collaboration with Peninsula Clean Energy on a Joint Reach Code Initiative (BE1) that encouraged and supported their member agencies to develop, adopt, and implement building electrification and electric vehicle reach codes. As a result of the initiative, 17 out of the 34 local governments in the two CCA service territories have passed reach codes that exceed California's Title 24 statewide building energy efficiency and green building standards as of September 2020. These reach codes encouraged or required the use of all electric appliances in buildings, prohibited natural gas end uses, and/or specified enhanced requirements for electric vehicle charging. In fact,

the 17 local Bay Area governments that passed reach codes as a result of the initiative represent over half (17/32) of all municipalities in California that have adopted building electrification reach codes to date.⁸

Furthermore, the cities of Palo Alto and Santa Clara, which fall geographically within the boundaries of the SVCE service territory but are served by municipal utilities, piggybacked on the joint reach code initiative's RFP for a technical consultant and hired the same team to aid in their own reach code efforts. Palo Alto has also engaged with SVCE on its innovation strategies by serving on an evaluation panel for SVCE's Innovation Onramp (IN2) grant making efforts.

In yet another example of SVCE's collaboration, the CCA is building on the success of its reach code initiative with a follow-up effort to streamline community-wide electrification (BE4). The new effort focuses on assessing member agency policies (codes, permitting, inspection, incentives, etc.) related to all the FutureFit technologies. The plan is to streamline and align permitting and implementation across the entire service territory with shared tools, training, and support for member agency staff. "The first part of the initiative is to help our members benchmark their processes and understand the barriers associated with fuel switching," explained Bailey. "The second part is to develop best practice guidelines that can be applied across technologies and sectors." To accomplish this, SVCE is working with TRC and its Member Agency Working Group.

5.3 Budget

SVCE's Board of Directors formulates the budget for decarbonization strategy and program implementation as 2% of operating revenues. This equates to between \$5 and \$6 million with contractions or expansions depending on annual revenue. Due to the COVID-19 pandemic, the budget has been lower in 2020. However, SVCE still approved a \$10 million supplemental fund that directs approximately \$2.5 million for residential customer relief efforts, including bill credits for low income customers. The fund also provides for \$2.5 million in bill credits for struggling small businesses, and \$5 million to help member agencies evaluate and deploy solutions that enhance community resilience (BE7).

SVCE also leverages external funding sources to help its member agencies. Examples of these external sources include its joint reach code initiative with PCE, the above-mentioned \$325,000 climate action grant from BAAQMD for its heat pump water heater program, the \$12 million block grant funds for the California Electric Vehicle Infrastructure Project, and other co-funding through the Innovation Onramp effort. The CCA also works with its member agencies and partners to apply for clean energy technology rebates from the federal government and incentives from the California Self-Generation Incentive Program (SGIP) that supports the installation of distributed energy resources on the customer's side of the utility meter.

6. Measuring Success

These examples of SVCE's implementation efforts provide a clear demonstration of the roadmap in action. Measuring the success of the overall multifaceted roadmap, as opposed to an individual program or initiative, however, is a complicated endeavor. The ultimate measure of success is whether SVCE meets its carbon reduction targets. "Our overarching key performance indicator is our emissions. We track it on an annual basis and are in the process of doing our 2019 emissions inventory right now," said Bailey. While these annual

⁸ For additional information see: *Peninsula Clean Energy and Silicon Valley Clean Energy Joint Reach Code Initiative: Group B, Deliverable 33 Case Study 3*, Tierra Resource Consultants and Opinion Dynamics, California Public Utilities Commission, 2020, <https://pda.energydataweb.com/api/downloads/2442/Group%20B%20D33%20Case%20Study%203%20Reach%20Codes%209-28-20.docx>

emissions inventories track incremental progress, it will be years before SVCE expects to achieve its ultimate goals.

In the meantime, SVCE tracks a host of interim metrics tied to individual programs and initiatives. “We look at program performance, cost effectiveness, and different outcomes, including economic outcomes like job creation or retention, which is especially important given the financial situation associated with the pandemic,” continued Bailey. “We also look at customer experience, including user acceptance and customer behaviors. Some of it is survey based so we can assess satisfaction or awareness levels, but we are also starting to do more digital tracking like if they decide to stop smart charging and go back to regular charging.”

While these metrics are useful key performance indicators, perhaps the most important measure of success for the decarbonization roadmap is how effective the roadmap framework is when it comes to guiding SVCE strategic planning and tactical execution. With that in mind, SVCE board member, Howard Miller, provided some insights. “Now that we have the roadmap, it’s no longer the program or product du jour. It’s a tool that guides our decision-making process by helping us visualize where we are, look at what we’ve achieved, compare one option with another, and decide which ones to pursue to stay on the slope we need to reach our goals and state mandates,” he said.

According to Miller, the Board also keeps financial cost, potential impact, and staff time in mind when making these decisions. “We only have so much money. Instead of giving dividends, we’ve chosen to direct it into programs, so we need to determine which efforts will have the most impact per dollar spent and how much time those efforts will require from our staff,” he said.

Whether considering new program options or reevaluating existing efforts, the SVCE Board refers to its three-part decision-making framework: 1) the types of activities to pursue, 2) key strengths to be leveraged, and 3) the five criteria for evaluating and prioritizing decarbonization efforts (see Decision-Making on page 11 for the full list). To help the Board with the decision-making process, SVCE staff prepare program briefs on all the primary initiatives covered under the decarbonization roadmap. Each two- to four-page program brief follows a consistent template that includes:

- Program summary
- Key challenges
- Goals
- Program approach
- Budget resources
- Required staff support in FTE per year
- Implementation timeline
- Program sector (power supply, built environment, mobility, energy efficiency and grid integration)
- Activity type (products and services, education and outreach, public policy, market transformation)
- Points of leverage (partnerships, innovation, and data)
- Prioritization criteria (emissions impact, customer and community value, scalability and transferability, equity and service, core role of SVCE)

While the value of this decision-making process cannot be directly quantified, the new programs and decarbonization initiatives added to the roadmap since its original inception can be counted. In all, SVCE has added 10 new efforts since the roadmap was originally approved. It has also eliminated or significantly changed four of the original initiatives. For instance, SVCE eliminated the “EV Incentives for Low Income” initiative, which was included in the original decarbonization roadmap, because they found there were already similar incentives being offered by the California Air Resources Board (CARB) and BAAQMD. SVCE reformulated

the “EV Fast Charging Depot” pilot into the “Priority Zone DC Fast Charging” program, which focuses on charging access for multi-unit dwelling (MUD) residents. They also eliminated the related “EV Charging for Multi-Unit Dwellings” effort since the subsequently added CALeVIP program addresses the same things while also providing technical assistance. Lastly, the All-Electric Showcase effort eliminated its incentives for all-electric new construction and is now limited to only the all-electric showcase awards. This decision arose out of the success of the reach code effort and because offering incentives did not make the short list of offerings SVCE stakeholders wanted in the new Building Decarbonization Joint Action Plan.

When the roadmap was conceived, the original intention was to formally update it every one to two years. While that still happens, it has become a flexible model that is revised as needed. “It’s a huge amount of work for staff to update it. So, we’ve gone to a continuous flow in our planning,” said Miller. “If something turns out to not be a good idea or it’s just not going to work, they can hit pause and let the Board know since we don’t want to waste time on it.” Likewise, promising opportunities arise that must be acted on quickly, such as responding to a grant opportunity, releasing a new request for proposals (RFP), or signing a new partnership agreement.

The decarbonization roadmap has had other successful influences beyond guiding the SVCE strategic decision-making process, as well. “All the pieces are integrative and additive so there is a lot that doesn’t necessarily show up in standard metrics or calculations,” said Supp. “It’s been really helpful to have the Board, our internal community, and our stakeholders focused on a common vision. I think that’s gone a long way to helping us set goals and align everyone’s efforts.”

That common vision was one of the primary purposes behind the drive to involve so many stakeholders in the process of developing the roadmap. The fact that SVCE member agencies now use the roadmap in their own planning processes provides further evidence of SVCE’s success. “We used the SVCE roadmap to guide our decisions regarding framing when we updated our climate action playbook in 2019,” said Tovar from Sunnyvale. “We looked at many strategies, including clean energy, decarbonization of transportation and buildings, and land use. We had good direct links back to see what they were thinking. Our reach code process and resiliency programming is also leveraging their efforts.”

7. Barriers and Opportunities

For CCAs and other organizations who want to pursue a similar decarbonization roadmap, the main elements for success include: 1) clear and ambitious goals, 2) a stakeholder driven process to identify desired outcomes, 3) a decision-making framework that includes criteria for inclusion and guidelines for prioritization, 4) a cohesive set of interrelated strategies and programs; and, 5) and an appropriate budget to support implementation. Although this list encapsulates the main ingredients necessary for an effective decarbonization roadmap, the SVCE representatives and others that we interviewed also shared some thoughts about the challenges they encountered, what worked well, and where they saw opportunities for improvement during future roadmap efforts.

“With 20/20 hindsight I might wish we put more resources in earlier to move things even faster,” said SVCE CEO, Balachandran. “But at the time we were still putting our financial house in order and we didn’t want to commit too much to programs before building our financial strength and creating a clear strategy. Now we’re in a better financial position and we’ve laid the groundwork to move ahead quickly.”

Bailey also found insights in retrospection. “One of the things we didn’t do was hire outside help. Aside from working with RMI on the design charrette, we handled everything ourselves. It was an intense and time-consuming process,” she said. “Reflecting on it now, I think it would have been helpful to bring on a consultant to help us get things done.”

She also had one other observation. “One of the challenges we had was not so much with creating the roadmap but with execution. Being such a young organization and having our customers not being aware of us affected the traction we’ve been able to have in the market,” Bailey added. “As we’ve been creating customer facing programs, we’ve faced an ongoing challenge that people don’t know that they are our customers. They still think they are just PG&E customers, so we have to explain who we are while we’re trying to launch programs. Our marketing and outreach materials need to include more information about who we are, and we need clear references for folks to find out more so that they can trust that we’re a legitimate organization. That’s been humbling.”

The hurdles for program enrollment have also been compounded by the fact that many of SVCE’s decarbonization efforts are focused on emerging technologies. “A lot of these technologies like heat pump water heaters are low on the adoption curve. So, we need to design our pilots to collect preliminary data before finalizing our approaches. And even if things are ‘final’ they are still subject to change as needed,” said Supp. Fortunately, in this case, circumstance plays to a SVCE strength: its propensity for rapid iteration and pivoting.

That willingness to reassess and quickly change is an important trait that complements the roadmap. The roadmap is a guide and not the terrain itself. It cannot reflect the full truth on the ground. “There are always going to be hurdles that need to be overcome, so the question is how does the strategy or tactic evolve. The models of yesterday won’t get you to tomorrow,” said Tahir of Google. “One of SVCE’s strengths is that they have the ability to think differently and reinvent and rethink.” Successful or not, they recognize that there is little time to rest on their laurels. “They set ambitious goals and they have less than 20 years to get there. So, they keep going up to the 30,000-foot strategy level and then diving back down into the trenches to get things done. It’s a continuous iterative process,” Tahir added.

Tahir also pointed out another attribute associated with SVCE’s decarbonization roadmap that seemed to counterbalance Bailey’s remarks regarding the need to build familiarity and trust among unfamiliar customers. “Many businesses and cities are looking to clean energy and decarbonization as a way to meet their sustainability goals and SVCE is providing ways to help them realize their decarbonization visions,” he said. “SVCE is in a unique position of being a public entity. So, when it comes to policy initiatives for decarbonization their voice carries more weight than the voices of many for-profit entities since there can be a skepticism about for-profit companies with people wondering if they are acting for the public good or not.” SVCE’s earnest desire to serve the greater good carries considerable weight once it is recognized.

Melody Tovar of Sunnyvale sounded a similar theme. “They’ve been a tremendous resource. They recognize that they aren’t the local decision-makers regarding land-use, transportation, or the built environment, but they help us evaluate and shape things. They also act as a conduit to connect the community and collaborate on mutual goals,” she said.

According to SVCE board member, Howard Miller, one of the keys to success has been getting everything and everyone literally on one page. “Creating a one slide graphic (Figure 1) that summarized the problem of meeting the State’s mandates and our individual member agency goals by showing how much transportation, electricity, and natural gas were contributing to our emissions was the key. Until we got that it was hard to talk with some of my fellow board members. It really helped us own the problem,” he said. “I know we’re just a little CCA and that we don’t own the whole carbon curve, but the State’s goals are so big that someone has to step up and claim responsibility, whether that’s at the local or regional level. That one slide did that for us by making it clear what we have to do for our part to bend the curve, and the roadmap gave us a vision for how to accomplish it.”

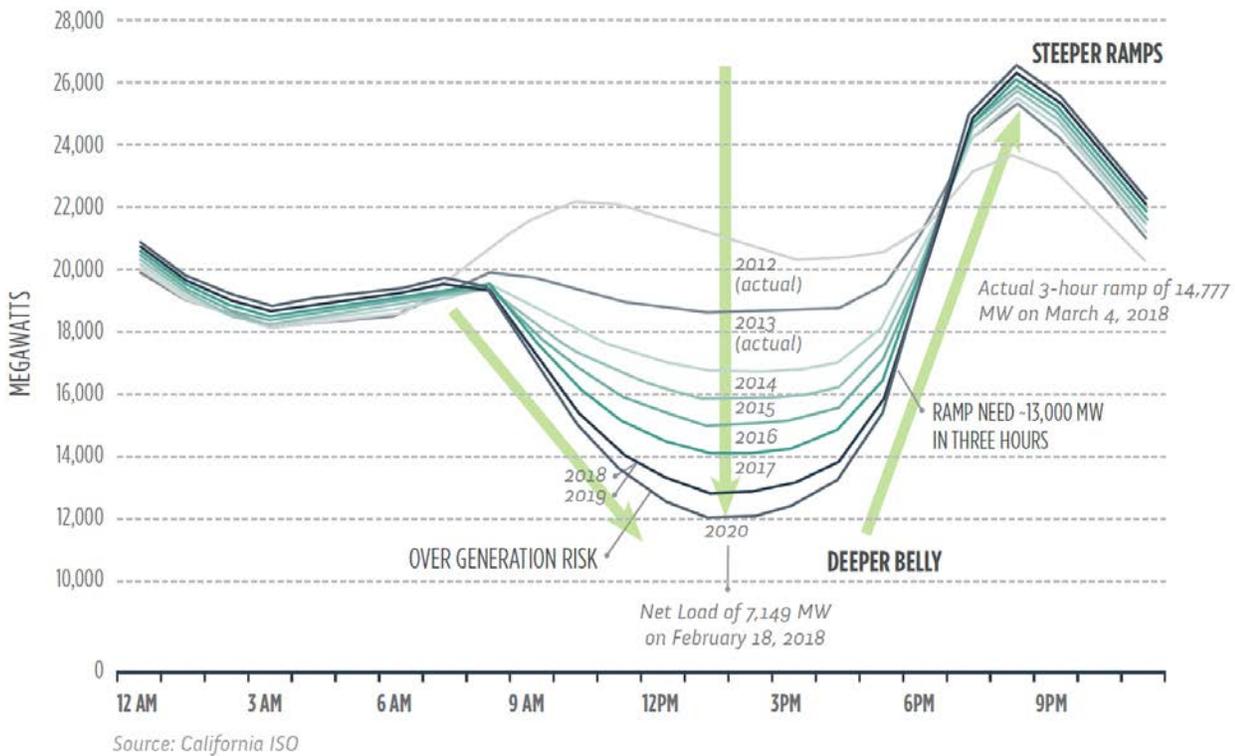
8. Next Steps

While the decarbonization roadmap lays out the big picture approach, SVCE needs a more detailed strategy to coordinate the activities within the built environment. To address this, they are currently engaged in a more refined strategic planning exercise to develop a Building Decarbonization Joint Action Plan (BE6) with their member agencies. The goal is to create a plan for the CCA and its member agencies that aligns and prioritizes incentives, permitting, codes, rates, and other activities. The effort is modeled after a similar joint action plan for electric vehicle infrastructure (MO1) that was adopted in 2019. As SVCE did when preparing the big picture decarbonization roadmap, this joint action plan will be based on extensive stakeholder engagement to solicit input from member agencies, customers, developers, advocacy organizations, PG&E, other CCAs, and state agencies. The process will use stakeholder workshops, webinars, and targeted one-on-one interviews. The resulting feedback will be included as SVCE drafts a communitywide building decarbonization strategy that spans all building types and uses.

Although the Building Decarbonization Joint Action Plan will address and align all SVCE's building decarbonization efforts, it will have a major emphasis on decarbonizing existing buildings. "In 2019 we focused on reach codes for new construction because we wanted to time the effort to align with the statewide code updates. That was important, and it's going to generate meaningful carbon reductions going forward, but now we're focusing on retrofitting existing buildings," said Bailey. "That's going to be a much bigger effort since our service territory is very built out and a lot of buildings have natural gas."

Another important new strategic focus will be reducing time-based emissions. Although reducing annual GHG emissions are central to SVCE's mission, goals, and the majority of its decarbonization roadmap methodologies, time dependent carbon emissions are now of growing importance. Building decarbonization and transportation electrification will help SVCE and its member agencies to meet their emission reduction goals but will also increase electricity demand and dependence on the grid. Like much of California, electricity usage patterns in SVCE's service territory form a "duck curve" (Figure 6) with high concentration of solar energy in the middle of the day that provides plentiful and inexpensive renewable generation but also causes a steep ramp in electric demand in the evening as solar production declines and residential customers return home. That steep ramp when renewables are not available often requires the use of fossil-fuel-fired electric generation that sends carbon emissions higher.

Figure 6. Typical Spring Day Electric Load Curve for California



SVCE is laying the groundwork to provide 100% clean energy on an hourly basis. The first step was working with Gridworks to carry out a stakeholder options analysis⁹ for its Virtual Power Plant (VPP) initiative (GI1). Through the VPP effort SVCE is considering potential options that will take advantage of the increasing tools and technologies that can automate grid interactive participation of customer owned DERs (for example, smart thermostats, energy management systems, electric vehicle chargers, inverters, and smart devices) to optimize, prioritize, aggregate, and dispatch electric load for load shifting, ramp smoothing, peak reduction, voltage regulation, and other grid benefits. While no decisions have been made regarding new program designs, several options were under consideration, including: a real-time pricing pilot rate,; peak day pricing for commercial and industrial customers, demand response auctions to aggregate DERs for resource adequacy, a program to incentivize customers to shift load, and a distribution service model that would optimize DERs to provide grid services and wholesale market products.

9. Key Takeaways

The SVCE Decarbonization Strategy and Programs Roadmap provides an excellent example of a comprehensive and integrated set of decarbonization strategies designed to ensure carbon-free power supply, electrify buildings and transportation, encourage energy efficiency and grid integration, and promote innovation and active customer engagement. More importantly, it represents a feasible, replicable, and

⁹ https://gridworks.org/wp-content/uploads/2019/08/GW_Silicon-Valley-Clean-Energy-report.pdf

scalable model for use in other regions. Best practices and lessons learned from this initiative include the following:

Best Practices

- **Act like you own the problem.** The first step to achieving a goal is accepting responsibility for its completion. California's carbon reduction mandates are so big that they can be overwhelming. But SVCE and its member agencies are partnering with customers and stakeholders to take ownership of their individual emissions and sustainability targets as they collectively strive to meet California's ambitious goals.
- **Try to get everyone on one page.** Literally. One of the keys to SVCE's success has been its ability to visualize their carbon reduction goals and the pathways for achieving them in a single graphic that succinctly conveys the urgency of the task and the most appropriate paths for accomplishing it. Doing so made it possible for SVCE board members, customers, member agencies, and other stakeholders to align with a shared vision and timeline, and to see their own roles in accomplishing it.
- **Do not focus on decarbonization alone.** While decarbonization of SVCE's power supply, built environment, and transportation systems was the centerpiece of what SVCE was targeting, it was not the only goal of its new customer programs. Other important factors included promoting energy efficiency and grid integration, delivering value to customers and community, and stimulating innovation.
- **Remain open to new possibilities.** SVCE engaged in the roadmap development process without preconceived notions about outcomes or the means of achieving them. SVCE's willingness to invite feedback, scrutiny, and criticism fostered more effective collaboration by making participants feel their thoughts were taken into consideration. As a result, the roadmap that emerged was more comprehensive, better integrated, more responsive to market needs, and ultimately more achievable.
- **Craft coordinated strategies to increase their effectiveness.** With six primary categories and 25 different strategic initiatives and programs, the SVCE decarbonization roadmap is a complex set of distinct, yet interrelated efforts that reinforce and build upon each other. For example, individual initiatives, such as the All-Electric Showcase and the FutureFit heat pump water heater program, generated awareness and support for the larger electrification reach code initiative for new construction. Moreover, the heat pump water heater effort also served as a forerunner for the FutureFit home concept that will encourage decarbonization in existing buildings. This innovative concept will promote the installation of all-electric grid-interactive distributed energy resources that can be monitored and controlled by individual customers and dispatched by SVCE or a third-party provider in order to drive time-dependent carbon reductions.
- **Establish clear criteria to guide decision making.** A strategic roadmap provides guidance on how to reach a desired endpoint, but the journey cannot begin until the path is chosen. SVCE needed a framework to guide its strategic planning and decision-making process. The CCA created a three-part framework to help decide which options to prioritize and how to leverage its strengths. SVCE places the greatest emphasis on efforts that: 1) reduce emissions, 2) deliver value to customers, 3) align with the CCA's core role as community-owned provider of carbon-free electricity, 4) strive for equity of service, and 5) demonstrate scalability and transferability within its service territory and beyond.

- **Build consensus.** SVCE has a large and diverse customer base, and not every entity has the same goals for sustainability or decarbonization. To increase cooperative participation, SVCE gathered feedback from a wide variety of stakeholders, including residential and commercial customers, local government representatives, experts, and advocates. They also took steps to circulate a penultimate draft among key stakeholders for refinements before final approval by the SVCE Board of Directors.
- **Know your role.** One of SVCE's guiding principles is to stay true to its core role as a CCA providing carbon free electricity. As a public entity chartered to serve the greater good, its voice carries significant weight with customers, stakeholders, and local community leaders. Nonetheless, SVCE recognizes that one of its main strengths lies in coordinating and advising others, while the ultimate purview for decision-making often resides at the local or individual level.
- **Expand your reach and your budget with strategic partnerships.** Due to the broad, encompassing nature of the decarbonization roadmap, it overlaps with the projects, activities, and service territories of local, regional, and state entities. Those overlaps present opportunities for SVCE to partner, collaborate, or alter their decarbonization efforts relative to the initiatives of the respective overlapping entities. SVCE has established strategic relationships with its member agencies and neighboring municipal utilities. These include Peninsula Clean Energy, San Jose Clean Energy, BayREN, Bay Area Air Quality Management District, Building Decarbonization Coalition, Joint Venture Silicon Valley, and others.
- **Plan to iterate.** Treat the roadmap as a living document with periodic updates. Since the initial adoption of the roadmap, SVCE has continued to update it based on new information, new opportunities, and changing market conditions. Such iterations demonstrate the strength of the overarching vision and the underlying strategic framework that facilitate consistent focus on the end goals while revising the modular programmatic components to adapt to changing circumstances.
- **Be deliberate about driving innovation.** SVCE emphasizes innovation and partnerships across its varying initiatives. One especially effective approach is to broadly frame the problem and invite bright ideas for forward-thinking solutions. While this crowdsourcing approach can yield innovative approaches anywhere, it is particularly apropos in Silicon Valley given the high number of technology and service companies engaging with the issues that SVCE is addressing.

Lessons Learned

- **It is difficult to predict pilot enrollments.** SVCE set modest enrollment targets for some of its pilot initiatives because it can be challenging to predict interest and participation, particularly when it comes to new technologies. Sometimes pilots can be quickly oversubscribed, while other times careful marketing and education may be needed to ensure customers realize they are SVCE customers and that the CCA was created to serve the public good. Fortunately, once people recognize SVCE's position as a public entity, the CCA's advocacy for decarbonization can dispel skepticism about any for-profit motivations.
- **Hire the help you need.** Crafting a comprehensive decarbonization strategy and programs roadmap is an extensive and time-consuming initiative. SVCE staff members recommend that sufficient budgets be set aside to hire consultants to support the initiative, lighten the workload, minimize the time to completion, improve the work product, and increase the likelihood of success.

- **Do not be afraid to fail.** Thinking big and being daring are essential for innovation, but not every effort works out as planned. SVCE recognized this and established a culture that allows for course corrections and rapid iterations to adjust to unanticipated situations or undesirable outcomes. In doing so, the SVCE Board of Directors empowered SVCE staff to pause and alter individual initiatives, as necessary. The board also saw the wisdom in allowing updates to the roadmap to occur as needed, rather than only doing so on a fixed annual cycle. For instance, rather than waiting until the first of the year, they are actively working on preparing and finalizing a Building Decarbonization Joint Action Plan that will address and align all SVCE's building decarbonization efforts.

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