



CLIMATE ACTION PLAYBOOK



Sunnyvale

August 2019



Sunnyvale's Climate Action Playbook created by and for the Community

City Manager's Note



The City of Sunnyvale is pleased to release the Climate Action Playbook – a plan for how our community can reduce greenhouse gas emissions and address climate change.

In 2017, the City and community began work to update Sunnyvale's Climate Action Plan (adopted 2014). The Climate Action Playbook is the result of this effort to identify how Sunnyvale will reach the state's ambitious 2050 climate target. Just as a sports playbook identifies a team's winning strategies for achieving success on the field, our Playbook contains winning strategies for how to cut back our carbon emissions.

And just as a sports team relies on the support of its fans, this Playbook represents a collaborative effort between the City and our community. We owe a huge thanks to all who contributed to the process – your creativity and enthusiasm generated a wealth of climate action solutions for our community. Many of your ideas have been incorporated into the Playbook to ensure that it reflects our community's needs and aspirations. Ideas that were not incorporated this time around have been preserved (see *Appendix A: Ideas Roster*), so that we can continue to draw on them for inspiration as we implement the Playbook in the coming years.

Sunnyvale has demonstrated its leadership in climate action through progressive City policies and active community engagement. Yet much remains to be done to reduce our emissions and enhance our resilience to the threats of climate change. The Playbook is the next step to help us take bolder climate actions.

The Playbook is available at the following link:

bit.ly/sunnyvaleplaybook

We look forward to working with you all to take bold climate action and help Sunnyvale achieve its 2050 target.

A handwritten signature in blue ink that reads "Kent Steffens".

Kent Steffens
City Manager

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Executive Summary

Executive Summary

The Climate Action Playbook sets a vision for the City of Sunnyvale to reduce carbon emissions by 2050. As a sustainability leader, Sunnyvale adopted its first Climate Action Plan (CAP 1.0) in 2014 and has already achieved its 2020 greenhouse gas (GHG) emissions target. Now, the State of California has set new targets that move the ball further down the field for deeper emissions reductions of 40% below 1990 levels by 2030 (“40x30”) and 80% below 1990 levels by 2050 (“80x50”).

This Sunnyvale Climate Action Playbook (hereafter “Playbook”) builds upon our past success and integrates new, bold, breakthrough ideas generated by our community. It paves the path for meeting or exceeding the state’s emissions targets of 40x30 and 80x50. To develop the Playbook, we sourced more than 120 ideas from our community (see *Appendix A: Ideas Roster*), worked closely with the CAP 2.0 citizens’ advisory committee, and engaged a consultant team for technical analysis.

Our most recent emissions numbers are from the 2016 season, adjusted to reflect the impact of carbon-free electricity. **With our current line of scrimmage at 28% below 1990 levels, we are well-positioned to meet the state’s 2030 target. However, the path to 2050 calls for steeper reductions in emissions**, even as Sunnyvale’s emissions are forecasted to increase with anticipated growth. State policies on energy, transportation, and GHG mitigation, many of which continue through 2030, will offset these emissions significantly. However, state policies alone are not enough.

Effective local policies and programs are needed to complement state regulations and dramatically shift the trajectory to start decreasing carbon emissions. **To reach 80x50, the City must achieve an interim target of a 56% reduction below 1990 levels by 2030, exceeding the state’s 40x30 target.** This calls for a continued focus on addressing the two largest emissions sources – transportation (54%) and energy (37%) – and for putting in place today the policies that will affect our infrastructure in the coming decades. Local policies are also needed to improve our preparedness for and response to climate impacts and to recover from extreme climate events quickly.

The Playbook lays out six **Strategies** that outline the overarching approach for bold climate action to achieve

the end game of 80x50. Within each Strategy, there are several **Plays** that identify areas for action and measurable targets to define progress (see At-A-Glance on next page). These Strategies and Plays foster innovation to transform the way we power our buildings, travel around the Bay Area, consume goods and services, and empower our community to take individual actions. The Strategies and Plays also identify how we can better adapt to increasing local climate change impacts.

The Playbook also includes **Game Plan 2022, which contains “Next Moves,”** or specific actions, that the City and community can collectively take in the short-term to reduce carbon emissions and improve resilience to climate impacts. Game Plan 2022 is intended to be dynamic and will map out the next moves for three years initially. It will be revised every five years thereafter to account for the changing regulatory context, evolving technologies, behavior trends, and community needs.

Our initial 46 next moves (Game Plan 2022) are planned for implementation over three years between 2019-2022. Some of the next moves will be absorbed and integrated into existing departmental operating or projects budgets. Additional resources needed over the next three years total \$1.39 million in one-time costs, which includes consultant services, temporary staffing, and infrastructure needs, and \$1.47 million in ongoing costs (approximately \$500,000 each year), which includes three additional staff positions and augmenting the City’s ongoing budget for CAP implementation. Resources allocated to implementing the Climate Action Playbook will be refined and finalized as part of the annual process for budget development and approval by the City Council.

Moving forward, the City will evaluate a variety of strategies to fund the implementation of the Playbook (e.g., differential utility use taxes, carbon impact fees) and will establish funding mechanisms customized to our community’s needs.

The issue of global climate change has become increasingly urgent, and **we need action today to create the highest GHG reductions by 2030 so that we can achieve 80x50.** This Playbook provides a path for transforming our community into a resilient and sustainable Sunnyvale through our collective commitment to individual and community-wide action.

At-a-Glance: Pathway to 2050



Strategy 1: Promoting Clean Electricity

Play 1.1	Promote 100% clean electricity	2030 Target: 100% participation in clean electricity 2050 Target: 100% participation in clean electricity
Play 1.2	Increase local solar photovoltaics	2030 Target: 3% of load from local solar 2050 Target: 5% of load from local solar
Play 1.3	Increase distributed electricity storage	2030 Target: 2% of electricity demand stored in batteries locally 2050 Target: 5% of electricity demand stored in batteries locally



Strategy 2: Decarbonizing Buildings

Play 2.1	Reduce energy consumption in existing buildings	2030 Target: 5% of existing homes and businesses receive deep energy retrofit 2050 Target: 30% of existing homes and businesses receive deep energy retrofit
Play 2.2	Support electrification of existing buildings	2030 Target: 20% of homes and businesses completely electrified 2050 Target: 50% of homes and businesses completely electrified
Play 2.3	Achieve all-electric new construction	2030 Target: 100% all-electric new buildings 2050 Target: 100% all-electric new buildings



Strategy 3: Decarbonizing Transportation & Sustainable Land Use

Play 3.1	Increase opportunities for and encourage development of mixed-use sites to reduce vehicle miles per person	2030 Target: 20% reduction in vehicle miles per person 2050 Target: 25% reduction in vehicle miles per person
Play 3.2	Increase transportation options and support shared mobility	
Play 3.3	Increase zero-emission vehicles	2030 Target: 20% of all vehicles on road are zero-emission vehicles 2050 Target: 75% of all vehicles on road are zero-emission vehicles



Strategy 4: Managing Resources Sustainably

Play 4.1	Achieve Zero Waste goals for solid waste	2030 Target: Reduce landfilled garbage to 1 lb per person per day 2050 Target: Reduce landfilled garbage to <1 lb per person per day
Play 4.2	Ensure resilience of water supply	Targets will be defined as per state requirement
Play 4.3	Enhance natural carbon sequestration capacity	Supports broader net carbon reductions
Play 4.4	Promote awareness of sustainable goods and services	Supports broader emissions reductions



Strategy 5: Empowering Our Community

Play 5.1	Enhance community awareness and engagement	Supports all other Plays
Play 5.2	Track and share data and tools	Supports all other Plays



Strategy 6: Adapting to a Changing Climate

Play 6.1	Assess climate vulnerabilities for Sunnyvale
Play 6.2	Protect shoreline area from sea level rise and coastal flooding
Play 6.3	Strengthen community resiliency

Top Climate Actions You Can Take Today



Drive less – walk and ride more. It's good for the air and your health! Use the new Sunnyvale Bike Map¹ to find your best route. And if you need a car, take advantage of State incentives for electric vehicles!

Opt-up to 100% renewable electricity. Take advantage of Silicon Valley Clean Energy's GreenPrime² program.



The Playing Field

A Vision for a Sustainable Sunnyvale

Climate change is a global phenomenon that is affecting the social, environmental, and economic health of communities worldwide. The latest scientific reports demonstrate conclusively that greenhouse gas (GHG) emissions from human activities contribute to a progressively warming climate. The most recent Intergovernmental Panel on Climate Change (IPCC) report (2018) shows that if the current trajectory of GHG emissions continues, even a 1.5-degree Celsius (2.7 degrees Fahrenheit) increase in global temperatures above pre-industrial levels by 2040 could lead to significant threats, including sea level rise, increased wildfires, intensifying droughts, food shortages, and ecosystem damage.

In 2015, the Paris Climate Agreement became the world's first comprehensive climate agreement with the goal of holding the increase in global average temperature to well below 2 degrees Celsius (3.6 degrees Fahrenheit). California's emissions reduction goals for 2030 and 2050 are aligned with the scale of emissions reductions necessary to achieve this goal of the Paris Agreement.

The time to act is now. And local governments, like Sunnyvale, can make bold policy decisions, leverage emerging technologies, and actively engage their communities to mitigate climate impacts. Located in the heart of Silicon Valley, the City of Sunnyvale embodies the spirit of being a socially aware, technologically savvy, ethnically diverse, and actively engaged community. As we witness climate impacts in our community, our City recognizes the need for leadership and action to address the stressors that threaten quality of life across Sunnyvale.

Sunnyvale's planning effort to accelerate climate action is designed to reimagine our community and create opportunities for sustainable growth while moving aggressively toward a fossil-free future.

A Vision for 80x50

- **Sustainable and healthy community that preserves natural resources and runs on clean energy**
- **Mobile and well-connected city, supported by “smart” infrastructure and services**
- **Robust economy that prioritizes community equity and wellbeing**
- **Resilient and prepared community that can adapt to a changing climate**

In setting the course to achieve the state's emissions targets, Sunnyvale will need to balance economic and population growth and an increased demand for City services, all while still meeting our climate goals. This means making a fundamental shift in current patterns of urban development, mobility, building construction, and consumption towards more sustainable, holistic systems. It means initiating high-impact sustainability practices and scaling them across both private and public sectors. It means engaging government leadership, local businesses, schools, community groups, and neighborhoods in coordinated action. Most importantly, it means creating a safe, healthy, and liveable Sunnyvale for all in our community.

We know that evolving conditions mean that we will need to identify new moves in the coming years to continue to reduce emissions. This Playbook provides a framework for us to do so. It clearly defines the end game of reducing emissions by 80% by 2050, identifies key strategies and plays, and sets the ball rolling towards the goal posts.

Together, we can create a sustainable, equitable, and prosperous community by enabling next-generation mobility solutions, enhancing our built environments, investing in cleaner technologies, and minimizing our impact on the natural environment.

Background

Climate Action at the State Level

As a climate action leader, California has continued to demonstrate its commitment to early and aggressive action on climate change. The State Legislature and Governor have adopted ambitious targets to encourage bolder climate action, including statewide GHG emissions reduction targets of reaching:

- 1990 levels by 2020 (Assembly Bill 32, 2006)
- 40% below 1990 levels by 2030 (Senate Bill 32, 2016)
- 80% below 1990 levels by 2050 (Executive Order S-3-05, 2005)

In September 2018, Governor Brown signed Senate Bill 100 into law, setting a state target of 100% carbon-free electricity by 2045. SB 100 also sets interim requirements for 50% renewable electricity by 2026 and 60% by 2030, superseding previously established targets. Also in September 2018, Governor Brown signed Executive Order B-55-18, which establishes a new statewide goal to “achieve carbon neutrality as soon as possible, no later than 2045, and achieve and maintain net negative emissions thereafter.”

Building Upon Sunnyvale’s CAP 1.0

When the City of Sunnyvale’s first Climate Action Plan (CAP 1.0) was adopted in 2014, it set the City on a path toward creating a more sustainable, healthy, and livable community. Since then, the City achieved the state’s target GHG reductions by reaching 1990 levels ahead of the 2020 schedule, through both local actions and state policies. Notably, Sunnyvale has been a driving force for the launch of Silicon Valley Clean Energy (SVCE), a community choice aggregator that provides carbon-free electricity to most of our community.

Although CAP 1.0 helped the City exceed the state’s 2020 GHG emissions reduction target, it was not designed to identify how more ambitious, long-term targets for 2030 and 2050 could be achieved.

To drive progress towards the aggressive emissions reduction targets by 2030 and 2050, City Council adopted Accelerating Climate Action as a Council Policy Priority in January 2017 and directed the development of an updated plan to reflect this Policy Priority.



Staff worked with consultants to build upon the foundation laid by CAP 1.0 and developed this Playbook to guide the City and community in achieving or exceeding the state’s 2030 and 2050 GHG emissions reduction targets.

Setting a New Bar for Leadership

Climate change is a global threat with local impacts. While communities around the world will be affected differently, we all share a collective responsibility to act.

As the heart of the Silicon Valley, what is created in Sunnyvale has influence far beyond its borders. Along with hundreds of cities worldwide, Sunnyvale has signed and endorsed national commitments and charters, such as:

- **U.S. Climate Mayors**, to uphold the commitments enshrined in the Paris Climate Agreement to meet the 1.5 degrees Celsius target; and
- **#WeAreStillIn**, to set a goal for emissions reductions equal to or greater than the U.S. goal under the Paris Climate Agreement.

While one city alone cannot solve the problem of climate change, we can demonstrate that reaching 80x50 is possible. This Playbook reveals how we plan to do our part to sustain future generations. In this way we join leading cities across the globe to realize the ambition of the Paris Climate Agreement.

Our Accomplishments

City Reaches 2020 Target Ahead of Schedule

Since 2008 – when Sunnyvale’s first GHG inventory was developed – the City has experienced significant growth in population, jobs and construction of new buildings. Despite these trends, which historically resulted in emissions growth, the City of Sunnyvale’s overall emissions decreased 12% below 1990 levels in 2016, surpassing the CAP 1.0 goal of reaching 1990 levels of emissions by 2020.

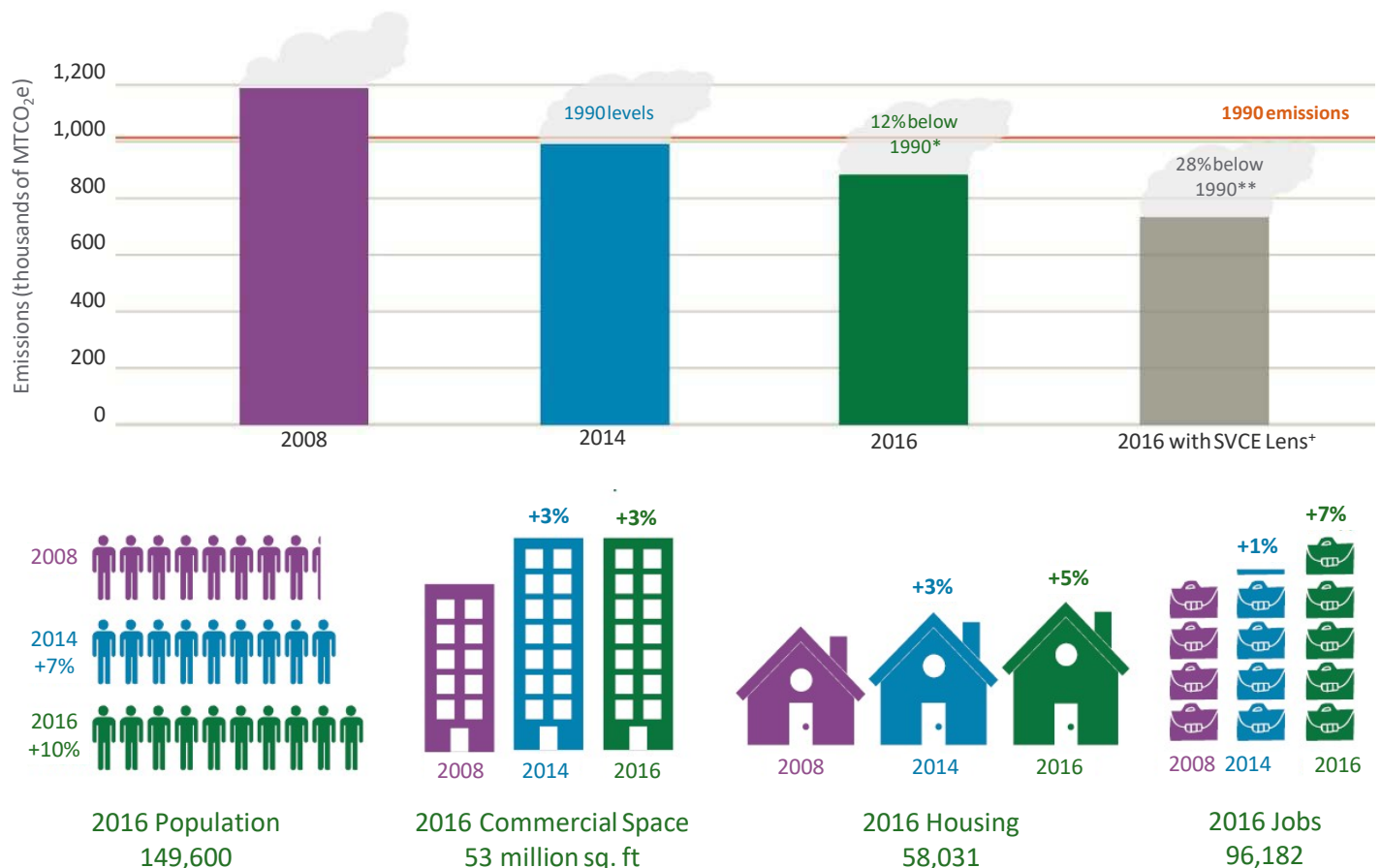
Additionally, SVCE was launched in 2017 and has had an immediate impact. SVCE is the community choice aggregator for Sunnyvale and 12 neighboring communities; they purchase clean electricity on our behalf. Creating such an agency was the action from

CAP 1.0 with the greatest GHG reduction potential. Since SVCE launched, it has provided clean electricity to 97% of Sunnyvale residents and businesses.

If SVCE had been supplying its 100% GHG-free electricity to Sunnyvale in 2016, we estimate that 2016 emissions would have been 28% below 1990 levels – putting our City on its way to achieving the State’s climate target of 40% below 1990 levels by 2030.

The clean energy provided by SVCE is the foundation for the city-wide energy transition Sunnyvale will need across all sectors. The use of carbon free electricity is essential as we shift away from the use of fossil fuels in buildings and transportation through electrification strategies. This is why SVCE is not only an accomplishment to be celebrated from our CAP 1.0, but also one that will continue to be the foundation for actions in this Playbook.

Sunnyvale’s 2016 Accomplishments



*25% below 2008.

**39% below 2008.

⁺ Estimated impact of SVCE by applying 2017 SVCE enrollment data to the City’s 2016 emissions.

Current Emissions

2016 GHG Emissions in Sunnyvale

In 2016, Sunnyvale emitted 880,000 metric tons of carbon dioxide equivalent (MTCO₂e), representing a 12% decrease in emissions below 1990 levels. Prior to the implementation of SVCE, electricity and natural gas consumption in buildings were the largest source of emissions (48%), followed by on-road transportation (44%) and other sources.

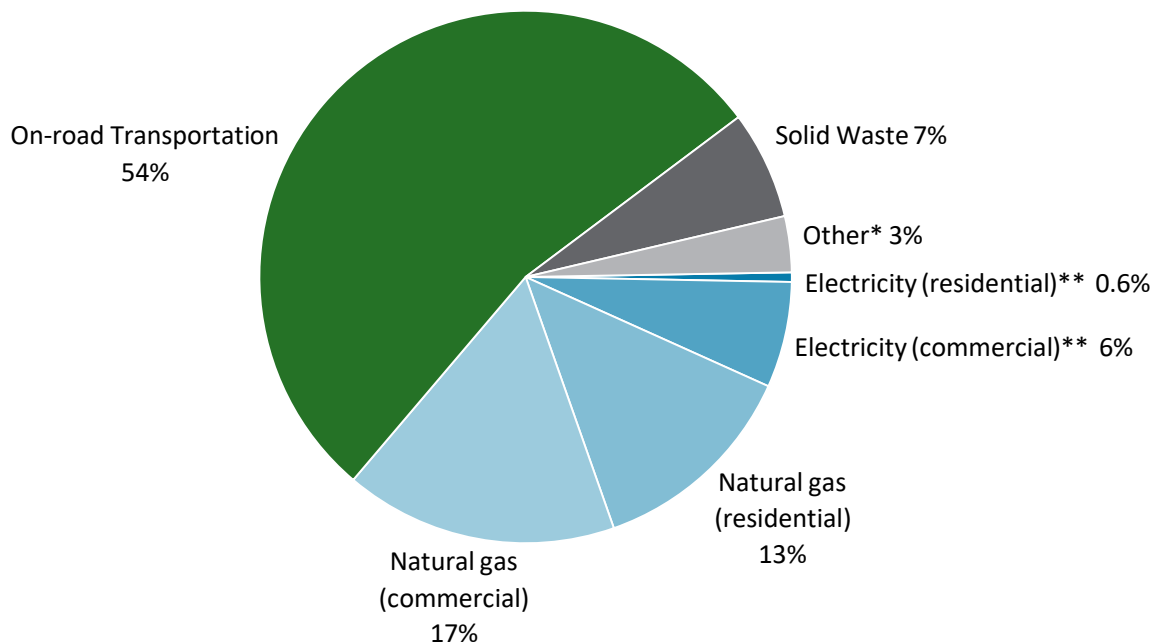
By the end of 2017, however, 98% of Sunnyvale's residents and businesses were purchasing carbon-free electricity from SVCE. Applying these 2017 SVCE participation levels to the 2016 GHG Inventory decreases total emissions to 721,000 MTCO₂e – an additional 16% drop (total 28% below to 1990 emissions) resulting from switching to clean electricity.

The Impact of Clean Electricity

With SVCE, electricity use in residential and commercial buildings now makes up a much smaller portion of total emissions, with transportation now the largest emissions source (54%), followed by natural gas in buildings (30%) and other sources.

As electricity continues to be supplied by clean, renewable sources, the importance of addressing natural gas and transportation emissions increases. The pathway to zero-emission buildings and transportation, therefore, will largely depend on electrification strategies and growing clean electricity supplies, to move the City away from petroleum and other fossil fuel emissions.

City of Sunnyvale Greenhouse Gas Emissions Sources Estimated 2016 Emissions (with SVCE)



*"Other" represents emissions associated with water, wastewater, off-road motorized equipment and Caltrain.

**In 2016, prior to the launch of SVCE, residential electricity made up 4% of total emissions and commercial electricity made up 20% of total emissions.

Future Scenarios: 2030 and 2050

Projecting Future Emissions

To understand the level of action the City must undertake to achieve 2030 and 2050 emissions reduction targets, it is necessary to consider how projected growth, state policies and existing efforts will impact future emissions.

As shown below, City of Sunnyvale's GHG emissions are forecasted to increase over time by 2050. This is despite key initiatives at the state and local levels to make electricity, buildings and cars less carbon intensive.

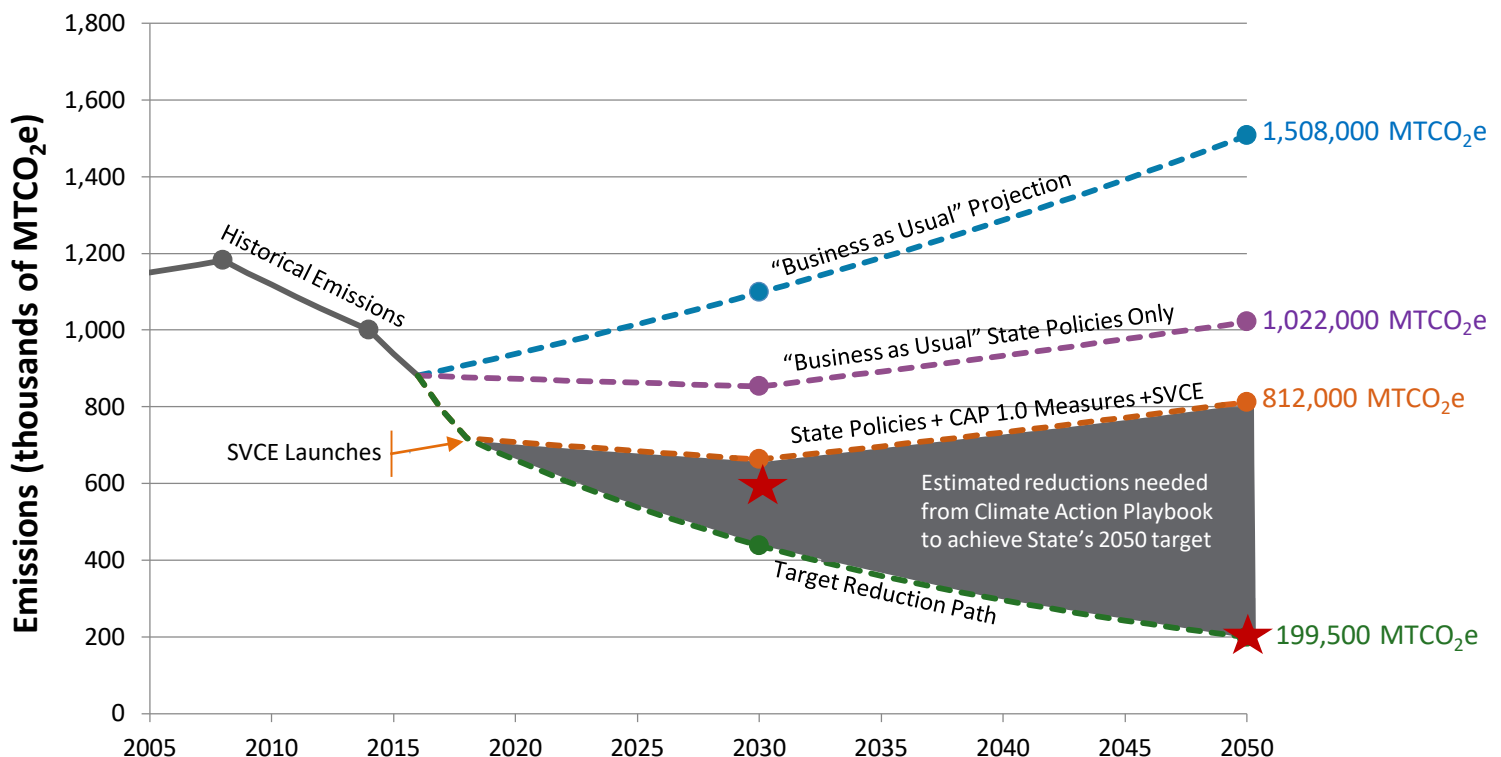
Key state policies and programs include:

- Renewable Portfolio Standard (Senate Bill 350, 2015)
- Title 24 of California Building Standards Code
- Advanced Clean Cars Program (offered by California Air Resources Board, 2012)

These state policies generally address emissions through 2030, after which without further state and local action, emissions are forecast to increase through 2050 due to anticipated growth.

CAP 1.0 measures currently being implemented by Sunnyvale are also included in the analysis, including the full implementation of SVCE. The grey shaded area indicates additional emissions reductions needed from City action to achieve its end game of 80x50.

Early action is critical to setting Sunnyvale on a path to achieving 80x50, especially considering the projected growth in population and jobs. **For this reason, it is important that Sunnyvale achieve a reduction of 56% below 1990 level emissions by 2030 – surpassing the State's goal of 40% reduction by 2030.** The programs and infrastructure critical to achieving the 2050 goal must be in place and well underway by 2030 to put the City on the 80x50 trajectory.



The business-as-usual (BAU) forecast utilizes Sunnyvale-specific growth projections from the City's Land Use and Transportation Element (LUTE), adopted in 2017. These growth projections are available through 2035 when the City is projected to achieve complete buildout. This BAU forecast, however, assumes continued growth in the absence of future projections between 2035-2050.

★ = State Targets: 40% by 2030; 80% by 2050

Future Scenarios: 2030 and 2050

A Path to 80x50

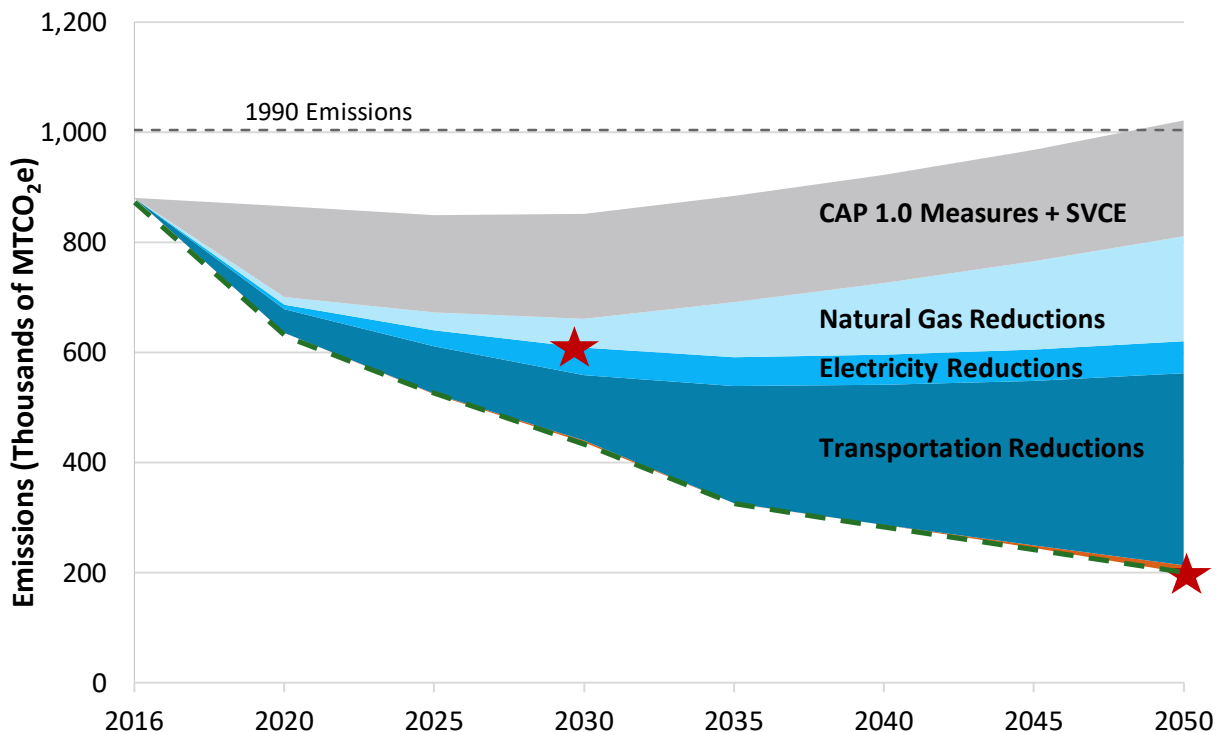
The City must take action to reduce emissions from four key sources – natural gas, electricity, transportation fuels and waste – in order to achieve its goal of carbon neutrality by 2050. While action is needed across sectors, some sectors may need more than others. Evaluating different scenarios for reducing emissions is valuable for understanding how actions result in GHG reductions and for guiding the selection of strategies to focus on in the coming decades.

To develop Sunnyvale’s Playbook, we explored the emissions reduction potential for each sector (shown below; see *Appendix B: Technical Background*). This scenario analysis incorporates the many existing City initiatives, including CAP 1.0 implementation of SVCE and the new FoodCycle (food scraps collection) program. The upper bound represents the adjusted business-as-usual scenario, where anticipated emissions are offset until 2030 by state policies and programs. Each “wedge” in

the chart, identified by a different color, represents the reductions needed from different sectors. The largest emissions reductions needed are in the transportation sector, followed by natural gas use in buildings.

The Playbook identifies strategies, plays, and measurable targets to achieve the emissions reductions related to each emissions source.

The scenario presented below shows the City exceeding the State’s 2030 target of 40% below 1990 levels on the path to achieving the State’s 2050 target. Aiming for emissions well beyond the 2030 State target is essential to being able to achieve the 2050 State target. Early actions help avoid higher cost approaches to retrofit and rebuild, and can have lasting impacts. Early action also has the greatest potential to inspire actions in other communities, amplifying the positive impact of Sunnyvale’s commitment to accelerating climate action.



★ = State Targets; 40% by 2030; 80% by 2050

GHG reductions in the waste sector (orange sliver below Transportation) constitute <3% of total emissions reductions needed to achieve 80x50.



Six Climate Strategies for the Win

Introduction to the Playbook

Sunnyvale’s Playbook engages the enthusiasm of Sunnyvale’s community, innovation of local technology companies, and creative can-do Silicon Valley spirit to create an aspirational, achievable and adaptable plan. It lays out a framework of overarching key strategies designed to be used by the City and the community to plan and implement long-term climate actions. This framework readies the field for Sunnyvale’s long-term GHG emissions reduction targets to meet or exceed the state goals of 40% by 2030 and 80% by 2050 (“80x50”).

Reaching 80x50 – or carbon neutrality – is our “end game.” In the context of reducing emissions, the target of 80x50 is generally considered to be aligned with carbon neutrality, with the potential for remaining emissions to be addressed through sequestration.

The Playbook lays out the pathway that can be followed to achieve our *end game*, hereafter referred to as “80x50”:

- **Six key Strategies** for Sunnyvale to reduce fossil fuel consumption and greenhouse-gas emissions, as well as enhance resilience and adapt to climate change.
- **Eighteen Plays** associated with key strategies, that specify a plan of action. Where possible, Plays are associated with *measurable targets*, which will be tracked and reported in progress reports.

Following the Plays is our “*Game Plan 2022*,” a compilation of the **Next Moves** to be taken by the City in the next three years. The Game Plan of Next Moves will be revised every five years thereafter to be sure we stay on track with the Plays and reach the end game.

Our Team

- **Sunnyvale’s local government**, including all City departments.
- **Community members** who live or work in Sunnyvale.
- **Regional Agencies and Organizations**, such as Silicon Valley Clean Energy (SVCE), Valley Transportation Authority (VTA), County of Santa Clara, and Valley Water, among others.
- **Private Sector**, including large corporations, small businesses, technical consultants, contractors, manufacturers of clean technologies, start-ups, funders, and technology incubators.
- **Non-Profit Organizations** that provide support for grassroots community engagement initiatives.

End Game in 2050

- **80x50:** We are seeking to reduce emissions 80% by 2050. Remaining emissions could be sequestered within the city or nearby through projects such as urban forestry, marsh management, or applying compost to our soils.

Strategy 1: Promoting Clean Electricity



Path to 2050

Community-wide electricity can be supplied by different providers, including investor-owned utilities (like PG&E), wholesale electricity markets (used by some businesses), and by local building-scale projects, such as rooftop solar photovoltaic (PV). Sunnyvale has made tremendous progress in reducing emissions in this key sector by launching a community choice energy program, which combines the collective buying power of a community to procure power directly from electricity suppliers. With the launch of SVCE in 2017, 98% of Sunnyvale's residential and commercial accounts receive carbon-free electricity.

Our success with SVCE will help us move the ball down the field faster than state requirements, as outlined in:

- Senate Bill 350, requiring all utilities in the state to source 50% of their electricity from renewable energy by 2030, and
- Senate Bill 100, committing California to 100% carbon-free electricity by 2045.

Moving forward, the City will seek to encourage and promote the use of carbon-free electricity sources from all energy providers. Electricity-related emissions have already reduced approximately 76% by moving from conventional PG&E electricity (left bar) to SVCE's carbon-free electricity. The remaining emissions are associated with electricity procured from other electricity providers and from conventional (not carbon-free) sources. The City will continue to work on shifting these remaining emissions to carbon-free sources by working with large purchasers of electricity that buy electricity from wholesale markets (i.e., direct access customers).

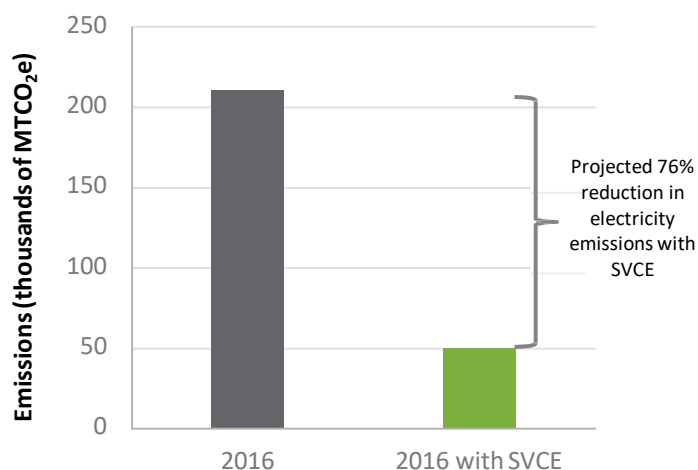
In addition to grid-supplied electricity, the City of Sunnyvale has the opportunity to leverage the falling cost of GHG-free distributed energy resources, such as solar photovoltaic (PV). Currently, approximately 1% of Sunnyvale's electricity comes from locally generated solar PV. Increasing local investments in distributed energy resources, such as solar PV, particularly when combined with on-site energy storage, may enable buildings to be self-sufficient during power outages, thereby enhancing resilience to climate-induced extreme

	Targets	
Play 1.1: Promote 100% clean electricity	2030:	100% participation in clean electricity
	2050:	100% participation in clean electricity
Play 1.2: Increase local solar photovoltaics	2030:	3% of load from local solar
	2050:	5% of load from local solar
Play 1.3: Increase distributed electricity storage	2030:	2% of electricity demand stored in batteries locally
	2050:	5% of electricity demand stored in batteries locally

weather events. In addition, increased solar installations may also support the local solar industry and, therefore, jobs growth.

Supply of clean electricity is a critical foundation for Strategies 2 (Decarbonizing Buildings) and 3 (Decarbonizing Transportation & Sustainable Land Use). As such, the City plans to continue supporting and expanding Sunnyvale's participation to transition all electricity accounts to SVCE's clean electricity by 2030. Further, the City will encourage expansion of local solar to provide 5% of total electricity by 2050, as storage options increase. Further, the City will continue to explore opportunities to increase distributed battery electricity storage at homes and businesses.

Sunnyvale Electricity Emissions



Strategy 1: Promoting Clean Electricity



Plays for the Win

Play 1.1: Promote 100% clean electricity. The City is committed to working with SVCE to expand 100% clean energy services to 100% of our community. Supporting and protecting this clean electricity supply is critical to other Strategies from this Playbook that rely on decarbonization (namely, Strategies 2 and 3).

Play 1.2: Increase local solar photovoltaics (PV).

Targeted incentives, regulations and educational resources will be essential to increasing adoption of distributed solar resources in Sunnyvale. These will help ensure local supply but also help to offset demands on the electricity grid during peak demand periods.

Play 1.3: Increase distributed electricity storage.

The City will work with Silicon Valley Clean Energy to pursue opportunities for electricity storage at the building scale, separate from the utility-scale storage that SVCE plans to invest in as a part of its Decarbonization Roadmap. Estimated local storage in Sunnyvale as of 2019 is less than 0.5 MW (Source: California Solar Initiative). Battery technologies are typically rated by the maximum amount of power (kilowatts) they can continuously provide over a 4-hour period. Accordingly, battery installations may be sized to meet specific power and duration requirements. As battery technologies improve, the City will promote and encourage the use of distributed (or behind-the-meter) electricity storage at commercial and residential buildings in Sunnyvale. Local electricity storage provides opportunities to lower peak electricity demand periods and improve grid resilience; improve cost-effectiveness of electricity for the consumer as time-of-use rates go into effect (anticipated in 2020); and supply emergency backup power for limited periods during power outages.

Strategy 2: Decarbonizing Buildings



Path to 2050

While Sunnyvale has experienced significant growth in recent years, emissions from the building sector have decreased by 40% compared to 2008 levels. These reductions can be attributed to many efforts, including the City's incentive-based Green Building Program; a cleaner electricity grid; and financial incentives offered to businesses and residents for efficiency upgrades.

As the electricity supply has become GHG-free, key challenges and opportunities remain for further reductions in emissions associated with the buildings sector. We must continue to pursue all energy efficiency opportunities to reduce overall energy demand and help our citizens and businesses save money. Secondly, we must identify technical and financial innovations to move buildings away from natural gas, which is used to heat our homes, offices and other buildings, as well as to heat water.

The State of California is moving towards Zero Net Energy (ZNE) new buildings. The upcoming Uniform Building Code cycle (in effect January 2020) is expected to include a requirement for all new residential buildings to be ZNE by 2020 and all new commercial buildings to be ZNE by 2030. However, these requirements do not fully address natural gas consumption as the ZNE approach offsets electricity consumption with onsite generation. For this reason, the City has chosen to focus on all-electric buildings that contain no natural gas infrastructure.

To transition away from fossil fuel usage in buildings, partnerships with SVCE, other cities, utilities and the private sector will be essential to effectively target electrification strategies for implementation and to also advocate for building electrification at the State level. These partnerships can also lend themselves to scaling-up the deployment of clean electric appliances to heat our homes, buildings and water.

The City of Sunnyvale will focus on improving building energy efficiency, reducing natural gas use through building electrification, and continuing to source electricity from renewable sources in order to pave the way to a decarbonized building sector by 2050.

	Targets	
Play 2.1: Reduce energy consumption in existing buildings	2030:	5% of existing homes and businesses receive deep energy retrofit
	2050:	30% of existing homes and businesses receive deep energy retrofit
Play 2.2: Support electrification of existing buildings	2030:	20% of homes and businesses completely electrified
	2050:	50% of homes and businesses completely electrified
Play 2.3: Achieve all-electric new construction	2030:	100% all-electric new buildings
	2050:	100% all-electric new buildings

Decarbonizing buildings requires that we address new construction and also seek to retrofit buildings, since not all buildings will be rebuilt before 2050. Play 2.3 seeks to maximize electrification implementation on new buildings, and the target is to get to 100% quickly. Plays 2.1 and 2.2 seek to improve efficiency and then switch fuel uses to electricity. The modest target for efficiency in the early years reflects the relatively low participation seen in efficiency programs. While efficiency is still essential, the Playbook aims for steeper progress on encouraging electrification through appliance retrofits with clean technologies like heat pump technology. The Playbook envisions that by 2050, at least half of the buildings are fully electrified.

Plays for the Win

Play 2.1: Reduce energy consumption in existing buildings. Increasing efficiency will mean continued program outreach and incentives to residents and businesses to encourage efficient designs for new construction and retrofits in existing buildings. System efficiencies such as insulation and upgrades to electric heat pump technologies are top priorities.

Strategy 2: Decarbonizing Buildings



Play 2.2: Support electrification of existing buildings. Building energy optimization includes an innovative focus on installing efficient, electric systems to heat water and heat/cool interiors. Space and heat pump water heaters are high-efficiency alternatives to natural gas systems and have the added benefit of being powered by clean electricity.

Play 2.3: Achieve all-electric new construction. While the state requires moving toward Zero Net Energy (ZNE) for new construction, the City will work towards incentivizing and promoting all-electric new construction options for deep decarbonization.

Strategy 3: Decarbonizing Transportation & Sustainable Land Use



Path to 2050

The transportation sector is the largest source of GHG emissions in Sunnyvale, mostly attributed to personal driving. Congestion from daily traffic creates pressure on the city's transportation infrastructure, reduces mobility and safety and increases emissions.

The City of Sunnyvale is committed to a vision of a complete community, which represents a place to live that is less dependent on automobiles. This includes:

- Comfortable, safe, convenient, and complete pedestrian and bicycle networks
- Transit access on arterial streets within a 10-minute walk from home or work
- Diverse housing choices with a range of affordability
- Village Centers with enhanced neighborhood services

As Sunnyvale's population and jobs continue to increase, providing realistic options for reducing single-occupancy vehicles is key. With this in mind, Sunnyvale is focusing job growth and housing in specific plan areas including Downtown, along El Camino Real, and in the Transit and Village Center areas. The vision is to allow for economic growth and revenue that supports local businesses, while providing housing that ensures that residents have places to live, work and play without having to travel long distances.

The City's plans and policies call for an integrated transportation approach that supports pedestrian-, bike- and transit-friendly neighborhoods. Vehicle electrification augments these mobility strategies to support further emissions reductions and achieve the state's climate goals.

Furthermore, Sunnyvale will continue to explore innovative first- and last-mile solutions to encourage greater use of public transit, including accommodating on-demand ridesharing, piloting shared bicycle and scooter programs and assessing the potential for shuttle service in targeted areas.

	Targets	
	2030:	2050:
Play 3.1: Increase opportunities for and encourage development of mixed-use sites to reduce vehicle miles per person	20% reduction in vehicle miles per person	25% reduction in vehicle miles per person
Play 3.2: Increase transportation options and support shared mobility		
Play 3.3: Increase zero-emission vehicles	2030:	20% of all vehicles on road are zero-emission vehicles
	2050:	75% of all vehicles on road are zero-emission vehicles

There are two elements to understanding emissions from the transportation sector. One is how much driving occurs, typically expressed as vehicle miles traveled, and the other is how much GHG emissions come from a typical vehicle. The Playbook targets use both of these metrics to achieve the overall reductions needed from the transportation sector. The Playbook targets envision big changes by 2050 – that we are in general driving in single occupancy vehicles half as much as we do today, and that three out of every four vehicles are zero-emission vehicles. To the extent that one of these targets is lowered or not achieved, stronger performance in the other will be needed to achieve the overall emission reduction targets for the transportation sector.

Plays for the Win

Play 3.1: Increase opportunities for and encourage development of mixed-use sites to reduce vehicle miles per person. The City is committed to creating places to live that are less dependent on automobiles, through ensuring access to nearby services and activity centers. Furthermore, Sunnyvale seeks to provide housing options for all incomes and lifestyles, particularly near transit corridors and Caltrain stations, to support alternative modes of transportation.

Strategy 3: Decarbonizing Transportation & Sustainable Land Use



Play 3.2: Increase transportation options and support shared mobility. Multimodal transportation choices need to be enhanced to offer a variety of travel options in and around the city that are connected to regional transportation systems and destinations. Advocating for and increasing transportation options and shared mobility will create safer, healthier and more convenient movement throughout Sunnyvale.

Play 3.3: Increase zero-emission vehicles. Shifting to electric or alternatively fueled (e.g., hydrogen) vehicles has significant potential to reduce GHG emissions related to transportation. Since SVCE provides 100% carbon-free electricity, promoting a shift to electric vehicles away from fossil fuels would significantly reduce emissions. Other priorities include electrification of public transportation, car sharing, and electric bikes and scooters, and also improving availability of alternative fueling stations (e.g., EV charging facilities, hydrogen fueling stations). Currently (as of October 1, 2018) 2.4% of vehicles registered in Sunnyvale are battery-electric vehicles and 1.3% are plug-in hybrid electric vehicles.³

Strategy 4: Managing Resources Sustainably



Path to 2050

Emissions from waste sent to landfills, transporting water and treating wastewater make up about 7% of total community-wide GHG emissions in Sunnyvale. The City will continue to find alternative methods to divert 90% of its waste away from landfills by 2030, in alignment with the Zero Waste Strategic Plan.

Although emissions from solid waste make up a small portion of Sunnyvale's GHG footprint, the conventional methodology only accounts for emissions released from organic material decomposing in landfills. Substantially more emissions are generated during the production and shipping of goods (furniture, food, cars, etc.) that are eventually used in Sunnyvale. Therefore, emissions associated with goods purchased and food consumed, called embedded emissions, are often dramatically underestimated. As a result, conserving these valuable resources still remains a top priority for the City. Additionally, finding innovative ways to decrease the embedded emissions in food that Sunnyvale residents consume and to capture carbon in our trees and soil can help make our community more sustainable.

Plays for the Win

Play 4.1: Achieve Zero Waste goals for solid waste.

Diverting waste away from landfills, either to recycling, energy recovery or composting facilities, is critical for the City to realize its Zero Waste goals as outlined in its Zero Waste Strategic Plan. This can be accomplished by waste prevention – consuming and throwing away less – and being smarter about the items that must be thrown away. Expanding Sunnyvale's food scraps collection program (FoodCycle) will help to increase the amount of organic material diverted away from the landfill.

However, state laws and policies limit access to diversion technologies so that 75% diversion is the current limit. Increasing diversion to 90% will require changes at the state level to allow use of technologies that recover energy from unrecyclable resident waste, primarily plastic and paper.

	Targets
Play 4.1: Achieve Zero Waste goals for solid waste	2030: Reduce landfilled garbage to 1 lb per person per day 2050: Reduce landfilled garbage to <1 lb per person per day
Play 4.2: Ensure resilience of water supply	Targets will be determined as per state requirement
Play 4.3: Enhance natural carbon sequestration capacity	Supports broader net carbon reductions
Play 4.4: Promote awareness of sustainable goods and services	Supports broader emissions reduction

Play 4.2: Ensure resilience of water supply. As the region faces water supply challenges driven by recurring droughts and population growth, it will be critical to find ways to reduce the amount of water consumed and increase the sustainability of water supplies. Water conservation and water reuse, in the form of recycled and purified water, will help Sunnyvale reduce the stress placed on Northern California's water resources.

Play 4.3: Enhance natural carbon sequestration capacity.

The natural environment, including plants and soil, have an immense capacity to store carbon dioxide that would otherwise be released into the atmosphere. Through implementation of the City's Urban Forest Management Plan⁴ and Green Stormwater Infrastructure Plan, Sunnyvale can continue to capture carbon by expanding its urban tree canopy and designing landscape features to address stormwater pollution and flood risk.

Play 4.4: Promote awareness of sustainable goods and services.

The process of producing consumer goods, such as clothing or appliances or cars, is energy-intensive and produces greenhouse gas emissions. Further, the transport and distribution of goods and services also results in emissions, particularly for imported goods. Emissions from food, particularly methane emissions from cattle, are a major source of GHG emissions. In addition, emissions are also produced from the services we use for everyday life and from personal air travel. Most of these

Strategy 4: Managing Resources Sustainably



upstream emissions are not represented in a community-wide inventory, but can be reflected in a consumption-based inventory.

Reducing consumption of carbon-intensive consumer goods and foods, such as meat or dairy, is a way for community members to directly lower their personal carbon footprints. Encouraging the production of food in local gardens can help reduce the emissions associated with transporting foods over long distances. In addition, creating awareness of consumption-based emissions is a key approach in motivating reduced consumption, encouraging local purchases, and choosing foods that have a lower carbon footprint.

Strategy 5: Empowering Our Community



Path to 2050

Addressing climate change requires action by all members of our community. The City of Sunnyvale recognizes its role in supporting and empowering individuals throughout Sunnyvale to realize a common vision of achieving our 80x50 target. Together with the diverse sectors of our community, the City will continue to build inclusive and innovative solutions to one of the most difficult challenges of our time.

Through the Playbook planning process, we sourced bold, breakthrough and practical ideas that would pave the way toward more engaged climate action across the community. The engagement process featured a large community workshop, where more than 160 people came together with enthusiastic contributions for the Playbook, and an online portal to collect ideas and encourage stakeholder feedback to hone the ideas. These ideas form the basis of this Playbook (see *Appendix A: Ideas Roster*) and we will continue to draw upon them in the years to come.

The Sunnyvale community has shown a strong commitment to climate action, and much remains to be done to accomplish our 80x50 end game. More ongoing marketing, outreach and behavior change campaigns will be necessary to inspire an 80x50 lifestyle, leverage the benefits of new technologies and empower the people that want to help. Our Plays in this area are focused on sharing necessary information, resources and tools to enable residents and businesses to take continued climate action and build our community. These Plays support other Plays within the Playbook.

Plays for the Win

Play 5.1: Enhance community awareness and engagement. The City is committed to collaborating with the community for immediate and effective climate action through outreach and engagement programs. The City will provide tools, education, and resources (e.g., programs) to enable residents, businesses, corporations, and other stakeholders to work towards mitigating emissions across the Strategies in this Playbook.

	Targets
Play 5.1: Enhance community awareness and engagement	Supports all Plays
Play 5.2: Track and share data and tools	Supports all Plays

Play 5.2: Track and share data and tools. The City will develop regular and effective data collection and communication tools to report progress on climate action. We will continue to partner with innovators in the community to maintain and enhance information and tools to keep our community informed.

Strategy 6: Adapting to a Changing Climate



Path to 2050

Adaptation strategies enable local communities to limit damage and improve recovery from the effects of climate change. This is often referred to as “community resiliency.” In our area, anticipated effects from climate change include rising sea levels, more extreme rain events, and more extreme heat events. Other effects may not occur locally but still affect our community, such as increased susceptibility to drought and increased occurrence and severity of wildfires.

Unlike Strategies 1 through 5 of the Playbook, adaptation strategies do not typically reduce greenhouse gas emissions. Rather, they are an essential complement to emissions reductions to provide a holistic response to climate change.

Adapting to a changing climate may be done effectively by:

- Reducing our exposure to climate stressors, such as sea-level rise, through effective management and improved infrastructure;
- Reducing sensitivity, or the reaction to climate stressors, which is greatest in sensitive populations, including minority or low-income groups, seniors, and children. This can be managed through improved local services to such populations; and
- Enhancing adaptive capacity or resilience, through better emergency preparedness, stronger social systems, and effective communication tools.

The City recognizes that adaptation requires a regional approach to ensure that proactive actions are implemented efficiently and do not have adverse impacts in other communities. For instance, sea-level rise may be addressed through a levee system in one city, which could have the unintended effect of diverting water to a neighboring, lower lying city. We need extensive collaboration and partnerships with neighboring cities, counties, regional agencies, corporations and businesses, and community groups to design, promote, and implement effective strategies that can benefit the Bay Area as a whole.

Play 6.1: Assess climate vulnerabilities for Sunnyvale

Play 6.2: Protect shoreline area from sea level rise and coastal flooding

Play 6.3: Strengthen community resiliency

Plays for the Win

Play 6.1: Assess climate vulnerabilities for Sunnyvale. The first step in addressing climate impacts is to assess our community’s vulnerability to climate change. The City will continue to work with partners to develop tools and resources that enable a better understanding of the vulnerability of our social, environmental, economic, and physical resources to varied climate stressors.

Play 6.2: Protect shoreline area from sea level rise and coastal flooding. The City will continue to plan for and protect the shoreline area under its control against sea-level rise, working with Valley Water (formerly Santa Clara Valley Water District) and other regional partners to do so. Sunnyvale will explore the possible use of traditional levees as well as natural mitigation efforts to protect both its coastal infrastructure, including the City’s Water Pollution Control Plant and closed landfill, as well as the natural and built land area along the Bay.

Play 6.3: Strengthen community resiliency. City departments will continue to collaborate with local volunteer and community groups to develop stronger social support systems to improve communication during emergencies and peer-to-peer education of preparedness and response. Pre-emptive rather than reactive strategies are needed to minimize exposure and improve resilience, particularly among the most vulnerable populations in Sunnyvale.



Photo credit: Alfred Leung

Game Plan 2022: Our Next Moves

Game Plan 2022: Our Next Moves

Focusing Our Efforts

Strategies and Plays are critical to guiding Sunnyvale towards our 80x50 end game. But what actions do we need to take today to ensure success tomorrow?

This chapter identifies “Next Moves,” which are specific, tactical actions to execute in the next three years to ensure the right incentives, technologies and infrastructure are in place to set us up for success in the long-term. Each Move corresponds to a specific Play and Strategy.

The Moves in Game Plan 2022 are not intended to achieve the 2030 targets, but rather to help catapult action and progress towards those targets. The Moves will be updated in alignment with department work plans every five years thereafter, to ensure that climate action priorities are consistently and continually woven throughout City operations.

Moves consist of one or more of the following types of actions:

- Researching the viability of new ideas;
- Implementing and expanding existing plans or programs; and
- Building partnerships with external entities to achieve common goals.

A detailed description of the Next Moves in Game Plan 2022 are provided in the pages that follow. A summary view of the Next Moves is provided on page 34.



Determining Carbon Savings Potential

The Next Moves were prioritized from our list of community ideas (see *Appendix A: Ideas Roster*) based on carbon savings potential and co-benefits to the community. Implementation will be led by specific City departments, in collaboration with other City departments or appropriate external partners.

Each Next Move includes an assessment of its carbon savings potential, which is determined by the following two principles:

- **Maximum Carbon Savings Potential.** Each Next Move is evaluated by its maximum potential impact to reduce carbon emissions, regardless of specific levels of implementation in the current 3-year planning horizon. This approach is used to ensure that the implementation can be measured relative to the target for the associated Play. Therefore, the carbon reduction potential for Moves related to initial feasibility studies or planning activities is assessed assuming implementation of the activity.

For example, for *Move 3.I: Develop a Community Electric Vehicle Readiness and Infrastructure Plan*, the carbon savings potential assumes implementation of a plan resulting in an electric vehicle adoption rate consistent with the measurable target associated with the Play (i.e., 20% of all vehicles are zero-emission by 2030). In the current 3-year time frame, the City will work with SVCE to develop the Plan itself for implementation in future years.

- **City-scale Carbon Savings Impact.** Each Next Move is assessed by its potential to reduce emissions at the local-scale. Such emissions are accounted for within the City's GHG inventory, in accordance with community-wide GHG inventory protocol boundaries. These emissions are currently tracked and will continue to be tracked on a regular cycle to assess CAP implementation progress and ensure Sunnyvale is on track to 80x50. Lifecycle- or consumption-based emissions are not accounted for.

For example, for *Move 4.G: Promote consumer awareness of sustainable food choices*, the carbon savings potential is low because emissions reductions from its implementation occur upstream and are not included in the City's GHG inventory. Only a consumption-based inventory, which evaluates the upstream impacts of all goods and services consumed by a community, would reflect the true carbon savings potential of such a move.

The carbon savings potential for the Next Moves is qualitatively described as follows:



Minimal potential

Uncertain impact. Move is primarily informational or educational (e.g., to develop support for other moves).



Some potential

Move affects a small subset of GHG emissions within a sector (e.g., municipal operations).



Significant potential

Move affects a large portion of GHG emissions within a sector (e.g., incentives, programs and services).



Maximum potential

Move affects GHG emissions in an entire sector (e.g., all buildings, vehicle miles traveled or VMT, etc.).

Co-benefits

Each Move also provides co-benefits as follows:



Local Environmental Quality

Move improves air quality, water quality, and/or open space amenities.



Health & Livability

Move improves physical, mental and emotional health or wellbeing and quality of life for residents, employees, and visitors.



Community Savings

Move provides long-term savings for residents, businesses, or the City.



Partnerships

Move entails assistance from and coordination with partner organizations or agencies, such as SVCE and Valley Water.

City Departments

CDD	Community Development Department
DPW	Department of Public Works
ESD	Environmental Services Department
DPS	Department of Public Safety
FIN	Finance Department
OCM	Office of City Manager

Game Plan 2022 At-a-Glance



Strategy 1: Promoting Clean Electricity

- 1.A Continue to support and steer Silicon Valley Clean Energy (SVCE) in providing clean power and decarbonization programs.
- 1.B Collaborate with SVCE to target direct access customers to shift to 100% clean electricity.
- 1.C Research a mandatory solar roof ordinance for new commercial developments.
- 1.D Collaborate with SVCE to evaluate opportunities for energy storage to maximize utilization of local solar supply and to enhance resiliency.



Strategy 2: Decarbonizing Buildings

- 2.A Research energy disclosure and energy benchmarking requirements for commercial and multi-family residential buildings to encourage property owners and managers to invest in energy efficiency upgrades and building information systems.
- 2.B Advocate to regional providers of energy efficiency programs (such as Bay Area Regional Energy Network or BayREN, Silicon Valley Energy Watch or SVEW) that their offerings are more aggressively promoted to Sunnyvale residents and businesses.
- 2.C Develop a program to accelerate the adoption of heat pump water heaters and space heaters.
- 2.D Electrify municipal buildings upon rebuild or significant remodel, including the Civic Center.
- 2.E Evaluate code and permitting processes to streamline building electrification.
- 2.F Investigate the potential for implementing a differential Utility Use Tax that is at least revenue neutral, such that local taxes on electricity are lower than on natural gas, to incentivize electrification.
- 2.G Continue to incentivize energy efficient and high performance buildings through the Green Building Program updates.



Strategy 3: Decarbonizing Transportation & Sustainable Land Use

- 3.A Plan for additional housing, with the goal of diverse housing, to reduce long-distance commutes.
- 3.B Identify areas that are most appropriate for parking strategies that discourage vehicle use, such as pricing, time limits and supply reductions.
- 3.C Enhance City Transportation Demand Management (TDM) program implementation and monitoring to facilitate further reductions in single-occupant automobile trips, citywide.
- 3.D Advocate that regional service providers implement high quality transit service and a robust set of first- and last-mile strategies in over two-thirds of the cross-city corridors.
- 3.E Update and implement Active Transportation Plan to achieve a connected, safe and active network.
- 3.F Pilot and evaluate shared bicycle and scooter programs.
- 3.G Pilot shuttle service in Peery Park and consider options for expansion of a similar service in other areas undergoing redevelopment.
- 3.H Develop design standards for streets and parking lots to accommodate increased pick-up and drop-off for rideshare passengers and apply as appropriate.
- 3.I Monitor autonomous vehicle testing and deployment to inform proactive policy.
- 3.J Develop a Community Electric Vehicle Readiness and Infrastructure Plan.
- 3.K Promote and seek incentives for community adoption of electric vehicles.
- 3.L Electrify Municipal Fleet as vehicles are replaced and continue to seek incentives for electric vehicles and charging infrastructure.

Game Plan 2022 At-a-Glance



Strategy 4: Managing Resources Sustainably

- 4.A Implement and expand food scraps diversion programs to include additional businesses and multi-family residences.
- 4.B Consider solid waste collection and processing improvements to increase waste diversion away from landfills as a part of service provider and facility transition planning.
- 4.C Implement campaign for waste prevention.
- 4.D Promote and seek incentives for making water conservation a way of life and set a water reduction target consistent with new statewide requirements.
- 4.E Partner with Valley Water to evaluate opportunities to expand water reuse.
- 4.F Implement the City's Urban Forest Management Plan and continue to protect and greatly expand tree canopy.
- 4.G Implement the City's Green Stormwater Infrastructure Plan.
- 4.H Promote consumer awareness of sustainable food choices.
- 4.I Work with large businesses to identify best practices for implementing local food gardens.



Strategy 5: Empowering Our Community

- 5.A Pilot a targeted grassroots community engagement strategy (e.g., Cool Blocks Program) to create stronger connections between neighbors to advance climate action and emergency preparedness.
- 5.B Evaluate opportunities for the City to provide online resources and tools for community and small business climate action (e.g., resource center for retrofit electrification, online tool or app to track individual carbon emissions).
- 5.C Create a stronger social media and web presence for Sunnyvale climate action.
- 5.D Implement the Sustainability Speaker Series.
- 5.E Pilot and evaluate a program for youth engagement on climate, building on current engagement with school classrooms and green teams.
- 5.F Build relationships with largest employers to collaborate on climate action, such as: (a) engaging employees to participate in sustainability initiatives; (b) encouraging and facilitating investment in climate action programs or projects.
- 5.G Implement improvements for climate action data performance tracking and reporting progress to the public (e.g., community dashboard).
- 5.H Publish annual greenhouse gas (GHG) inventory.



Strategy 6: Adapting to a Changing Climate

- 6.A Review and summarize assessment products developed by the County's Silicon Valley 2.0 project and by the State.
- 6.B Participate in regional forums on climate vulnerabilities.
- 6.C Collaborate with Valley Water to advance a shoreline protection project with the US Army Corps of Engineers or other partners.
- 6.D Identify shoreline protection solutions as part of Moffett Park Specific Plan update.
- 6.E Update existing emergency preparedness and response plans to address climate-related impacts such as heat events, air quality issues and flooding.
- 6.F Develop a community resiliency plan.

Next Moves for Strategy 1: Promoting Clean Electricity



The City's Next Moves will focus on promoting programs to increase the adoption rate of 100% carbon-free and renewable electricity. In the Game Plan 2022, this Strategy will focus on collaboration with SVCE on expanding participation, continuing the shift towards 100% renewable electricity, and launching programs that support Sunnyvale's customers in decarbonizing their homes and businesses. Further, we will also work with our larger local companies to develop and encourage commitments that direct access to procurements that focus on carbon-free electricity.

Finally, as electric loads increase due to the electrification of transportation and buildings, the City will support distributed energy resources, such as rooftop solar (PV) combined with energy storage. Integrating electrified aspects of buildings, such as electric vehicle chargers, heat pump technologies, and PV will provide opportunities for faster, easier, and more cost-effective conversion away from fossil fuels. A cleaner, smarter electric grid will therefore enable implementation of Strategies 2 and 3, and will more rapidly catalyze movement towards our 80x50 end game.

Strategy 1: Promoting Clean Electricity



Play 1.1: Promote 100% Clean Electricity

Move 1.A: Continue to support and steer Silicon Valley Clean Energy (SVCE) in providing clean power and decarbonization programs. With the launch of SVCE, Sunnyvale residents and businesses have access to clean electricity, sourced primarily from renewable sources. Further, as a part of its mission, SVCE is committed to supporting further actions and investments in its member communities to further reduce carbon emissions, particularly from energy use in buildings and from fuel consumption in vehicles. As a part of its adoption of a Decarbonization Strategy and Programs Roadmap⁵ (December 2018), SVCE has pledged nearly \$6.02 million to offering customer programs to promote decarbonization and energy efficiency improvements to the 13 cities in its service territory. As the municipality with the largest SVCE customer base, the City of Sunnyvale will advocate for programs that incentivize high-impact behaviors (such as installing electric heat pump water heaters) and are responsive to the needs of Sunnyvale residents and businesses.

Move 1.B: Collaborate with SVCE to target direct access customers to shift to 100% clean electricity. While most Sunnyvale residents and businesses have traditionally purchased electricity from an investor-owned utility, some large businesses have contracts to purchase electricity directly from Electric Service Providers. This allows these large businesses, that typically have high energy needs, to purchase electricity at lower prices. While some of these large companies have expressed a strong commitment to ensure significant portions of their electricity is generated from renewable sources, others purchase electricity generated from conventional sources, like coal, which generates GHG emissions. The City has limited opportunities to identify and encourage these companies, called “Direct Access” (DA) customers, to switch to cleaner sources of electricity.

With nearly 97% of residential customers opting in to clean electricity provided by Silicon Valley Clean Energy (SVCE), the electricity sourced to DA customers is now the largest source of electricity-related GHG emissions. With its status as Sunnyvale’s clean electricity provider, SVCE and City staff can encourage DA customers to switch to SVCE’s 100-percent carbon-free offering, or even opt up to 100-percent renewable electricity, which would substantially lower GHG emissions from electricity use in Sunnyvale.

Play 1.2: Increase Local Solar Photovoltaics

Move 1.C: Research a mandatory solar roof ordinance for new commercial developments. A local ordinance requiring solar installations on new commercial buildings leverages and complements the anticipated 2019 California Building Standards Code requirement of mandatory solar installations for all new residential buildings starting in 2020. Local solar installations would also help to comply with the anticipated requirement for all new non-residential buildings to be Zero Net Energy (ZNE) by 2030. By evaluating the feasibility of a local ordinance, the implementation rate of localized solar may be accelerated on all building types.

Play 1.3: Increase Distributed Electricity Storage

Move 1.D: Collaborate with SVCE to evaluate opportunities for energy storage to maximize utilization of local solar supply and to enhance resiliency. Energy storage plays a growing role in ensuring a resilient power grid, especially as dependence on renewable energy increases. Community-scale energy storage could maximize utilization of local solar supply, smooth out electricity supply and demand discrepancies and provide other benefits.

















Strategy 1: Promoting Clean Electricity



Play 1.1: Promote 100% clean electricity

TARGET:









- 2030: 100% participation in clean electricity
- 2050: 100% participation in clean electricity

Next Moves		Lead	Impacts	FY20	FY21	FY22
1.A	Continue to support and steer Silicon Valley Clean Energy (SVCE) in providing clean power and decarbonization programs.	ESD	       	●	●	●
1.B	Collaborate with SVCE to target direct access customers to shift to 100% clean electricity.	ESD	       	●	●	

Play 1.2: Increase local solar photovoltaics

TARGET:









- 2030: 3% of load from local solar
- 2050: 5% of load from local solar

Next Moves		Lead	Impacts	FY20	FY21	FY22
1.C	Research a mandatory solar roof ordinance for new commercial developments.	CDD	       		●	

Play 1.3: Increase distributed electricity storage.

TARGET:

- 2030: 2% of electricity demand stored in batteries locally
- 2050: 5% of electricity demand stored in batteries locally

Next Moves		Lead	Impacts	FY20	FY21	FY22
1.D	Collaborate with SVCE to evaluate opportunities for energy storage and to maximize utilization of local solar supply and to enhance resiliency.	ESD	       	●	●	●

- Timeline of this Move has been updated since the Climate Action Playbook was adopted in August 2019.



GHG Avoided



Local Environmental Quality



Health & Livability



Community Savings



Partnerships

Next Moves for Strategy 2: Decarbonizing Buildings



Buildings are long lasting infrastructure, and development occurring in Sunnyvale today will likely still be in use in 2050. As the City anticipates most of its land area will be developed by 2035, infrastructure put in place today will be critical in addressing both our 2030 and 2050 targets.

As such, the City's Next Moves focus on both new construction and existing buildings with programs and policies designed for the future climate and energy realities. This includes increasing building efficiency for extreme temperatures and scaling up adoption of technologies in buildings powered by clean electricity.

The City will focus on moves that emphasize and enhance energy conservation, establish policies or programs to support electrification, and facilitate adoption of new building decarbonization technologies for the largest uses, such as electric heat pumps for water and space heating.

Sunnyvale will continue to enhance and update its award-winning Green Building Program, using incentives and codes to achieve greater gains in efficiency and better building performance.

Strategy 2: Decarbonizing Buildings



Play 2.1: Reduce energy consumption in existing buildings

Move 2.A: Research energy disclosure and energy benchmarking requirements for commercial and multi-family residential buildings to encourage property owners and managers to invest in energy efficiency upgrades and building information systems. Energy benchmarking collects data about a building's energy usage during a specific time period. With AB 802 (2015)⁶, energy benchmarking is already required for large commercial and residential buildings above a certain square footage, but a local ordinance (e.g., City of San Jose's Energy and Water Building Performance Ordinance⁷; City of Berkeley's Building Energy Saving Ordinance⁸) would extend the requirement to smaller buildings. Energy benchmarking empowers commercial and multi-family residential building managers and property owners with meaningful data depicting energy consumption, allows comparison of energy usage among similar buildings, and helps the City potentially incentivize energy conservation by customizing programs that target areas of greatest need. Energy benchmarking also informs and motivates consumer demand for efficient buildings.

Move 2.B: Advocate to regional providers of energy efficiency programs (such as Bay Area Regional Energy Network or BayREN, Silicon Valley Energy Watch or SVEW) that their offerings are more aggressively promoted to Sunnyvale residents and businesses. Many existing regional energy efficiency programs are available to Sunnyvale residents and businesses through entities such as Bay Area Regional Energy Network (BayREN) and Silicon Valley Energy Watch (SVEW). Greater promotion of existing programs ensures that Sunnyvale residents and businesses are aware of and encouraged to take advantage of these opportunities for assistance to further decarbonize their buildings.

Play 2.2: Support electrification of existing buildings

Move 2.C: Develop a program to accelerate the adoption of heat pump water heaters and space heaters. Heating space and water in buildings is the single largest use of natural gas. Installing electric heat pump water heaters and space heaters is one of the most effective ways to transition away from natural gas towards clean electricity, as provided by SVCE. The technology has progressed for electric equivalents to be as economically competitive and capable of maintaining the same level of comfort as their conventional natural gas counterparts. Partnering with SVCE to teach the public about the benefits of heat pump water heaters and space heaters, while simultaneously offering incentives to conduct these upgrades, will accelerate adoption of heat pump technology.

Move 2.D: Electrify municipal buildings upon rebuild or significant remodel, including the Civic Center. Natural gas use is the largest source of GHG emissions in the building sector, now that SVCE provides clean electricity. Transitioning towards all-electric buildings far outweighs GHG reductions achieved through simply improving building efficiency. Thus, when feasible, existing buildings must transition to all-electric while simultaneously ensuring that newly-constructed buildings are all-electric to begin with. The City of Sunnyvale has an opportunity to lead the local all-electric movement when updating municipal buildings and facilities.

Play 2.3: Achieve all-electric new construction

Move 2.E: Evaluate code and permitting processes to streamline building electrification. All-electric building is increasing in popularity and feasibility and innovative building codes are important to facilitate this transition in building design. Sunnyvale will explore opportunities to accelerate and specifically incentivize all-electric new construction. The City will investigate the possibility of a reach code to encourage all-electric new construction in collaboration with SVCE and its other member agencies. Such collaboration can amplify the impact and simplify

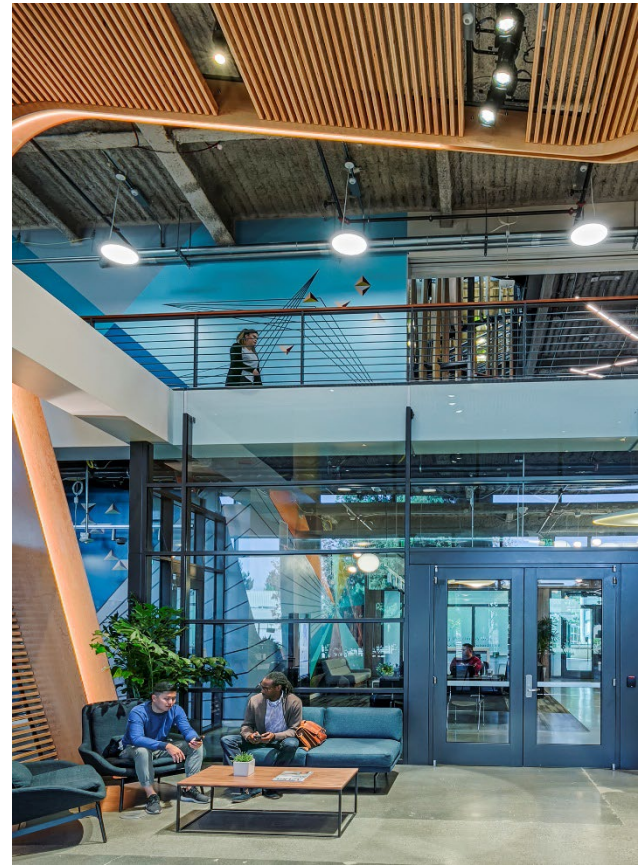
Strategy 2: Decarbonizing Buildings



implementation for project applicants with similar programs across jurisdictions.

Move 2.F: Investigate the potential for implementing a differential Utility Use Tax that is at least revenue neutral, such that local taxes on electricity are lower than on natural gas, to incentivize electrification. Utility User Taxes (UUTs) are fees leveraged by local jurisdictions to consumers of certain utility services. In Sunnyvale, the existing UUT charges a 2% rate on telephone, electricity, and natural gas use. A differential Utility User Tax where the rates on electricity are lower than on natural gas is a possible approach to incentivize all-electric buildings.

Move 2.G: Continue to incentivize energy efficient and high performance buildings through the Green Building Program updates. Sunnyvale's award-winning Green Building Program has successfully facilitated sustainable building design by offering compelling voluntary incentives for developers, allowing more units or increased square footage if the building sufficiently exceeds the California Building Code's minimum environmental requirements. Continuing to update the Green Building Program with more rigorous pathways to qualify for incentives will drive building developers to even further decarbonize to all-electric designs. This will increase the number of new buildings in Sunnyvale that eliminate GHG emissions, particularly since the buildings built today will continue to be in operation well beyond 2030.











Strategy 2: Decarbonizing Buildings



Play 2.1: Reduce energy consumption in existing buildings

TARGET:









- 2030: 5% of existing homes and businesses receive deep energy retrofit
- 2050: 30% of existing homes and businesses receive deep energy retrofit

Next Moves		Lead	Impacts	FY20	FY21	FY22
2.A	Research energy disclosure and energy benchmarking requirements for commercial and multi-family residential buildings to encourage property owners and managers to invest in energy efficiency upgrades and building information systems.	CDD	   			●
2.B	Advocate to regional providers of energy efficiency programs (such as Bay Area Regional Energy Network or BayREN, Silicon Valley Energy Watch or SVEW) that their offerings are more aggressively promoted to Sunnyvale residents and businesses.	ESD	   	●	●	●

Play 2.2: Support electrification of existing buildings

TARGET:

- 2030: 20% of homes and businesses completely electrified
- 2050: 50% of homes and businesses completely electrified

Next Moves		Lead	Impacts	FY20	FY21	FY22
2.C	Develop a program to accelerate the adoption of heat pump water heaters and space heaters.	ESD	   	●	●	●
2.D	Electrify municipal buildings upon rebuild or significant remodel, including the Civic Center.	DPW	   	●	●	●



GHG Avoided



Local Environmental Quality



Health & Livability



Community Savings



Partnerships

























Strategy 2: Decarbonizing Buildings



Play 2.3: Achieve all-electric new construction

TARGET:

- 2030: 100% all-electric new buildings
- 2050: 100% all-electric new buildings

Next Moves		Lead	Impacts	FY20	FY21	FY22
2.E	Evaluate code and permitting processes to streamline building electrification.	CDD	       	●		
2.F	Investigate the potential for implementing a differential Utility Use Tax that is at least revenue neutral, such that local taxes on electricity are lower than on natural gas, to incentivize electrification.	FIN	       		●	
2.G	Continue to incentivize energy efficient and high performance buildings through the Green Building Program updates.	CDD	       			●

- Timeline of this Move has been updated since the Climate Action Playbook was adopted in August 2019.



GHG Avoided



Local Environmental Quality



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Next Moves for Strategy 3: Decarbonizing Transportation & Sustainable Land Use



Our Next Moves are focused on setting Sunnyvale on the path to becoming a community that is less dependent on vehicles. This includes encouraging new development, including housing, in areas near transit and managing parking supply to support multi-modal transportation options that connect to regional systems and destinations.

To achieve a meaningful shift away from single-occupancy fossil-fueled vehicles, we need stronger partnerships with regional agencies and must continue to support increased funding for regional transit service providers to expand mobility options. Action in these areas can help simultaneously plan for transit-oriented land use while reducing vehicle miles traveled, and can thereby reduce carbon emissions. Locally, more first- and last-mile options (like bikeshare programs) are needed to encourage transit ridership. Additionally, the City will continue to improve and expand access to live and work spaces, retail, and services by focusing on balanced mixed uses in new or redevelopment areas.

Sunnyvale's current development, while serviced by existing public transit, still largely reflects a car-dependent lifestyle. Dramatic changes to driving habits and accelerated adoption of alternative fuel vehicles will need to work in tandem to achieve steep reductions in transportation emissions.

Strategy 3:

Decarbonizing Transportation & Sustainable Land Use



Play 3.1: Increase opportunities for and encourage development of mixed-use sites to reduce vehicle miles per person

Move 3.A: Plan for additional housing, with the goal of diverse housing, to reduce long-distance commutes.

The high cost and shortage of housing across the Bay Area has led a rising number of commuters to live in more affordable areas in distant suburbs. The resulting hefty car commute to Silicon Valley employment centers contributes to worsening congestion. By increasing the availability of affordable housing in Sunnyvale, more workers may be able to live closer to their jobs, commute shorter distances or via alternative modes, and thereby lower GHG emissions. This Move may be particularly effective at reducing the vehicle miles per person.

Move 3.B: Identify areas that are most appropriate for parking strategies that discourage vehicle use, such as pricing, time limits and supply reductions. (E.g., goBerkeley⁹, Downtown Redwood City¹⁰) In a car-dependent community, it is critical to promote alternative transportation while simultaneously disincentivizing single occupant car trips. Limiting parking is a common disincentive to decrease car trips and increase alternative trips, and may be particularly important for reducing GHG emissions from vehicle miles. This Move will inform appropriate types and locations of parking options to limit and optimize parking opportunities while ensuring that, when implemented, they do not create unintended disruptions.

Play 3.2: Increase Transportation Options and Support Shared Mobility

Move 3.C: Enhance City Transportation Demand Management (TDM) program implementation and monitoring to facilitate further reductions in single-occupant automobile trips, citywide. A significant part of Sunnyvale traffic comes from long-distance commuters. Transportation Demand Management (TDM) describes the holistic approach by which workplaces encourage their employees to commute via alternative means, counterbalancing the default inclination to drive. Existing TDM programs in Sunnyvale

have mixed results. Better monitoring is needed to understand the effectiveness of current TDM programs, to monitor compliance and enforce TDM requirements, to implement regular data collection procedures, and to use data in developing new TDM programs for residential and business developments.

Move 3.D: Advocate that regional service providers implement high quality transit service and a robust set of first- and last-mile strategies in over two-thirds of the cross-city corridors. Improved frequency, route offerings and quality of local public transportation is expected to increase ridership and reduce the number of cars on the road. Public transit will seem more attractive and viable in conjunction with first- and last-mile options that help residents and employees travel to and from transit stops. Though the City does not directly control public transportation offerings within City limits, the City can advocate to agencies like VTA and Caltrans for improved service. Further, the City can augment alternatives for first- and last-mile mobility.

Move 3.E: Update and implement Active Transportation Plan to achieve a connected, safe and active network. Transitioning away from car dependency requires easy and safe travel via other modes such as walking and biking. Thus, improving the existing bicycle and pedestrian network will make walking and biking to work, school, and other local destinations more palatable and lower VMT and GHG emissions. A complete bicycle and pedestrian network will also assist with first/last mile and TDM efforts. This Move will be particularly important for creating mode shift away from personal vehicles.

Move 3.F: Pilot and evaluate shared bicycle and scooter programs. Increased access to bicycles and scooters without having to purchase, maintain or store them may increase the likelihood of residents not using a car for short trips. Bicycle and scooter shares additionally help remedy first- and last-mile challenges. This pilot will inform the feasibility of a bike or scooter share program in select areas of Sunnyvale.

Move 3.G: Pilot shuttle service in Peery Park and consider options for expansion of a similar service in other areas undergoing redevelopment. Shuttle service in frequently visited and/or major employment areas will supplement and extend the reach of existing public transportation offerings. The shuttle(s) would allow more

Strategy 3:

Decarbonizing Transportation & Sustainable Land Use



commuters and travelers to get around Sunnyvale without a car, thereby reducing VMT and GHG emissions.

Move 3.H: Develop design standards for streets and parking lots to accommodate increased pick-up and drop-off for rideshare passengers and apply as appropriate. As transportation network companies (TNCs), like Uber and Lyft, continue to become more prevalent, they will continue to impact traffic and safety at pick-up and drop-off points. Accommodating the needs of TNCs in the streetscape will minimize disruptions and increase the ease of using these services. Although increased use of TNCs does not directly lower GHG emissions or VMT, TNCs may provide services that make car-free or car-light lifestyles more viable. Further, as TNCs electrify their fleets, GHG emissions would continue to decrease.

Move 3.I: Monitor autonomous vehicle testing and deployment to inform proactive policy. When autonomous vehicles enter the mainstream market, they could dramatically alter the existing transportation landscape. Keeping track of new developments and proactively formulating policy will ensure that such a transportation transition will happen smoothly.

Play 3.3: Increase Zero-Emission Vehicles

Move 3.J – Develop a Community Electric Vehicle Readiness and Infrastructure Plan. (E.g., City of Santa Monica’s Electric Vehicle Action Plan, 2017¹¹)

As electric vehicles (EVs) make up a greater proportion of cars on Sunnyvale streets, so too will demand rise for charging stations and electricity from the grid. To support the transition to EVs, the City of Sunnyvale must prepare and plan for infrastructure accordingly. Developing this Plan will help define the specific changes that are most needed from an infrastructure readiness and from permitting processes and incentives perspectives. In partnership with SVCE, the City will develop a Plan to accelerate our transition to an EV-ready community.

Move 3.K: Promote and seek incentives for community adoption of electric vehicles. Electric vehicles (EVs) charged at residential, office or public locations in Sunnyvale run on carbon-free electricity, which drastically lowers transportation-related emissions. The City will work with community groups to create an EV awareness and education program, such as Acterra’s proposed “Sunnyvale Goes EV! Program” to accelerate EV adoption. Such a program would include activities such as EV ride-and-drive events and workshops to educate prospective buyers on benefits, convenience, and incentives.

Move 3.L: Electrify Municipal Fleet as vehicles are replaced and continue to seek incentives for electric vehicles and charging infrastructure. The City of Sunnyvale has an opportunity to be a local leader in transportation decarbonization by updating its municipal fleet to electric vehicles (EVs). The City is committed to electrifying its vehicle fleet as old fleet vehicles are phased out, where a suitable EV replacement is available. Based on the current replacement schedule, the target is to add 16 EVs by 2022. The City will partner with SVCE to obtain funding and technical support for enhancing public EV chargers throughout the city. In addition, the City will leverage resources and information from sustainability networks, such as Climate Mayors EV Purchasing Collaborative¹², to continue fleet electrification. The City will also monitor future potential for EVs to replace more specialized fleet vehicles, such as trash trucks or police cars.

Strategy 3: Decarbonizing Transportation & Sustainable Land Use



Play 3.1: Increase opportunities for and encourage development of mixed-use sites to reduce vehicle miles per person

TARGET:

- 2030: 20% reduction in vehicle miles per person
- 2050: 25% reduction in vehicle miles per person

Next Moves		Lead	Benefits	FY20	FY21	FY22
3.A	Plan for additional housing, with the goal of diverse housing, to reduce long-distance commutes.	CDD		•	•	•
3.B	Identify areas that are most appropriate for parking strategies that discourage vehicle use, such as pricing, time limits and supply reductions.	CDD DPW				•

Play 3.2: Increase transportation options and support shared mobility

TARGET:

- 2030: 20% reduction in vehicle miles per person
- 2050: 25% reduction in vehicle miles per person

Next Moves		Lead	Benefits	FY20	FY21	FY22
3.C	Enhance City Transportation Demand Management (TDM) program implementation and monitoring to facilitate further reductions in single-occupant automobile trips, citywide.	DPW		•	•	•
3.D	Advocate that regional service providers implement high quality transit service and a robust set of first- and last-mile strategies in over two-thirds of the cross-city corridors.	DPW		•		
3.E	Update and implement the Active Transportation Plan to achieve a connected, safe and active network.	DPW		•	•	•
3.F	Pilot and evaluate shared bicycle and scooter programs.	DPW		•		
3.G	Pilot shuttle service in Peery Park and consider options for expansion of a similar service in other areas undergoing redevelopment.	CDD		•	•	•
3.H	Develop design standards for streets and parking lots to accommodate increased pick-up and drop-off for rideshare passengers and apply as appropriate.	DPW, CDD				•



GHG Avoided



Local Environmental Quality



Health & Livability



Community Savings



Partnerships









Strategy 3: Decarbonizing Transportation & Sustainable Land Use



Play 3.2: Increase transportation options and support shared mobility

TARGET:

























- 2030: 20% reduction in vehicle miles per person
- 2050: 25% reduction in vehicle miles per person

Next Moves		Lead	Benefits	FY20	FY21	FY22
3.I	Monitor autonomous vehicle testing and deployment to inform proactive policy	DPW	       	●		

Play 3.3: Increase zero-emission vehicles

TARGET:

- 2030: 20% of all vehicles on road are zero-emission vehicles
- 2050: 75% of all vehicles on road are zero-emission vehicles

Next Moves		Lead	Benefits	FY20	FY21	FY22
3.J	Develop a Community Electric Vehicle Readiness and Infrastructure Plan.	DPW	       	●	●	
3.K	Promote and seek incentives for community adoption of electric vehicles.	ESD	       	●	●	●
3.L	Electrify Municipal Fleet as vehicles are replaced and continue to seek incentives for electric vehicles and charging infrastructure.	DPW	       	●	●	●



GHG Avoided



Local Environmental Quality



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Next Moves for Strategy 4: Managing Resources Sustainably



Photo credit: Emmanuel Piuze

Reducing landfilled waste, using water efficiently, capturing carbon in the natural environment and lowering the emissions intensity of food consumed are all essential to Sunnyvale becoming a sustainability leader. The City's Next Moves will focus on expanding and improving waste diversion services, adopting water conservation as a way of life, expanding natural landscape areas in the community, and promoting the importance of sustainable food choices.

Implementation of the City's Urban Forest Management Plan will not only help to sequester carbon, but will also result in a more robust urban tree canopy that can alleviate the urban heat island effect.

Strategy 4: Managing Resources Sustainably



Play 4.1: Achieve Zero Waste Goals for solid waste

Move 4.A: Implement and expand food scraps diversion programs to include additional businesses and multi-family residences. Currently, food scraps are only collected from single-family residences, schools, and larger businesses in Sunnyvale. With food scraps as the largest component of Sunnyvale garbage, expanding food scraps collection to additional businesses and multi-family residents will further reduce food waste going to the landfill and associated GHG emissions.

Move 4.B: Consider solid waste collection and processing improvements to increase waste diversion away from landfills as a part of service provider and facility transition planning. In addition to Sunnyvale residents and businesses reducing their waste, there may be opportunities to increase waste diversion away from landfills by modifying waste collection and processing practices. Additionally, as processing facilities (e.g., SMarT Station®) are slated for renovation or replacement, more efficient technology or practices may be employed to improve waste diversion.

Move 4.C: Implement campaigns for waste prevention. The City's Zero Waste Strategic Plan aims to reduce waste generated in Sunnyvale. As of 2018, the residential disposal rate is 3.3 pounds of waste per person per day. Consumer goods require energy to be manufactured, packaged, and transported from where they are produced to where they are consumed. These upstream consumption-based emissions are typically not represented in the standard communitywide GHG inventory. When less waste is generated and sent to the landfill, fewer GHG emissions are released. This campaign to reduce the production of waste may include efforts to encourage the public to reduce waste generation, reuse or upcycle everyday items, spur producer responsibility for less packaging, advocate for legislative and regulatory actions at the local and regional level, and develop incentives and/or disincentives to guide particularly impactful consumer actions.

Play 4.2: Ensure resilience of water Supply

Move 4.D: Promote and seek incentives for making water conservation a way of life and set a water reduction target consistent with new statewide requirements. Given Sunnyvale's location in a drought-prone area with heavy reliance on drinking water sources outside the City's boundaries, water conservation needs to be a way of life. Reduced water use and wastewater production may reduce GHGs emitted during the extraction, purification, and distribution of water, in addition to ensuring the sustainability of our water supply for the future.

Move 4.E: Partner with Valley Water to evaluate opportunities to expand water reuse. Expanding the existing use of recycled water (e.g., to Apple Campus in Cupertino) and exploring opportunities for indirect and direct potable reuse of treated wastewater at a regional level are critical to long term water sustainability. Water reuse options provide a sustainable supply source and also have a lower carbon footprint than other alternative water supply options like desalination.

Play 4.3: Enhance natural carbon sequestration capacity

Move 4.F: Implement the City's Urban Forest Management Plan and continue to protect and greatly expand tree canopy. Urban trees sequester carbon, provide shade that can lower heating- and cooling-related energy consumption in buildings, serve as green features that can reduce flooding, and provide an outlet to connect to nature in a city environment. Continuing to protect and expand the tree canopy by implementing the Urban Forest Management Plan³ will improve both environmental quality and quality of life.

Move 4.G: Implement the City's Green Stormwater Infrastructure Plan. Stormwater runoff from an urban area like Sunnyvale contains trash, debris and pollutants that are carried into the Bay. Green infrastructure involves natural and physical treatments, such as permeable pavement, rain gardens and bioswales, that reduce and treat stormwater at its source. The City's Municipal Regional Stormwater Permit requires the City to develop and implement a

Strategy 4: Managing Resources Sustainably



long-term Green Stormwater Infrastructure Plan to reduce watershed pollution. Beyond reducing water pollution and flood risk, many of the vegetative features also increase carbon sequestration, thereby reducing net carbon emissions.

Play 4.4: Promote awareness of sustainable goods and services

Move 4.H: Promote consumer awareness of sustainable food choices. Our food habits have significant GHG emission consequences as food eaten in Sunnyvale may be produced through energy-intensive processing and may travel long distances to reach our tables. Educating the public and the local food industry about the benefits, environmental and otherwise, of eating food that is locally grown, organic and more plant-based may shift our collective ethic. The City can lead by example by considering the carbon footprint of food served at City-sponsored events.

Move 4.I: Work with large businesses to identify best practices for implementing local food gardens. Large businesses with corporate cafeterias that serve food to thousands of employees everyday have an opportunity to make a big impact in their carbon footprint. The distance traveled by food served in our local communities has associated energy and transportation emissions. By cultivating a portion of the food served locally onsite at large businesses, such businesses can lower their corporate carbon emissions while also inspiring their workforce to consider low carbon foods. Though currently uncommon, a few businesses in Sunnyvale that are committed to innovative environmental stewardship are piloting local food gardens. The City will work with these businesses to identify, hone and share best practices to empower other businesses to follow suit.



























Strategy 4: Managing Resources Sustainably



Play 4.1: Achieve Zero Waste goals for solid waste

TARGET:

















- 2030: Reduce landfilled garbage to 1 lb per person per day
- 2050: Reduce landfilled garbage to <1 lb per person per day

Next Moves		Lead	Impacts				FY20	FY21	FY22
4.A	Implement and expand food scraps diversion programs to include additional businesses and multi-family residences.	ESD	   	   	●	●	●		
4.B	Consider solid waste collection and processing improvements to increase waste diversion away from landfills as a part of service provider and facility transition planning.	ESD	   	   	●	●	●		
4.C	Implement campaigns for waste prevention.	ESD	   	   	●	●	●		

Play 4.2: Ensure resilience of water supply

TARGET:

- Targets will be determined as per state requirement

Next Moves		Lead	Impacts				FY20	FY21	FY22
4.D	Promote and seek incentives for making water conservation a way of life and set a water reduction target consistent with new statewide requirements.	ESD	   	   	●	●	●		
4.E	Partner with Valley Water to evaluate opportunities to expand water reuse.	ESD	   	   	●	●	●		



GHG Avoided



Local Environmental Quality



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Strategy 4: Managing Resources Sustainably



Play 4.3: Enhance natural carbon sequestration capacity

TARGET:

- Supports broader net carbon reductions

Next Moves		Lead	Impacts				FY20	FY21	FY22
4.F	Implement the City's Urban Forest Management Plan and continue to protect and greatly expand tree canopy.	DPW							
							•	•	•
4.G	Implement the City's Green Stormwater Infrastructure Plan.	ESD							
							•	•	•

Play 4.4: Promote awareness of sustainable goods and services

TARGET:

- Supports broader emissions reductions

Next Moves		Lead	Impacts				FY20	FY21	FY22
4.H	Promote consumer awareness of sustainable food choices.	ESD							
									•
4.I	Work with large businesses to identify best practices for implementing local food gardens.	ESD OCM							
								•	•



GHG Avoided



Local Environmental Quality



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Next Moves for Strategy 5: Empowering Our Community



Achieving Sunnyvale's climate objectives will require active participation from the whole community including businesses, residents, community-based organizations and all city departments. The City will continue to empower the community with the necessary information, incentives and tools to advance climate action. Through partnership with our community organizations and diverse leaders, we can transform the buildings we live and work in, the way we get around and the way we consume goods and services. Effective engagement and outreach go hand-in-hand with progressive policies and programs that facilitate the decarbonization of our City. Our Next Moves focus on working with neighborhoods, home owners, corporations and their employees. The City will also harness the aspirational power of our youth to expand awareness to our next generation.

Strategy 5: Empowering Our Community



Play 5.1: Enhance Community Awareness and Engagement

Move 5.A: Pilot a targeted grassroots community engagement strategy (e.g., Cool Blocks Program¹³) to create stronger connections between neighbors to advance climate action and emergency preparedness. This initiative aims to bring neighbors together at a very localized level to strengthen community, advance climate action and prepare for natural disasters. Participants in other Bay Area communities with this type of program cut their household carbon emissions by 30% on average. Neighbors learn about climate action behaviors together and collectively shape a local ethic of environmental conscientiousness and preparedness.

Move 5.B: Evaluate opportunities for the City to provide online resources and tools for community and small business climate action (e.g., resource center for retrofit electrification, online tool or app to track individual carbon emissions). There are online resources available to help residents and businesses reduce their carbon footprints, but finding the right information can be overwhelming. Curating an online resource center, tool, or app with user-friendly climate action resources will make it easier for community members to access and understand their carbon impact and to take actions to reduce it.

Move 5.C: Create a stronger social media and web presence for Sunnyvale climate action. Sunnyvale's website and social media channels are effective avenues to reach and communicate with many Sunnyvale residents. Discussing climate action on social media can educate and frequently remind followers in an approachable way about pro-environmental behavior. By expanding existing efforts, Sunnyvale's social media audience will grow, information will be updated more often and posts can be better catered to our audience with more interactive media like videos, polls and livestreams.

Move 5.D: Implement the Sustainability Speaker Series¹⁴. This event series brings renowned experts in sustainability research and policy development to share their ideas and innovations with our community. Implemented in partnership with the Sustainability Commission, each event fosters discussion, brings the community together and inspires individuals to take

climate action into their own hands.

Move 5.E: Pilot and evaluate a program for youth engagement on climate, building on current engagement with school classrooms and green teams. Youth are among the most receptive populations to respond positively to calls for climate action and influence their households' environmental behaviors. Educating the next generation of our community to be sustainability advocates is important to continue climate action going forward. To build on current engagement with school classroom and green teams on environmental topics, this program will expand the conversation to climate action.

Move 5.F: Build relationships with largest employers to collaborate on climate action, such as: (a) engaging employees to participate in sustainability initiatives; (b) encouraging and facilitating investment in climate action programs or projects. Carbon emissions in the business sector can be reduced by changing employee behaviors, from turning off lights and computers at night to commuting to work via alternative modes. The City of Sunnyvale will partner with large employers to encourage employee participation in sustainability initiatives and to seek investment in climate action programs or projects with local benefits.

Play 5.2: Track and Share Data and Tools

Move 5.G: Implement improvements for climate action data performance tracking and reporting progress to the public (e.g., community dashboard). It is important to identify and share our climate action victories and accomplishments with the community. The City will develop a resource such as a community dashboard (e.g., City of Encinitas Climate Action Dashboard¹⁵, City of Richmond Climate Action Open Data¹⁶) to track project progress, improve transparency, and make climate data available and digestible to the public. A list of metrics that will be tracked to monitor Playbook progress is included in *Appendix B: Technical Background*.

Move 5.H: Publish annual greenhouse gas (GHG) inventory. Updating our community about our local GHG emissions on an annual basis keeps the public informed, builds motivation to expand on current progress and conveys the City's commitment to climate action. Regular updates that parse out the GHG emissions associated with each sector also helps inform policy and programming decisions.

























Strategy 5: Empowering Our Community



Play 5.1: Enhance community awareness and engagement

TARGET:









- Supports all other Plays

Next Moves		Lead	Impacts	FY20	FY21	FY22
5.A	Pilot a targeted grassroots community engagement strategy (e.g., Cool Blocks Program) to create stronger connections between neighbors to advance climate action and emergency preparedness.	ESD	   	●	●	●
5.B	Evaluate opportunities for the City to provide online resources and tools for community and small business climate action (e.g., resource center for retrofit electrification, online tool or app to track individual carbon emissions).	ESD	   	●	●	
5.C	Create a stronger social media and web presence for Sunnyvale climate action.	ESD OCM	   	●	●	●
5.D	Implement the Sustainability Speaker Series.	ESD	   	●	●	●
5.E	Pilot and evaluate a program for youth engagement on climate, building on current engagement with school classrooms and green teams.	ESD	   		●	
5.F	Build relationships with largest employers to collaborate on climate action, such as: (a) engaging employees to participate in sustainability initiatives; (b) encouraging and facilitating investment in climate action programs or projects.	ESD OCM	   	●	●	●

Play 5.2: Track and share data and tools

TARGET:

- Supports all other Plays

Next Moves		Lead	Impacts	FY20	FY21	FY22
5.G	Implement improvements for climate action data performance tracking and reporting progress to the public (e.g., community dashboard).	ESD	   	●	●	●
5.H	Publish annual greenhouse gas (GHG) inventory.	ESD	   	●	●	●



GHG Avoided



Local Environmental Quality



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Next Moves for Strategy 6: Adapting to a Changing Climate



Photo credit: Ryan Ferrin

As we continue to experience climate change impacts in the Bay Area and worldwide, Sunnyvale will take steps to better ensure our local community is both prepared for climate disasters and, more importantly, resilient to them.

Recognizing that climate adaptation cannot be addressed single-handedly by one local government, the City will focus on cultivating partnerships with regional entities that are addressing adaptation and on enhancing its participation in regional actions.

In addition, the City will focus on short-term preparedness measures our community can take to resist climate impacts, while simultaneously identifying key future vulnerabilities and strategies to address them in the coming years.

Strategy 6: Adapting to a Changing Climate



Play 6.1: Assess Climate Vulnerabilities for Sunnyvale

Move 6.A: Review and summarize assessment products developed by the County's Silicon Valley 2.0 project and by the State. In 2015, Santa Clara County brought Sunnyvale and other cities together to develop a Countywide vulnerability assessment tool to assess the potential impact of sea level rise on infrastructure and assets in the County, known as Silicon Valley 2.0. The City will continue to participate in this effort and other emerging efforts like it.

Move 6.B: Participate in regional forums on climate vulnerability and adaptation. Climate adaptation efforts necessitate regional discussion to ensure actions effectively and efficiently address risks and don't place adjacent communities in greater harm. Organized regional conversations on climate adaptation are emerging, such as Bay Area Climate Adaptation Network (BayCAN), and various projects facilitated by the Association of Bay Area Governments (ABAG), such as Silicon Valley 2.0. This Move positions the City to participate in these discussions, maintain partnerships with key entities leading adaptation efforts, and stay informed about latest climate adaptation innovations.

Play 6.2: Protect Shoreline Area from Sea Level Rise and Coastal Flooding

Move 6.C: Collaborate with Valley Water to advance a shoreline protection project with the US Army Corps of Engineers or other partners.

Valley Water (formerly Santa Clara Valley Water District) began the Shoreline Project in 2005, to provide sea level rise protection in Santa Clara County in partnership with the United States Army Corps of Engineers (USACE) and the State Coastal Conservancy (Conservancy). The first phase of the Shoreline Protection Project¹⁷, located in north San Jose, has been progressing and recently received federal funding for design and construction. In parallel, Valley Water prepared a Preliminary Feasibility Study for the remaining shoreline areas, including those adjacent to Sunnyvale. This study was completed in March 2017, and USACE has received \$500,000 in their FY 2019 work plan to continue the work to determine

the next phase for project implementation. Sunnyvale staff has remained engaged as a stakeholder in the project and will continue to participate to advocate for a project to protect Sunnyvale's shoreline.

Move 6.D: Identify shoreline protection solutions as part of Moffett Park Specific Plan¹⁸ update. The Moffett Park Specific Plan was adopted in 2004 to provide direction on land use, infrastructure, and design in the northernmost portion of the City, which is mainly commercial and industrial. This part of the City is located right along the Bay and is vulnerable to sea level rise. The Moffett Park Specific Plan is currently being updated to include, among other things, considerations to address future sea level rise.

Play 6.3: Strengthen Community Resiliency

Move 6.E: Update existing emergency preparedness and response plans to address climate-related impacts such as heat events, air quality issues and flooding. While the City has emergency response plans for some events like fire or earthquake, there are no community-specific plans to address response to extreme weather events, which may increase in frequency and severity due to climate change. These include heat waves, intense rain storms, and flooding from sea level rise. This Move calls for cross-departmental collaboration to expand current community-oriented emergency preparedness plans to respond to such events, with particular attention to vulnerable populations during natural disasters.

Move 6.F: Develop a community resilience plan. Climate resiliency means that residents and businesses have proactively prepared for extreme weather events such that they can withstand the duration and after-effects of the event. For the community to be more resilient to extreme heat, rain, and flooding events, the City will develop a community resilience plan to help even the most vulnerable populations be prepared to weather the storms of climate change.

















Strategy 6: Adapting to a Changing Climate



Play 6.1: Assess climate vulnerabilities for Sunnyvale

TARGET:

















- No quantifiable targets

Next Moves		Lead	Impacts	FY20	FY21	FY22
6.A	Review and summarize assessment products developed by the County's Silicon Valley 2.0 project and by the State.	ESD	       	•		
6.B	Participate in regional forums on climate vulnerability and adaptation.	ESD	       	•	•	•

Play 6.2: Protect shoreline area from sea level rise and coastal flooding

TARGET

















- No quantifiable targets

Next Moves		Lead	Impacts	FY20	FY21	FY22
6.C	Collaborate with Valley Water to advance a shoreline protection project with the US Army Corps of Engineers or other partners.	ESD	       	•	•	•
6.D	Identify shoreline protection solutions as part of Moffett Park Specific Plan update.	CDD	       	•	•	

Play 6.3: Strengthen community resiliency

TARGET

- No quantifiable targets

Next Moves		Lead	Impacts	FY20	FY21	FY22
6.E	Update existing emergency preparedness and response plans to address climate-related impacts such as heat events, air quality issues and flooding.	DPS	       		•	
6.F	Develop a community resiliency plan.	DPS	       		•	•



GHG Avoided



Local Environmental Quality



Health & Livability



Community Savings



Partnerships



Future Work Planning & Resources

Future Work Planning & Resources

This Playbook provides an overarching, strategic framework for the City of Sunnyvale to achieve its end game of 80x50. The City envisions that the core elements of the Playbook – the Strategies and Plays – will not change as we progress towards our end game. The Strategies and Plays will continue to be the foundation for Sunnyvale’s ambitious march down the field towards our long-term targets.

As we live in an age and place of abundant technological innovation, we acknowledge that there will be future technologies and creative innovations that we don’t see today but that will drive our society in the decades to come. With uncertainty in our political climate, inevitable changes in the City as an organization, our evolving culture, and future policy changes from the state and federal governments, it is impractical to forecast the specific Moves to achieve all the strategies over a very long time-frame. Our detailed Next Moves, therefore, are deliberately intended to focus on a shorter time horizon so they can be meaningfully integrated into the business of the City and updated dynamically.

The implementation of this Playbook will occur in 5-year cycles. The first cycle is aimed for just three years to take advantage of the dynamic landscape for climate actions among local communities and to give greatest consideration to funding opportunities and partnerships. Subsequent cycles will be every five years. All city departments will be responsible for incorporating the implementation of their designated Moves into departmental work plans. At the close of each cycle, the City will review progress on implementation of all Moves across all departments and on the future projections for community emissions in order to determine the best Next Moves for the subsequent cycle. New Moves will represent local conditions of the time, build on progress to date, and continue to advance assertively toward climate neutrality. An update on current emissions and on implementation progress of the current Moves will also be reported to the City Council, Sustainability Commission, and the community each year as part of a Playbook Scorecard.

The Next Moves chapter presented in this Playbook is our first short-term game plan that we’re calling “Game Plan 2022.” In order to align to the City’s annual budget cycle, Game Plan 2022 addresses implementation through fiscal year 2021-22. An update to the emissions

inventory, based on community performance through 2020, and a proposal for the next Game Plan will be presented to the City Council in early 2022 to inform the budget cycle for the next implementation timeframe, commencing with fiscal year 2022-23.

For Game Plan 2022, staff has evaluated the resource impacts across City departments and identified resources needed for implementation.

Some of the next moves will be absorbed and integrated into existing departmental operating or projects budgets. Additional resources needed over the next three years total \$1.39 million in one-time costs, which includes consultant services, temporary staffing, and infrastructure needs, and \$1.47 million in ongoing costs (approximately \$500,000 each year), which includes three additional staff positions and augmenting the City’s ongoing budget for Playbook implementation. Resources allocated to implementing the Climate Action Playbook will be refined and finalized as part of the annual process for budget development and approval by the City Council.

The City’s strategy to finance the implementation of the current and future game plans will evolve over time. Strategies that the City may consider could include:

- Leveraging partnerships and collaborative projects, particularly through Silicon Valley Clean Energy
- Developing a differential utility use tax (UUT) to incentivize electrification
- Charging carbon impact fees for development projects
- User fees for selected activities and services
- Paid parking in selected locations
- Transportation impact fees

Game Plan 2022

- Game Plan 2022 implemented through fiscal year 2021-2022
- Annual Playbook Scorecard to report progress
- Game Plan 2027 proposed in early 2022

Terms and Acronyms

40x30	40% greenhouse gas reductions by 2030
80x50	80% greenhouse gas reductions by 2050; equivalent to “carbon neutral”
BAU	Business-as-usual
CAC	Community Advisory Committee
CAP	Climate action plan
CAP 1.0	Sunnyvale’s Climate Action Plan (2014)
CAP 2.0	Initiative to Update Climate Action Plan 1.0; Playbook is the product of the CAP 2.0 Initiative
Carbon neutral	GHG emissions reduced by 80% from 1990 levels by 2050, with potential for remaining emissions to be addressed by carbon sequestration
DA	Direct Access
EV	Electric vehicle
EVCI	Electric vehicle charging infrastructure
GHG	Greenhouse gas
MTCO ₂ e	Metric tons of carbon dioxide equivalent
PV	Photovoltaic (solar energy)
SVCE	Silicon Valley Clean Energy
TNC	Transportation Network Company (e.g., Uber, Lyft)
VMT	Vehicle miles traveled

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LinkedIn
Plug and Play

Consultant Team

DNV GL
OpenIDEO
Fehr & Peers
Acterra
Ascent Environmental

Community Members

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