

INNOVATION IMPACT REPORT

August 2021

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A MESSAGE FROM

THE CEO & BOARD CHAIR



GIRISH BALACHANDRAN
CEO, SILICON VALLEY CLEAN ENERGY



MARGARET ABE-KOGA
BOARD CHAIR, SILICON VALLEY CLEAN ENERGY

Never before have we seen decarbonization at the forefront of national conversations about energy, let alone a commitment to a clean grid by 2035. California has been the climate leader with bold policies, like SB 100, requiring all energy to come from clean sources by 2045, and now there is a national call to make it happen 10 years earlier. These kinds of commitments were unimaginable not that many years ago.

To achieve our local, state and national goals, we must seek new solutions that are reliable, affordable, equitable, and scalable. We have a lot of work to do to drastically cut carbon to stave off the worst effects of climate change. We must leverage innovation to get us there. When Silicon Valley Clean Energy was formed in 2016, the Board of Directors made a commitment to providing carbon-free energy to our customers. Since launching service in 2017, we have made good on that promise, and cleaning up our power supply has unlocked potential for developing innovative policies and programs that touch every aspect of our organization and community.

Since the adoption of our Decarbonization Programs Roadmap in 2018, we have set out on a path to reduce emissions from power supply, transportation, and the built environment. Innovation is at the core of how we will achieve our goals and cut emissions across sectors. Right before the pandemic, we hosted the GridShift Hackathon because we believe we need rapid ideation to help solve some of our greatest decarbonization challenges. When the resulting economic crisis ensued, our pilots moved forward addressing critical challenges, including increasing reliable access to EV charging for renters in multifamily properties, offering cost savings to local businesses that need access to utility data for clean energy projects, and enhancing community and household resilience through smart electrical panel technologies.

This report highlights some of our key achievements to date with our innovation pilots, several of which are ongoing and being adopted in other regions. We hope that our work unlocks new ways to reduce emissions, and that one day, these pioneering solutions help increase access to clean energy and cost savings for many more ratepayers throughout the state and country.



VISION

FOR THE FUTURE

Our current technologies, institutions, and ways of thinking are inadequate to address the climate crisis. We must evolve rapidly to address the greatest existential threat of our time. This is our vision for the future.

-  Clean, affordable, reliable electricity
-  All-electric, efficient homes and buildings
-  Electrified transportation, including micro-mobility solutions
-  Local resources are grid-integrated and support reliability, decarbonization
-  Resilience solutions and considerations are built-in by design

-  Markets, regulations and business models align to achieve climate goals
-  Streamlined, authorized data sharing unlocks innovation and the digital transformation
-  Communities have equitable access to the benefits of the energy transition

OUR APPROACH TO INNOVATION

We focus on three high-impact interventions to drive the most promising solutions to the climate crisis.



IDEATION

Engage stakeholders to ideate promising concepts and approaches for addressing key challenges and barriers we see in the field.

INNOVATION
PARTNERS



PROTOTYPE & DEMONSTRATION

Engage industry to rapidly pilot new solutions that have potential to scale.

INNOVATION
ONRAMP



COMMERCIALIZATION

Create demand pull through local policy and procurement so climate solutions will flourish.

POLICY &
PROCUREMENT



IDEATION

Innovation Partners

Through the Innovation Partners program, we partner with incubators, accelerators and research institutions to engage with the local innovation ecosystem and provide a voice for our customers and our decarbonization mission.

Highlights:

- Hosted the GridShift Hackathon in Jan. 2020 with support from Powerhouse, and sponsorship from City of Palo Alto Utilities, East Bay Community Energy, Peninsula Clean Energy, and San Jose Clean Energy
- Sponsored the Stanford Cleantech Hackathon and the Powerhouse SunCode Hackathon in Spring 2019
- Regularly engage entrepreneurs outside of organized events and programs to provide industry perspective and feedback



“For many entrepreneurs in clean energy and mobility, piloting and commercializing with CCAs and municipalities is an essential step in validating and scaling their products. From hackathons to startup programs, SVCE is helping to accelerate the growth of new and innovative decarbonization technologies.”

► **Emily Kirsch**, Founder, CEO and Managing Partner, Powerhouse



PROTOTYPE & DEMONSTRATION



COMMERCIALIZATION

GUIDE INNOVATORS



IDEATION

Innovation Onramp

Through our flagship program Innovation Onramp, SVCE provides small grants to external partners to launch promising pilots.

Highlights:

- Over one hundred pilot proposals received from four application cycles over three years
- 12 pilots selected with 13 pilot partners
- Pilot cohorts cover focus areas of building decarbonization, mobility and resilience
- More info on our pilots and impact are included in the remainder of the report



“To more quickly reduce greenhouse gases and respond to public concerns about climate change, it's critical for local agencies, like SVCE, to fund early stage innovations. SVCE is providing a model approach to demonstrate how involvement at the community-level can accelerate the deployment of viable decarbonization solutions.”

► **Jeff Byron**, Band of Angels, Former California Energy Commissioner



PROTOTYPE & DEMONSTRATION



COMMERCIALIZATION

RAPIDLY PILOT





IDEATION



PROTOTYPE & DEMONSTRATION



COMMERCIALIZATION

Policy and Procurement

We work closely with member agencies to support forward-thinking local policies and drive procurement to create an environment where climate solutions will flourish.

Highlights:

- Over \$1.6 billion invested in renewable energy contracts
- Led procurement effort with eight CCAs for up to 500 MW of long-duration energy storage
- Joint SVCE-Peninsula Clean Energy building code initiative to support all-electric new construction and EV charging resulted in 24 local ordinances & an industry award
- Contracted with Sunrun for multiple MWs of behind-the-meter solar+storage capacity for community resilience and grid reliability



“We need urgent action at all levels of government including community energy agencies and local governments to achieve our common goal of transforming the energy system to one that is sustainable, reliable, affordable, and resilient. SVCE and its member agencies are leading partners in addressing the climate crisis by supporting entrepreneurs, adopting forward-thinking local policies such as all-electric building codes, and creating markets for emerging technologies such as long-duration storage.”

► David Hochschild, *Chair, California Energy Commission*

CREATE DEMAND PULL



SUMMARY OF IMPACT



13

Startup Partners



112

Applications Received



\$1.1M

Grants Awarded



\$575,000

Pilot Partner Co-Funding



Our pilot partners have raised over **\$15 million** in follow-on funding from investments, grants, and business contracts.

PARTNERSHIPS

Follow-on funding includes partnerships with Blue Ox Ventures, Energy Impact Partners, Future Energy Ventures, EPRI's Incubatenergy Labs, California Energy Commission, US DOE, National Grid, Fort Collins Utility, Peninsula Clean Energy & MCE

TECHNOLOGIES

Technologies Supported: L1 & L2 EV chargers, electric bikes, smart electrical panels, EV charging reservation platforms, building load management software, EV charging optimization software platform, energy data access platform, electricity data anonymization algorithm



2400+

SVCE customers have benefitted from technologies deployed through our Innovation Onramp pilots



Pilot partners engaged with over **180+** local entities, including CCAs, public utilities, city councils, transit authorities, multi-family property managers, community groups, contractors, and advocacy groups.



Our pilots attracted the attention of major energy news outlets, including **Canary Media**, **Smart Energy International**, **American Public Power Association**, **CleanTechnica**, **Greentech Media**.



Learnings from our innovation pilots have informed over a **dozen** regulatory and legislative proceedings at the federal and state levels, including California, New York, Connecticut, Michigan, and New Hampshire.



HIGHLIGHT #1

RELIABLE EV CHARGING ACCESS FOR MULTIFAMILY TENANTS

Local multifamily tenants make up 39% of households but account for only 9% of EVs. Differences in charging access is one important piece of this discrepancy: property managers face barriers in awareness, funding access, utilization uncertainty, and ability to cover upfront costs. Some site owners are further discouraged from installing charging because they perceive low tenant demand – a chicken-and-egg issue as tenants may avoid buying EVs due to a lack of charging. SVCE has two pilots attempting to address these barriers.



Direct Installation at Lower-Income Housing

This pilot demonstrates a no-cost offer to install EV charging at low- and moderate-income multifamily sites. The program provider costs are minimized by identifying low-power solutions that avoid costly infrastructure upgrades while meeting property operators' needs and connecting residents with EV education and incentives.



Charging Reservation Software

This pilot tests how the ability to reserve charging times can impact the feasibility of multifamily EV charger deployments. Tenants get more certain access to charging, while site owners may see improved utilization and a better economic case.

INSTALLATION LOCATIONS



INITIAL OUTCOMES



30 unique users of EVmatch reservation software and chargers



EVmatch secured **additional funding of \$1.2M** for this approach, including a CEC grant, with SVCE support



Ecology Action has used initial learnings to **inform conversations** with PG&E and CEC staff on future statewide programs



Pilot sites include **over 400 affordable/low-income units**



HIGHLIGHT #2 STREAMLINED DATA ACCESS TO ACCELERATE DECARBONIZATION

The SVCE Data Hive is a flagship pilot with UtilityAPI that makes initiating clean energy projects quicker and easier by providing instant, authorized and secure access to standardized energy data. This project pilots a data exchange platform funded by the U.S. Department of Energy and designed to reduce friction in the market by addressing both the cost and hassle of getting authorized access to customer data, as well as empower customer choice and support local businesses.

INITIAL OUTCOMES

-  **160+** registered clean energy companies
-  **2,085** meters, **\$99M** in bills, and **400 GWh** in data shared
-  Over **\$200k** in **co-funding** and over **\$3.5M** in **follow-on funding**
-  Referenced as the “gold standard” in regulatory proceedings in **four states, D.C., and federally**
-  Set to be the **first certified** retail customer Green Button Connect in the world



“SVCE’s Data Hive pilot built with UtilityAPI is demonstrating how a community-driven approach can accelerate renewable energy deployment. New capabilities like Data Hive foster much-needed collaboration with clean-energy entrepreneurs; create opportunities for them to test, validate, and scale their solutions; and speed their path to market adoption.”

► **Dr. Becca Jones-Albertus**, Director of the U.S. Department of Energy Solar Energy Technologies Office, which funded UtilityAPI’s early development

UTILITYAPI



Since the initial pilot deployment, the SVCE Data Hive has been scaled across the U.S. by a variety of utility and energy agencies for millions of households and businesses.



Multiple additional deployments are in the pipeline for 2021 and beyond



“Data Hive has rapidly become a model for utilities across the country. In our work nationwide, we point to Data Hive as the leading example of a fully-featured data platform with an excellent user experience.”

► **Michael Murray**, President of Mission:data Coalition, a non-profit advocate for data portability in the energy sector.

HIGHLIGHT #3 SMART CHARGING TO LOWER COST & CARBON

Over the course of six months, the GridShift pilot helped SVCE customers save money and emissions by optimizing their EV charging according to their time-of-use electricity rate and California's electricity generation mix. In addition, the pilot trialed low-carbon events over a two-month period, during which participants were rewarded for charging during off-peak hours when average grid emissions were especially low.

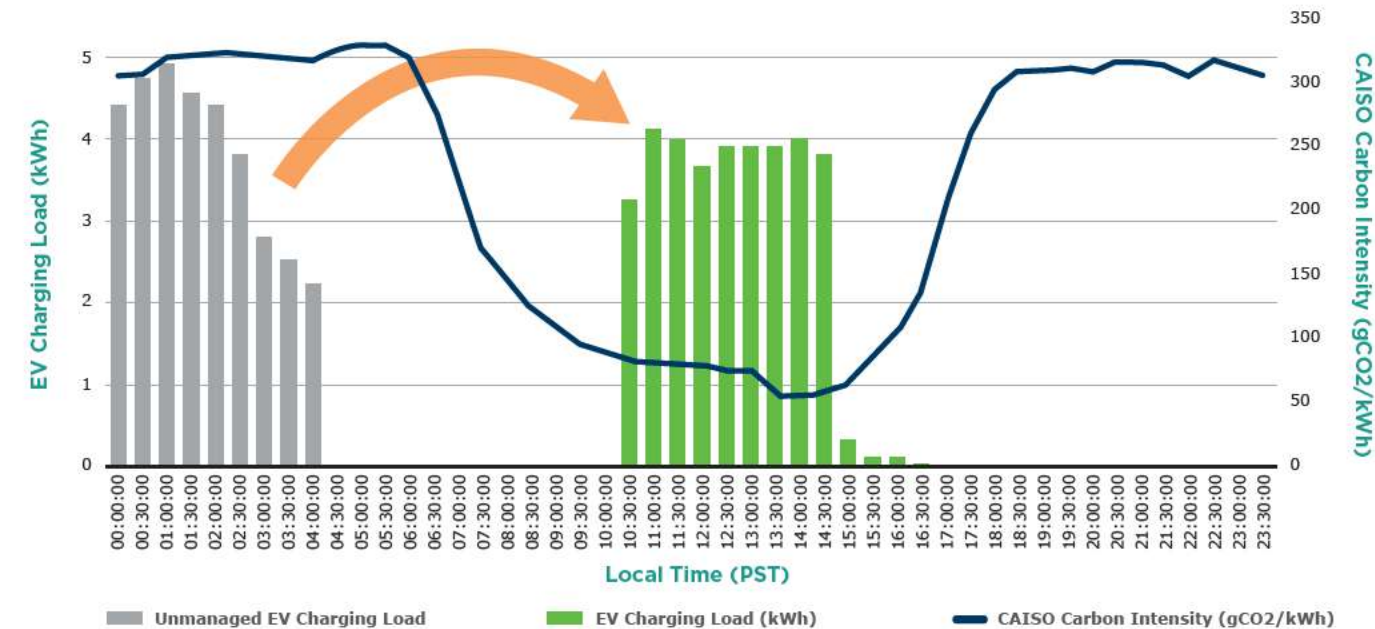


GridShift: EV Charging

Powered by **ev.energy**



Our pilot demonstrated that a telematics-based approach to smart charging **cost 35% less** compared to using networked chargers. Vehicle manufacturers offering telematics APIs can unlock value to their customers and power industry, while helping to achieve climate goals.



This figure depicts how GridShift shifted a participant's EV charging during a low-carbon event to coincide with the lowest emissions hours of the day while remaining within the off-peak period.



The pilot received positive feedback on core app features and functionality, as well as on user experience. Participants saved an average of \$24 per month on energy bills. Low-carbon events helped avoid 4,000 lbs of CO₂, with 70% of participants participating in at least one low-carbon event.

The GridShift pilot was scaled to a full program in summer 2021. In addition to low-carbon events, GridShift will introduce a reliability-focused event season to support grid reliability.



“

As a doctor, GridShift fits my busy and sometimes unpredictable schedule. All I need to do is set a ready-by-time to guarantee that my car will be charged during the cheapest off-peak hours.

► Dora



“

I had to manage the start and stop times manually to ensure that I paid the lowest electric rates. GridShift has taken this hassle away.

► Charles



“

“SVCE's Innovation Onramp program enabled ev.energy to prove its value proposition and technology with one of California's largest CCAs, providing funding and credibility that allowed ev.energy to later sign contracts with other CCAs. Moreover, SVCE served as a forward-thinking and collaborative partner for ev.energy to test out innovative use-cases and propositions, including low-carbon events and grid-reliability events, that can be deployed across California to accelerate decarbonization and grid resiliency.”

► Patrick Elftmann, *Partner at Future Energy Ventures*

ADDITIONAL PILOTS



EMPOWERING HOMEOWNERS WITH HOME DECARBONIZATION SOLUTIONS

Cohort: Buildings

Overview: This pilot will develop an optimized design for a mobile app to engage homeowners to understand their emissions and pursue decarbonization initiatives.

Impact: The SVCE pilot looks to build upon XeroHome's innovative building energy modeling technology originally developed with support from the DOE's Small Business Innovation Research program by making it accessible over mobile devices to a wider audience of homeowners. XeroHome's goal is to provide compelling analysis that shows the value of electrification and decarbonization for each home to its homeowners.

Funding: \$20,000 grant + \$10,000 from XeroHome



SMART SPLITTER TECHNOLOGY TO ACCELERATE DECARBONIZATION

Cohort: Buildings

Overview: This pilot will demonstrate the value of the Smart Splitter device to enable home electrification and EV charging access by eliminating expensive panel upgrades, permits, and electrical work through low-cost retrofits.

Impact: In addition to joining SVCE's first cohort of Innovation Onramp seed grants, NeoCharge was recently accepted into the Wells Fargo Innovation Incubator, a partnership between Wells Fargo and the National Renewable Energy Lab.

Funding: \$20,000 grant + \$7,000 from NeoCharge



DESIGN FOR A LOCAL MARKET TO INCENTIVIZE GRID RESILIENCY

Cohort: Resilience

Overview: This pilot will design a prototype of a new local marketplace where SVCE can procure clean energy services from its customers. The marketplace could be a valuable new revenue stream for owners of flexible technologies, such as batteries, and will therefore help to reduce the cost of resiliency for these consumers.

Impact: The marketplace has the potential to access the capacity of over 250MW currently in SVCE territory associated with EVs, commercial & residential behind-the-meter batteries and solar PV.

Funding: \$75,000 grant + \$60,000 from Electron



SMART HOME ELECTRICAL PANEL

Cohort: Resilience

Overview: This pilot aims to investigate how smart electrical panels can streamline residential solar and storage installations, facilitate household electrification, and create a network of flexible grid assets. The partnership between SVCE and Span has attracted national attention from clean energy industry publications, including Smart Energy International and American Public Power Association.

Funding: \$250,000 grant

ADDITIONAL PILOTS



REDUCING EMISSIONS THROUGH ACTIVE TRANSPORTATION AND MODE SHIFTING WITH E-BIKES

Cohort: Resilience

Overview: This pilot is part of a movement to make California cities safer and more equitable while rapidly reducing greenhouse gas emissions in the process. The pilot outfits income-qualified residents with a new e-bike, safety equipment and accessories, encourages them to choose their e-bikes instead of their car, and advocates for safety improvements to the city.

Impact: In the first two months of the pilot, users on average saw a decrease in their resting heart rate of 12 beats per minute. Over the course of a year, each user has the potential to avoid over 1000 lbs. of CO2 emissions.

Funding: \$69,250 grant + \$50,000 from OutThink



SMART AND RESILIENT SCHOOLS

Cohort: Resilience

Overview: This pilot demonstrates smart building technology that treats any commercial building with a solar array like a battery – whether or not a battery is installed. Smart & Resilient Solar Schools will seek to optimize school facilities' load shape to reduce utility bill demand charges as well as better match on-site consumption and battery charging with on-site energy production.

Impact: In 2021, Extensible Energy and Community Energy Labs raised over \$3.6 million in funding through venture funds, DOE grants, and EPRI's Incubatenergy Labs program.

Funding: \$99,000 grant + \$70,000 from Extensible Energy and Community Energy Labs



SUPPORTING SCHOOLS TO ACHIEVE ZERO OPERATING CARBON EMISSIONS

Cohort: Open Call

Overview: This pilot synthesized recent research and best practices of programmatic solutions for school districts modernizing existing school and college buildings towards zero-carbon operating emissions. Schools that have undertaken actions to go zero carbon have realized adjoining benefits that include reduced utility expenses and increased student health and attendance. Due to challenges in securing commitments from K-12 school and community college districts in the SVCE service territory to participate, the pilot closed early.

Funding: \$75,000 grant (planned), \$11,800 spent before closing



ROLE OF LAND USE AND URBAN FORM IN DECARBONIZING SILICON VALLEY'S CITIES

Cohort: Open Call

Overview: This pilot will investigate how DERs and EVs interact with the built environment and develop a novel framework to measure urban energy efficiency. The Stanford group developed a data anonymization algorithm allowing SVCE to safely share electricity consumption data that feeds into the team's urban building energy model. This algorithm can be leveraged by other CCAs and utilities to unlock valuable data sets for academic research, while maintaining customer privacy.

SVCE and our member agencies have made a meaningful impact on the energy transition. But, our work is just beginning. The impacts of climate change are already being felt in our communities. We must do more to accelerate the commercialization and adoption of climate change mitigation and adaptation solutions to protect our collective future.

Here are some of the steps we plan to take to move forward from here.

OUR OUTLOOK

Focus on communicating and disseminating key results from pilots to relevant stakeholder groups in a clear, engaging manner appropriate to the audience

Consider broadening the geographic scope of innovation activities by partnering with neighboring, mission-aligned community energy agencies and municipal utilities for future calls for applications

Continue to:
Maintain a regular, rapid application cycle that is accessible to entrepreneurs with promising ideas

Focus on equity with innovation program outreach, pilot selection and implementation

Incorporate industry leaders as advisors during the proposal selection process

Leverage third party partners for independent pilot evaluation



APPENDIX IMPACT METRICS & METHODOLOGY

We chose impact metrics and methodologies that are industry standard and most relevant to SVCE’s unique position as a load-serving entity and government agency. The impact metrics are defined below, categorized according to the SVCE Decarbonization Strategy and Programs Roadmap priorities that also guide our Innovation Onramp pilot evaluation criteria. Our goal is to expand our impact metrics to include more local economic and emissions impacts as our portfolio diversifies and matures.

Category	Metric Definition
 Customer & Community Value	CO-FUNDING: Includes external grants, self-funding or labor pilot participants offer to support the work completed under the SVCE grant
	USERS: SVCE customers who actively benefitted from the technology deployed through the innovation pilot
	TECHNOLOGY DEPLOYMENT: Technology that was deployed using SVCE grant funding or deployed because the technology, tools, or analysis funded by the SVCE grant enabled that technology to be deployed
 Emissions Impact	GHG REDUCTIONS: Annual GHG reductions in pounds that results from technology deployments, which may be the result of reductions in consumption of fossil fuels resulting from displacement of electricity from cleaner resources or by shifting loads to periods of lower carbon intensity electricity. These numbers are self-reported by pilot participants
	LOCAL RE CAPACITY & GENERATION: Storage refers to deployed technology that is used to store electricity and renewable energy generation is deployments of resources such as solar or wind
 Scalable & Transferrable	FOLLOW-ON FUNDING: Includes any investments, research grants, loans, awards, additional incubator/accelerator funds, non-profit/gov’t funding support received by the pilot participants received after receiving the SVCE grant
	FOLLOW-ON PARTNERS: Any partners or customers that the pilot participant is providing service to, working with, or received investment from after receiving the SVCE grant that is related to the grant, such as providing similar products and services
	MEDIA ARTICLES & PUBLICATIONS: News articles or stories, case studies, or research publications with mentions of SVCE pilot or are a direct deliverable of the pilot
 Equity In Service	LEADERSHIP AND STAFF DIVERSITY: Reported according to California’s GO 156 Supplier Diversity standards and by the number of women, minority, disabled veteran, and LGBTQ staff in the organization
	IMPACTS TRACKED ACROSS CUSTOMER SEGMENTS: Several metrics listed in this table are further reported by customer segment characteristics (low-income, housing type, etc.) to better track and diversify the distribution of the innovation pilots’ benefits
 Core Role for SVCE	COMMUNITY ENGAGEMENT: Local Bay Area organizations, such as contractors, schools, or local property managers, that were engaged by our innovation pilot partners during outreach efforts, site selections, or contracted for services
	REGULATORY & LEGISLATIVE ACTIVITY: Includes proceedings at the city, county, state, or federal levels that cite the innovation pilot or that was informed by the pilot learnings

APPENDIX

ACKNOWLEDGEMENT & THANKS

On behalf of SVCE, our member agencies and thirteen communities, we would like to specially thank the following people and organizations for their contributions and fellowship on this journey.

Industry experts and thought leaders for contributing their time and knowledge by serving as external evaluators



Sara Chandler
Elemental Excelerator



Mark Tang
*Bay Area Air Quality
Management District*



Ken Alston
*The Climate Pledge
Fund, Amazon*



Mark Hartney
*Breakthrough Energy
Ventures*



Lena Perkins
*City of Palo Alto
Utilities*



Jeff Byron
Band of Angels



Ankit Kalanki
Third Derivative

Our program administrative partners for their support and expertise



And, the pilot partners for their passion, ingenuity, and grit that inspires us all, as well as for their contributions that made these pilots and this report possible.

We give our sincerest thanks to Aimee Bailey who served as SVCE Director of Decarbonization and Grid Innovation from 2018 – 2021. Under her leadership, SVCE has a Decarbonization Programs Roadmap which defines the agency's carbon reduction goals and outlines how we will get there. The innovation programs, pilots and results highlighted in this report are a direct results of Aimee's visionary leadership.



Aimee Gotway Bailey, PhD
*SVCE Director of Decarbonization
and Grid Innovation*





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INNOVATION IMPACT REPORT

Silicon Valley Clean Energy is a not-for-profit, community-owned agency providing clean electricity from renewable and carbon-free sources to more than 270,000 residential and commercial customers in 13 Santa Clara County jurisdictions. As a public agency, net revenues are returned to the community to keep rates competitive and promote clean energy programs. Silicon Valley Clean Energy is advancing innovative solutions to fight climate change by decarbonizing the grid, transportation, and buildings.

Campbell | Cupertino | Gilroy | Los Altos | Los Altos Hills | Los Gatos | Milpitas | Monte Sereno |
Morgan Hill | Mountain View | Saratoga | Sunnyvale | Santa Clara County