CLIMATE ACTION PLAYBOOK Update and Game Plan 2028

Sunnyvale

June 2024

City Manager's Note

The City of Sunnyvale is pleased to release the next work plan for climate action in Sunnyvale; Game Plan 2028. Along with this work plan, Sunnyvale is committing to more aggressive carbon neutrality goals.

In 2019, the City adopted the Climate Action Playbook along with Game Plan 2022. Just as a sports playbook identifies a team's winning strategies for achieving success on the field, the Playbook contains winning strategies to meet California's targets for carbon neutrality. Game Plan 2022 laid out a three-year work plan of specific actions (Next Moves) for the City and community to take to catapult Sunnyvale towards our targets. Amidst Game Plan 2022, the COVID-19 pandemic hit, causing a delay in implementing all of Sunnyvale's Next Moves. Game Plan 2022 was extended and renamed Game Plan 2023. We learned a lot about the impact of behavior change on emissions through the pandemic and will see some changes carry through.

Game Plan 2028 is the next work plan for Sunnyvale to continue reducing emissions towards the 56% reduction goal by 2030. To align with new State targets, the Playbook's carbon neutrality target is being updated to 85% below 1990 levels by 2045. This Game Plan and Playbook update 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.

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. This Game Plan and Playbook Update will keep Sunnyvale in the lead and on track to carbon neutrality.

The Game Plan and Playbook Update is available at the following link:

SunnyvaleClimateAction.org

We look forward to working with you all to take bold climate action and help Sunnyvale achieve its 2045 target.

Kent Steffens
City Manager

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Executive Summary

Executive Summary

Sunnyvale adopted its first Climate Action Plan (CAP 1.0) in 2014 and has already achieved its 2020 greenhouse gas (GHG) emissions target. Sunnyvale adopted the Climate Action Playbook (CAP 2.0) in 2019. The Playbook set carbon reduction goals of 56% below 1990 levels by 2030 ("56x30") and 80% below 1990 levels by 2050 ("80x50"). With the Playbook, Sunnyvale also adopted Game Plan 2022. The Game Plan lays out specific actions (Next Moves) for the City and community to take to stay on the path toward carbon neutrality.

Game Plan 2028 and accompanying Playbook updates lay out a five-year plan to bring Sunnyvale to its 2030 goal line. Sunnyvale is also updating the Playbook's carbon neutrality target to align with the State's new target of 85% below 1990 levels by 2045 ("85x45"). This Game Plan will set Sunnyvale up to achieve this new carbon neutrality goal. The Playbook updates also fulfill the California Environmental Quality Act (CEQA) guidelines allowing for programmatic CEQA streamlining of project GHG emissions.

Game Plan 2028 identifies 66 Next Moves for the City and community to take over a five-year period. These Moves build upon our past success while integrating new, bold, breakthrough ideas. Implementation of Game Plan 2022 was impacted by the COVID-19 pandemic and extended a year to be renamed Game Plan 2023. **Despite the pandemic impacts, Sunnyvale achieved some major milestones throughout Game Plan 2023:**

- adoption of all-electric Reach Codes
- adoption of plans prioritizing mixed land use and transit such as the Lawrence Station Area Plan, El Camino Specific Plan and Moffett Park Specific Plan
- update, adoption and implementation of the Active Transportation Plan
- launch of programs like Cool Cooktops and Drive Electric

Building off Game Plan 2023, about half of the Moves in Game Plan 2028 are returning players. To develop the new Moves, we sourced more than 170 ideas from our community (see Appendix A: Ideas Roster). We also worked closely with City staff and engaged a consultant team for technical analysis.

While our most recent emissions numbers are from 2021, both 2020 and 2021 emissions are impacted by the COVID-19 pandemic shelter in place order. Sunnyvale used emissions from 2019 to forecast emissions and Game Plan 2028 reductions. **With our current line of scrimmage (2021) at 31% below 1990 levels, we are well-positioned to meet the state's 2030 target of 40%.** However, Sunnyvale set a higher goal than the state for 2030 calling for steeper reductions in emissions, even as Sunnyvale's emissions are forecasted to increase with anticipated growth and the return to pre-COVID activity levels.

To reach Sunnyvale's goal of 56x30, the City must try new, leading-edge ideas. Emissions from transportation and natural gas use now make up more than 75% of Sunnyvale's current emissions. Electric vehicle adoption is on the rise in Sunnyvale. While this helps reduce transportation emissions, we need to accelerate the adoption rate in the next five years. Sunnyvale also now requires all-electric new construction through Reach Codes. In Game Plan 2028 we will turn our focus to reducing natural gas use in existing buildings.

The 66 Next Moves are planned for implementation over five fiscal years between 2024-2028.. 33 of the Moves are returning from Game Plan 2023. Year one of this Game Plan consists of these Moves and staff have continued progress on these with existing resources while Game Plan 2028 was finalized and developed. One-time costs needed over the next four years of the Plan total $2.1 million which includes consultant services, advertising, infrastructure needs and one temporary position. Four new permanent staff positions to implement Game Plan Moves are adding approximately $800,000 per year in ongoing costs. Game Plan resource needs have been refined and finalized through the annual budget process, approved by City Council on June 18, 2024.

The Playbook Game Plans are intended to be dynamic. They will be revised every five years to account for the changing regulatory context, evolving technologies, behavior trends, and community needs. Future Game Plans and their associated Next Moves will support the City furthering our progress toward our carbon neutrality target. 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 85x45**. This Game Plan and Playbook update provide 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 2045

Strategy 1: Promoting Clean Electricity		
Play 1.1	Promote 100% clean electricity	2030 Target: 100% participation in clean electricity 2045 Target: 100% participation in clean electricity
Play 1.2	Increase local solar photovoltaics	2030 Target: 3% of load from local solar 2045 Target: 5% of load from local solar
Play 1.3	Increase distributed electricity storage	2030 Target: 2% of electricity demand stored in batteries locally 2045 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 2045 Target: 30% of existing homes and businesses receive deep energy retrofit
Play 2.2	Support electrification of existing buildings	2030 Target: 44% reduction in residential and 38% reduction in commercial natural gas use 2045 Target: 92% reduction in residential and 86% reduction in commercial natural gas use
Play 2.3	Achieve all-electric new construction	2030 Target: 100% all-electric new buildings 2045 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 2045 Target: 30% reduction in vehicle miles per person
Play 3.2	Increase transportation options and support shared mobility	
Play 3.3	Increase zero-emission vehicles registered in Sunnyvale	2030 Target: 42% of all vehicles on road are zero-emission vehicles 2045 Target: 90% of all vehicles on road are zero-emission vehicles
Play 3.4	Decarbonize off-road equipment and vehicles	2030 Target: 30% of off-road equipment and vehicles are zero-emission 2045 Target: 75% of off-road equipment and vehicles are zero-emission

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 and achieve 75% diversion of landfilled organics 2045 Target: Reduce landfilled garbage to <1 lb per person per day and achieve 75% diversion of landfilled organics
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

The Playing Field

Playbook Updates

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. In 2022, the State adopted a more aggressive carbon neutrality target of 85% reduction from 1990 levels by 2045 (Assembly Bill 1279)[1].

In September 2022, Governor Newsom established the California Climate Commitment which refers to goals supported both through policy adoption and the state budget. Other policies were adopted alongside AB 1279 to support California's drive toward carbon neutrality. The Climate Commitment dedicated funding toward a variety of climate strategies, but most notably are electric vehicles, public transportation, energy reliability, and drought resilience. In December 2022, the California Air Resource Board finalized the 2022 Scoping Plan[2] for Achieving Carbon Neutrality in alignment with AB 1279.

In order to align with the new state carbon neutrality target and the 2022 Scoping Plan and ensure Sunnyvale will reach its 2030 target, Sunnyvale's Playbook is being updated to reflect:

- Adoption of a new carbon neutrality target of 85% reduction below 1990 levels by 2045.
- Updating all Play metric goals to be achieved by 2045 (instead of 2050) and adjusting some 2030 metric goals based on updated forecasts.
- Adoption of new Play 3.4: Decarbonize off-road equipment and vehicles and associated metric.

Game Plan 2028 was developed based on the new 2045 carbon neutrality target, updated Play metrics and additional Play. The 66 Next Moves within the Game Plan will put Sunnyvale on track to meet its 2030 and make substantial progress towards our 2045 targets. Future Game Plans, developed in five-year increments, will map out Sunnyvale's continued progress toward our targets.

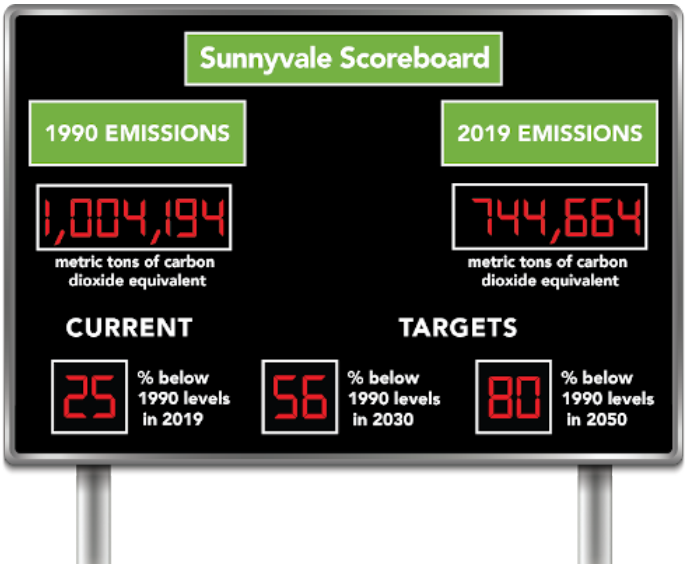
As the "Heart of Silicon Valley" within the Bay Area, Sunnyvale is committed to doing its part to sustain future generations.

Our Accomplishments

Tracking our Progress

In 2020, Sunnyvale launched its Climate Action Scoreboard. This is an interactive dashboard that displays Sunnyvale's GHG Inventory, key metrics, the status of Game Plan Moves, and much more. This allows the community to see how Sunnyvale is progressing towards its climate related target. It also serves as a resource for people to learn more about why certain actions are important and how to get involved.

The Scoreboard is updated annually to display the new GHG Inventory results, metric updates, and Move statuses. Once Game Plan 2028 is adopted, the Scoreboard will be updated to reflect the new Game Plan Moves. The Playbook sections will be updated with new goals and relevant information. Sunnyvale will maintain annual updates throughout the implementation of all five years of Game Plan 2028.



Game Plan 2023 Achievements

Along with the Playbook, Game Plan 2022 was adopted in 2019. It was intended to be a three-year Game Plan implemented from 2019-2022 containing 46 Next Moves. However, in 2020 the COVID-19 pandemic hit and impacted City operations and life in a big way. Due to these impacts, Game Plan 2022 was extended by one year and renamed Game Plan 2023.

Apart from needing to pause Moves as the City adjusted to the shelter in place order, the way that Moves were implemented also changed. Many of the community engagement or business community targeted Moves were impacted. These changes have sustained throughout the implementation of Game Plan 2023, as we are only now starting to see what life post-pandemic might look like.

Despite this curve ball, the City was able to achieve some major milestones! Some of the biggest accomplishments include:

- Adoption of Reach Codes requiring all-electric new construction and increased solar and EV requirements.
- Adoption of area plans that increase diverse housing and multi-use buildings near transit, including the Moffett Park Specific Plan
- Adoption and implementation of the updated Active Transportation Plan
- Launch of the shared scooter program, Cool Cooktops induction loaner program, and Drive Electric program
- Increasing our electric vehicle fleet to 11 vehicles and 10 charging stations
- Installation of 12 DC fast charging stations in City owned parking lots in Sunnyvale
- Completed the roll-out of the food scraps program to all multifamily dwellings
- Launch of the Climate Action Scoreboard

Current Emissions

2021 GHG Emissions in Sunnyvale

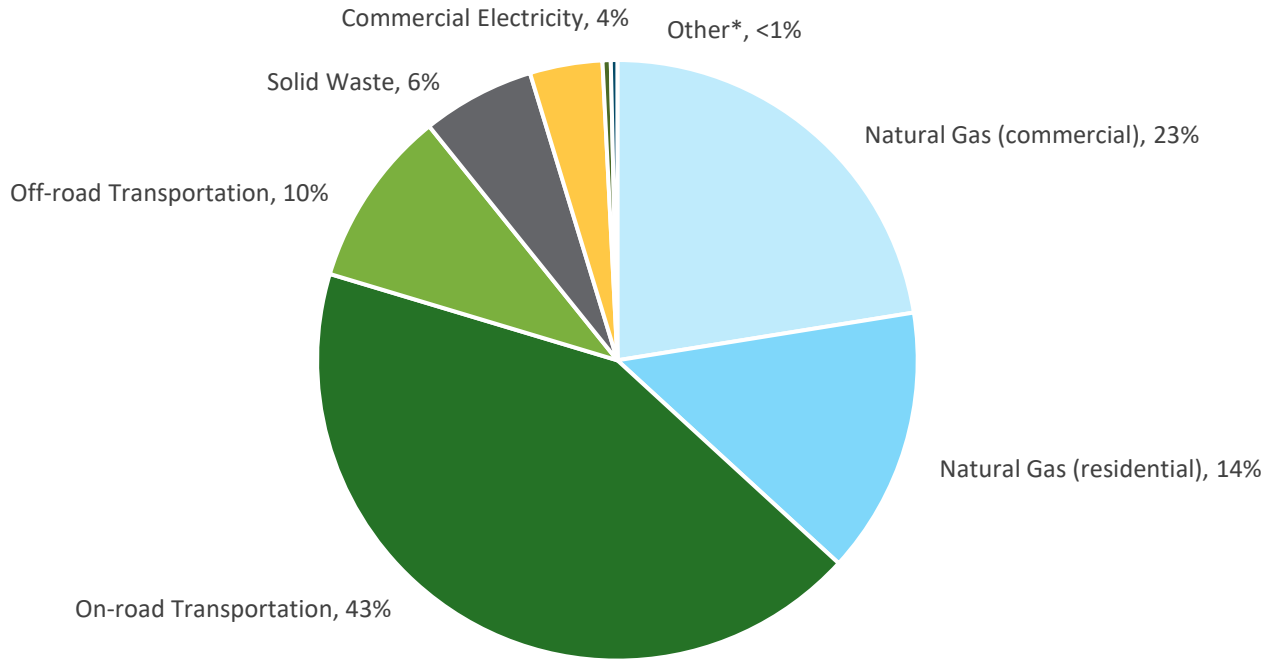
In 2021, Sunnyvale emitted 688,738 metric tons of carbon dioxide equivalent ($MTCO_2e$), representing a 31% decrease in emissions below 1990 levels. On-road transportation made up the largest share of Sunnyvale's GHG emission in 2019 (43%) followed by natural gas consumption in residential and commercial buildings (36%).

By the end of 2021, 98% of Sunnyvale's residents and businesses were purchasing carbon-free electricity from SVCE. By reducing the share in electricity emissions, the focus is now on transportation and natural gas use. These two sectors make up 82% of Sunnyvale's emissions. While we are driving more and more, we are doing so with less dependance on fossil fuels. EV and hybrid car adoption is on the rise. Although natural gas use is increasing, Sunnyvale passed an all-electric reach code ordinance. This will prevent new buildings from contributing to natural gas emissions.

Off-road sector emissions increased over 300% in 2021, due to an increase in the number of homes constructed in Sunnyvale. While this was an anomaly year, off-road sector emissions are becoming an important slice of Sunnyvale's emissions pie. The Playbook update includes Play 3.4 Decarbonize off-road equipment and vehicles, to help reduce emissions in this sector.

Implementation of Game Plan 2023 Moves for reducing waste have helped keep the emissions in this sector stable. Emissions from water, wastewater and Caltrain remain less than 1% of Sunnyvale's community-wide emissions inventory.

Sunnyvale 2021 Communitywide GHG Emissions by Source



*"Other" represents emissions associated with water and wastewater

Current Emissions

Lessons Learned from COVID-19

While 31% below 1990 levels is nearing our goal of reaching 56% below 1990 levels by 2030, we still have some work ahead of us. The COVID-19 pandemic caused a significant drop in emissions in 2020. Emissions dropped to 44% below 1990 levels surpassing the state 40x30 goal. However, as expected, emissions began to rise in 2021 as COVID impacts lessened. We expect to see emissions continue to rise in 2022 and 2023 as activity in Sunnyvale returns to pre-pandemic levels.

The biggest impact from the COVID-19 shelter in place order was reduced travel. Transportation emissions dropped 29% in 2020. As the shelter in place order was lifted, emissions in this sector increased 10% in 2021. We expect this to increase again in 2022. Moving forward, we can look at pandemic outcomes like slow streets and telework policies as permanent solutions to helping reduce transportation emissions.

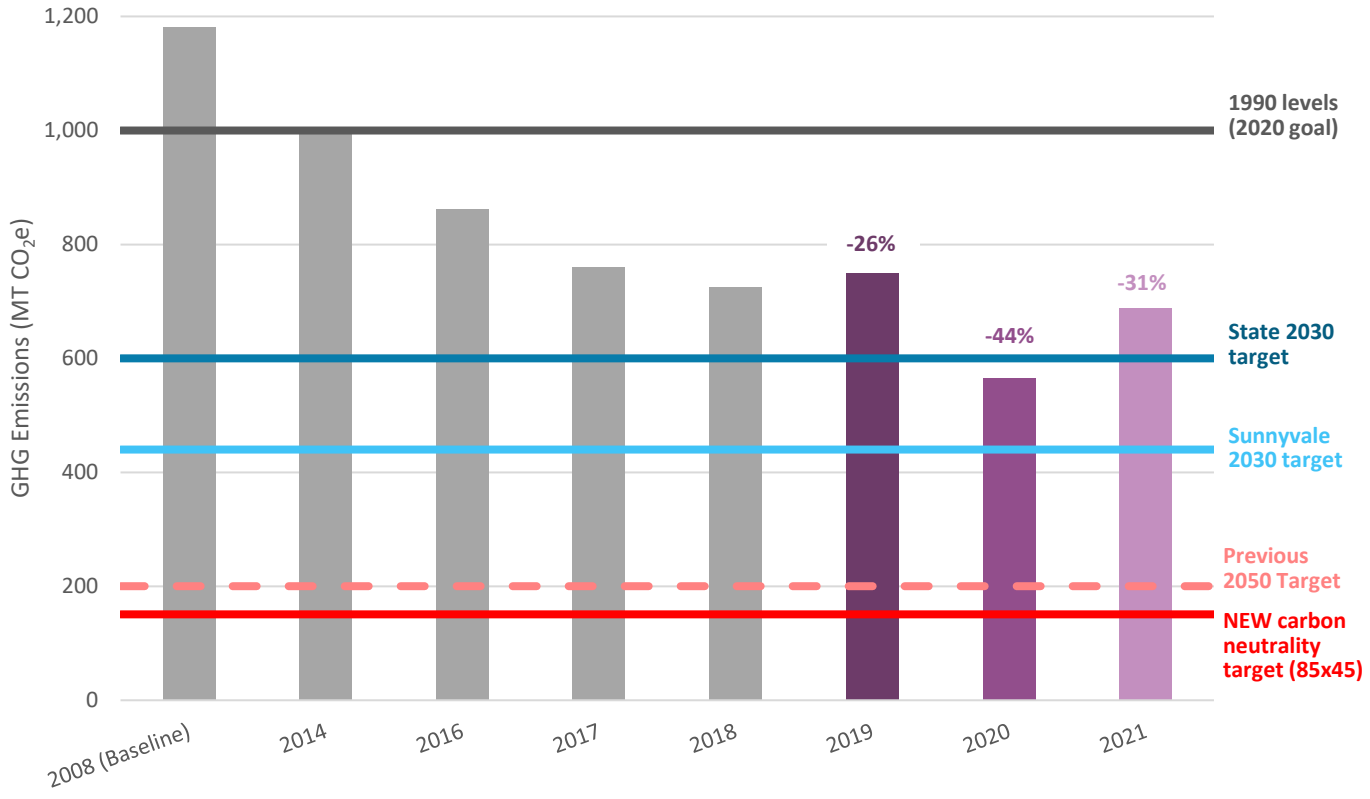
Forecasting from 2019

Both the 2020 and 2021 inventories do not represent a normal year in Sunnyvale. The following anomalies impacted emissions inventories in 2020 and 2021:

- Commercial electricity emissions were 0 in 2020 due to a reporting change. Commercial electricity emissions went back to expected levels in 2021.
- Off-road emissions increased over 300% in 2021 due to increased construction activity in Sunnyvale. Off-road emissions are expected to decrease in 2022, closer to 2019 levels.
- Transportation emissions were significantly reduced in both years due to the shelter in place order.

Due to the COVID-19 impacts as well as these data anomalies, Sunnyvale's 2019 Community-wide emissions inventory was used to forecast emissions for Game Plan 2028.

City of Sunnyvale GHG Emissions and Targets



Future Scenarios: 2030 and 2045

GHG Emissions Forecast

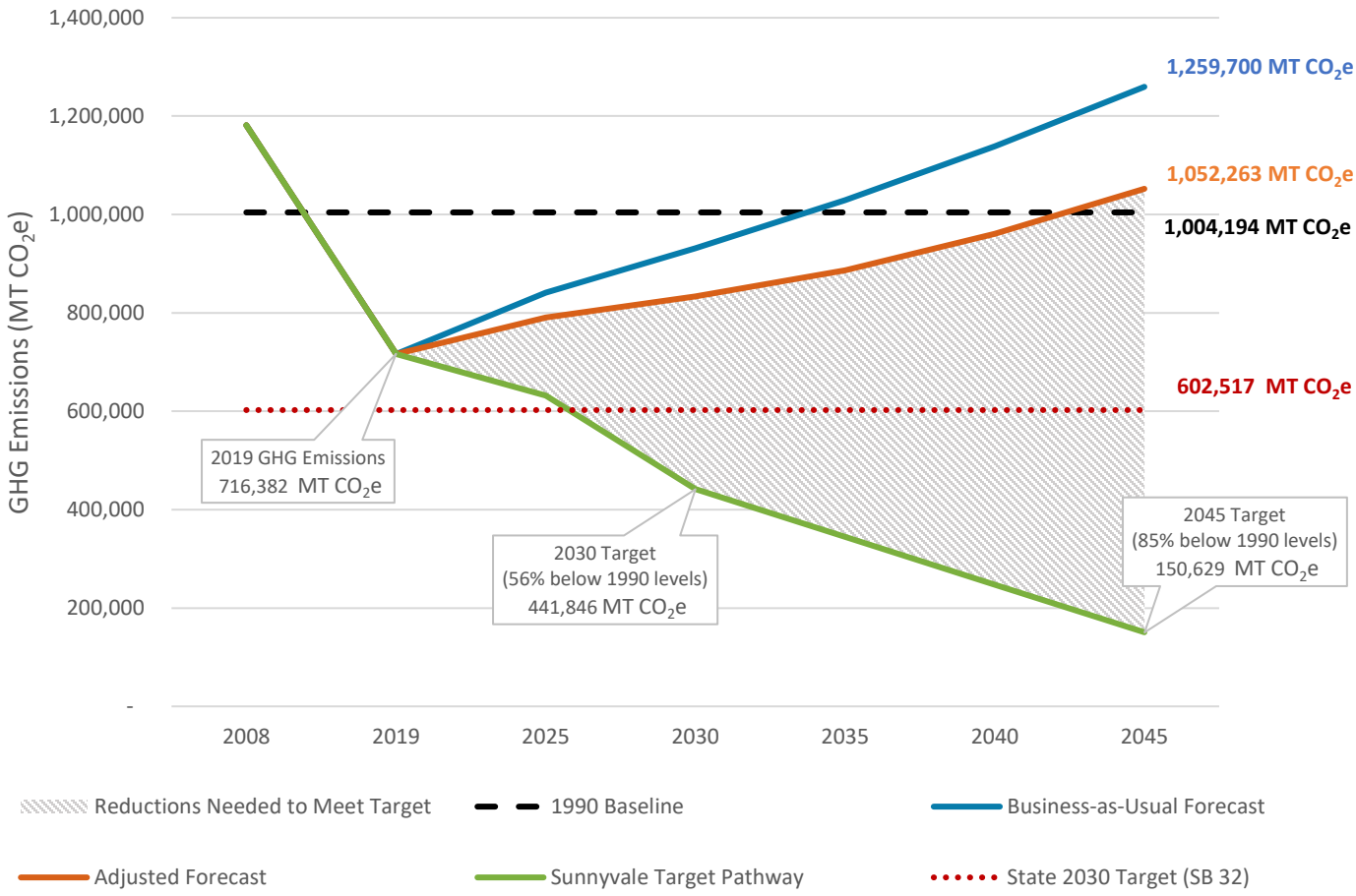
To understand the level of action the City must undertake to achieve the 2030 and 2045 GHG emission reduction targets, it is necessary to consider how projected growth and state legislative actions will impact future GHG emissions in Sunnyvale.

Sunnyvale's GHG emissions are forecasted with a *business-as-usual scenario* and an *adjusted scenario*. The business-as-usual scenario shows how GHG emissions would change based on projected population, housing, and job growth in Sunnyvale. The adjusted scenario demonstrates how currently adopted state legislation would reduce GHG emissions from the business-as-usual scenario.

Key state legislation included in the adjusted scenario include:

- Renewable Portfolio Standard (Senate Bill 100 and Senate Bill 1020)
- Building Energy Efficiency Standards (Title 24, Part 6 of the California Code of Regulations)[3]
- Advanced Clean Cars Program (introduced by the California Air Resources Board in 2012)[4]

As shown below, Sunnyvale's adjusted GHG emissions are forecasted to increase through 2030 and 2045. This growth is projected despite key state initiatives to make electricity, buildings and on-road vehicles less carbon intensive.



[3]The 2019 Building Energy Efficiency Standards were incorporated into the adjusted scenario. The 2022 Building Energy Efficiency Standards were not incorporated due to lack of data made available by the State.

[4]The latest Advanced Clean Cars II regulations expanded the Advanced Clean Cars Program but were not incorporated into the adjusted forecast because the State has not yet updated emissions models with the regulation's impacts.

Future Scenarios: 2030 and 2045

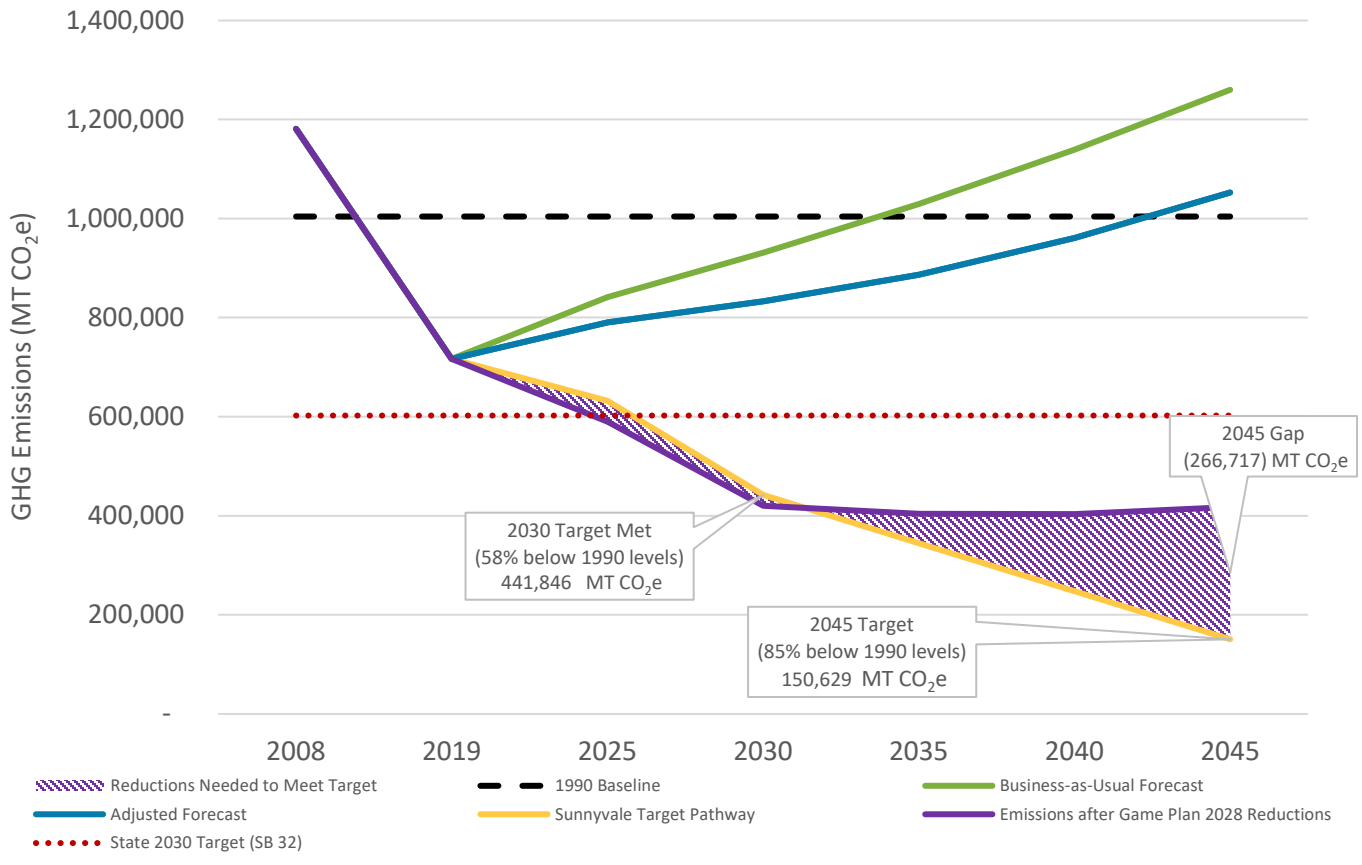
Meeting the Targets

The figure below also shows the target pathway Sunnyvale aims to achieve. Sunnyvale has adopted a short-term target that exceeds state goals (Senate Bill 32) to reduce GHG emissions 56% below 1990 levels by 2030 (56x30). Sunnyvale has also adopted a long-term target to reduce GHG emissions 85% below 1990 levels by 2045 (85x45) to help the State achieve carbon neutrality by 2045 (Senate Bill 1279).

The distance between the adjusted forecast and Sunnyvale's target pathway in the figure below represents the GHG emission reductions Sunnyvale will need to achieve through local action to reach the 2030 and 2045 targets.

Game Plan 2028 establishes the local actions that, once implemented, will achieve Sunnyvale's 2030 target and make progress on 85x45. While these local actions will not achieve 85x45 alone, they will put the programs and infrastructure in place to enable Sunnyvale to reduce future GHG emissions. For this reason, it is critical that Sunnyvale exceeds the State's 2030 goal to set Sunnyvale on a feasible trajectory to reach 85x45. Future Game Plan updates will establish the local actions that will help Sunnyvale reach beyond these 2030 GHG emission reductions to achieve 85x45. These updates will be built upon the progress Sunnyvale makes on Game Plan 2028 implementation, new legislation actions the State establishes to reduce GHG emissions, and growth in GHG emission reduction technology markets.

The figure below shows the GHG emission reduction pathway that will be achieved through local actions included in the Game Plan 2028. Once implemented, these local actions will allow Sunnyvale to meet our 2030 target. The figure also shows the GHG emissions gap remaining through 2045 that will need to be reduced through additional local actions in future Game Plan updates.



CEQA Streamlining

CEQA is a California statute that requires state and local agencies to evaluate the environmental impacts, including impacts from GHG emissions, associated with the construction and operation of new development projects. GHG emissions have the potential to adversely affect the environment on a cumulative basis through climate change. CEQA is designed to inform decision makers and the public about the potential environmental impacts of proposed projects, and to mitigate those environmental impacts to the extent feasible.

The CEQA Guidelines provide an option for new projects to streamline the CEQA analysis of GHG emissions by tiering off of a "qualified" GHG reduction plan. As a long-term programmatic plan that is implemented through regular updates to exceed the State's SB 32 GHG emission reduction goal and demonstrate substantial progress towards the State's AB 1279 GHG emission reduction goal, the Playbook has been prepared in accordance with CEQA Guidelines § 15183.5(b) as a qualified GHG reduction plan. Pursuant to CEQA Guidelines § 15183.5(b), a qualified GHG reduction plan and its accompanying environmental documentation are consistent with the criteria set forth in CEQA Guidelines Section 15183.5(b).The table below outlines the criteria Sunnyvale's Playbook is consistent with and identifies the Playbook section or document that provides a description of each criterion.

Because the Playbook meets these requirements, if projects and plans within Sunnyvale are consistent with the Playbook, CEQA analysis can be streamlined by presuming the project's GHG emissions are not significant. These projects and plans can utilize the CEQA GHG Emissions Analysis Compliance Checklist to demonstrate consistency in a streamlined process. Projects and plans within Sunnyvale that are not consistent with the Playbook, must complete a different assessment utilizing quantitative thresholds of significance to evaluate GHG emissions impacts.

Consistency with CEQA Guidelines § 15183.5(b)

CEQA Criteria		Game Plan 2028 Sections
A.	Quantify GHG emissions, both existing and projected over a specified time period, resulting from activities within a defined geographic area.	The Playing Field - Current Emissions
B.	Establish a level, based on substantial evidence, below which the contribution to GHG emissions from activities covered by the plan would not be cumulatively considerable.	The Playing Field - Meeting the Targets
C.	Identify and analyze the GHG emissions resulting from specific actions or categories of actions anticipated within the geographic area (See Greenhouse Gas Emissions Forecast as well as Appendix X: Greenhouse Gas Forecast Report).	The Playing Field - Greenhouse Gas Emissions Forecast
D.	Specify measures or a group of measures, including performance standards, that substantial evidence demonstrates, if implemented on a project-by-project basis, would collectively achieve the specified emissions level.	The Plays and Game Plan 2028
E.	Establish a mechanism to monitor the plan's progress toward achieving the level and to require amendment if the plan is not achieving specified levels.	Monitoring Plan
F.	Be adopted in a public process following environmental review.	*Pending Adoption*

Photo credit: Alfred Leung

Game Plan 2028: Our Next Moves

Game Plan 2028: Our Next Moves

Focusing Our Efforts

Strategies and Plays are critical to guiding Sunnyvale towards our 85x45 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 five 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 2028 are intended to help Sunnyvale achieve our 2030 targets. The Moves will be updated in alignment with department work plans every five years, to ensure that climate action priorities are consistently and continually woven throughout City operations. The City will review research and studies on implementation costs for the proposed Moves.

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

- Researching the viability of new ideas;
- Development of new policies;
- 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 2028 are provided in the pages that follow. A summary view of the Next Moves is provided on from page 23 to 25.

Photo credit: Felicia Kieselhorst

Determining Carbon Savings Potential

The Next Moves were prioritized from our list of community ideas (see *Appendix B: 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 5-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.M Develop a Community EV Readiness and Infrastructure Plan*, the carbon savings potential assumes implementation of a plan resulting in an EV adoption rate consistent with the measurable target associated with the Play (i.e., 20% of all vehicles are zero-emission by 2030).

- **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 Playbook implementation progress and ensure Sunnyvale is on track to 85x45. Lifecycle- or consumption-based emissions are not accounted for.

  For example, for *Move 4.A: Implement campaigns for waste reduction*, 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 (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.

Returning Move
Move is returning from Game Plan 2023.

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
LRS	Library and Recreation Services
HRD	Human Resource Department

Game Plan 2028 At-a-Glance

Strategy 1: Promoting 100% Clean Electricity

1.A	23	Continue to support and steer Silicon Valley Clean Energy (SVCE) in providing electricity from a mix of carbon-free and eligible renewable sources and decarbonization programs to the Sunnyvale community.
1.B	23	Collaborate with SVCE to target Direct Access (DA) customers to shift to 100% clean electricity.
1.C		Implement an Organic Waste-to-Energy program at the Donald M. Somers Water Pollution Control Plant.
1.D		Continue to enforce Reach Code solar panel requirements and Moffett Park Specific Plan policies to increase solar energy generation and storage in Moffett Park and throughout the community.
1.E	23	Collaborate with SVCE to evaluate opportunities for community-scale energy storage to maximize utilization of local solar supply and to enhance resiliency.
1.F		Support a shared thermal energy system with energy storage at Moffett Park to serve as a potential model for other areas.

Strategy 2: Decarbonizing Buildings

2.A	23	Research and develop energy disclosure and energy benchmarking requirements for existing commercial and multi-family residential buildings to encourage property owners and managers to invest in energy efficiency upgrades and building information systems.
2.B		Update the local Green Building Program by FY 2024/25 to incentivize energy efficiency measures and the achievement of net zero energy in existing buildings.
2.C		Conduct a municipal GHG emissions inventory every three to five years and continue tracking measure implementation.
2.D	23	Develop an engagement and incentive program to accelerate the adoption of all-electric appliances.
2.E	23	Eliminate non-electric sources of power in municipal buildings upon rebuild or significant remodel.
2.F		Develop and implement an existing residential building electrification strategy (RBES).
2.G		Adopt an electrification ordinance for existing residential buildings by 2026.
2.H		Conduct a study to evaluate the feasibility of adopting an end-of-flow ordinance for natural gas by 2045.
2.I		Develop and implement an existing commercial building electrification strategy (CBES).
2.J		Adopt an electrification ordinance for existing commercial buildings by 2026.
2.K		Enforce the residential and commercial electrification ordinance compliance by developing and implementing a comprehensive permitting compliance program.
2.L		Develop a Building Performance Standard (BPS) for existing buildings that requires electrification by 2030.
2.M		Partner with Santa Clara County, Bay Area Regional Energy Network (BayREN) and SVCE to create community-support programs to provide residents the resources and utility rate structures needed to convert to all-electric, energy efficient equipment and appliances.
2.N	23	Continue implementing and augmenting Reach Codes through a phased approach.

Strategy 3: Decarbonizing Transportation & Sustainable Land Use

3.A	23	Identify areas that are most appropriate for parking strategies that discourage vehicle use, such as pricing, time limits and supply reductions.

Game Plan 2028 At-a-Glance

3.B	23	Enhance City Transportation Demand Management (TDM) program implementation and monitoring to facilitate further reductions in single-occupant automobile trips, citywide.
3.C	23	Advocate that regional service providers implement high quality transit service and a robust set of first- and last-mile (FLM) strategies in over two-thirds of the cross-city corridors.
3.D	23	Implement Active Transportation Plan (ATP) to achieve a connected, safe and active network.
3.E	23	Continue to evaluate the potential for the shared bicycle and scooter pilot program as a permanent program.
3.F	23	Pilot shuttle service in Peery Park and consider options for expansion of a similar service in other areas undergoing redevelopment.
3.G	23	Develop design standards for streets and parking lots to accommodate increased pick-up and drop-off for rideshare passengers and apply as appropriate.
3.H		Create a TDM program for City staff to promote alternative transportation modes and carpooling to the greatest extent possible.
3.I		Establish and implement a plan to convert vehicle roadways to bicycle and pedestrian space to increase opportunities for active transportation in the community.
3.J		Require employers with 1,000 employees and more to develop TDM Plans.
3.K		Establish tracking metrics to evaluate effectiveness of various Moves' impact on VMT and a monitoring schedule to report progress.
3.L	23	Continue implementing the Drive Electric Program and providing resources to assist and encourage community adoption of EVs.
3.M	23	Electrify the Municipal Fleet as existing vehicles need replacement and install EV infrastructure (EVI) at municipal properties to support the electric fleet.
3.N	23	Support the development of the Community EV Readiness and Infrastructure Plan and facilitate the installation of EVI.
3.O		Partner with SVCE to strengthen and expand their incentive program for EVI.
3.P		Create a phased ordinance by 2026 to ban local operation of gasoline and diesel-powered off-road equipment by type, including banning local operation of gasoline and diesel-powered small off-road equipment (SORE) by 2028.

Strategy 4: Managing Resources Sustainably

4.A	23	Implement campaign for waste reduction.
4.B		Conduct a pilot program with reusable foodware for dine-in and takeout orders.
4.C		Comply with SB 1383 requirements to help the state reduce organic waste disposal 75% by 2025.
4.D		Expand the City's edible food recovery efforts to edible food generators beyond those required by SB 1383.
4.E		Continue to implement the mandatory waste diversion ordinance requiring all residents, visitors and businesses to place their discards in the appropriate container (i.e., recycle, food scraps or garbage).
4.F	23	Promote and seek incentives for making water conservation a way of life and set a water reduction target consistent with statewide requirements.
4.G	23	Partner with Valley Water to evaluate opportunities to expand water reuse.
4.H		Conduct a feasibility study to assess the costs and benefits of implementing Advanced Metering Infrastructure (AMI) citywide and implement if determined feasible.

Game Plan 2028 At-a-Glance

4.I		Implement a policy that prohibits installation of non-functional turf in new commercial construction.
4.J		Streamline the permitting process for rainwater catchment, dual water piping and graywater systems.
4.K		Adopt an ordinance requiring new construction to be built with dual plumbing, where allowable, in preparation for the availability of recycled water infrastructure.
4.L		Continue to pursue recycled water expansion including advanced recycled water production.
4.M	23	Implement the City's Urban Forest Management Plan and continue to protect and greatly expand tree canopy.
4.N	23	Implement the City's Green Stormwater Infrastructure Plan.
4.O		Update the City purchasing policy to be aligned with Playbook goals and develop an implementation strategy.
Strategy 5: Empowering Our Community		
5.A	23	Pilot a targeted grassroots community engagement strategy to create stronger connections between neighbors to advance climate action and emergency preparedness.
5.B	23	Create a stronger social media and web presence for Sunnyvale climate action.
5.C	23	Continue implementing the Sustainability Speaker Series.
5.D	23	Cultivate relationship between City and youth groups to engage students on climate, building on current engagement with school classrooms and green teams.
5.E	23	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.F		Create demonstration projects within City operations to educate the community on ways to reduce emissions.
5.G		Continue to develop and implement educational programs at the Sunnyvale Public Library that focus on environmental and sustainability topics.
5.H	23	Continue reporting climate action data for the public.
5.I	23	Publish annual GHG inventory.
Strategy 6: Adapting to a Changing Climate		
6.A	23	Participate in regional forums on climate vulnerability and adaptation.
6.B	23	Collaborate with Valley Water to advance a shoreline protection project with the US Army Corps of Engineers or other partners.
6.C		Develop strategies and projects to restore, protect and expand our tidal/salt marshes and natural water ways to the Bay using as much of the dredged materials from the Bay as possible.
6.D	23	Update existing emergency preparedness and response plans to address climate-related impacts such as heat events, air quality issues and flooding.
6.E	23	Develop a community resiliency plan.
6.F		Implement a Resilience Hub Initiative.

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 Game Plan 2028, this Strategy will focus on collaboration with SVCE on expanding participation in GreenPrime and continuing the shift towards 100% renewable electricity. Further, we will also work with our larger local companies to encourage direct access customers to focus on procuring 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 EV 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 85x45 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 electricity from a mix of carbon-free and eligible renewable sources and decarbonization programs to the Sunnyvale community. SVCE generates clean electricity for the Sunnyvale community and is delivered by PG&E on their existing power lines. Since SVCE's inception, Sunnyvale has maintained a 98% residential enrollment rate in SVCE, with 2% of residents choosing to opt-out. As of December 2022, Sunnyvale has reached a 97% commercial enrollment in SVCE. Maintaining an overall rate of 97% enrollment will ensure that Sunnyvale continues to benefit from the majority of the electricity being sourced from carbon-free power and eligible renewables is critical to keeping emissions from the electricity sector low. In addition, SVCE has supported its member agencies in decarbonizing the building and transportation sectors through programs, policy and grant funding. As the municipality with the largest SVCE customer base, the City of Sunnyvale will continue to 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 (DA) 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 more carbon intense energy sources, which generates greenhouse gas (GHG) emissions. The City has limited opportunities to identify and encourage these companies, called DA customers, to switch to cleaner sources of electricity. With nearly 97% of residential customers opting into clean electricity provided by SVCE, the electricity sourced to DA customers are now a larger 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.

Move 1.C: Implement an Organic Waste-to-Energy program at the Donald M. Somers Water Pollution Control Plant. Emissions from solid waste makes up 6% of Sunnyvale's inventory. A lot of this comes from organic waste collected in the landfill stream. Currently, the Food Scrap Recycling Program diverts the food from going to landfill from the Food Scrap bins and pales, then converts it to liquid mash. The mash is used as fertilizer to enrich soil and as FDA-approved animal feed ingredients[5]. The adjacent WPCP facility utilizes anerobic digesters, which processes organic waste in an oxygen-free, sealed tank. This project will utilize the food mash being produced at the SMaRT station® as fuel for the anaerobic digestors. Those digestors then produce methane that is captured and used as fuel. Utilizing the WPCP's anerobic digestors would create a closed-loop system for managing food waste in Sunnyvale and can reduce GHGs by processing food waste locally and feeding it back into our local systems as energy.

Play 1.2: Increase local solar photovoltaics

Move 1.D: Continue to enforce Reach Code solar panel requirements and Moffett Park Specific Plan policies to increase solar energy generation and storage in Moffett Park and throughout the community. The Moffett Park Specific Plan[6] is an area plan for the development of the Moffett Park region of Sunnyvale. This plan was adopted by the City Council in July 2023 and will transform the Moffett Park region from a primarily office use to a mixed-use area. The plan covers 1,156 acres, aims to add 20,000 housing units and will be an innovation and ecological district. The plan sets goals and guiding policies for the development of this area of Sunnyvale, which include policies that require solar and energy storage.

Strategy 1:
Promoting Clean Electricity

Play 1.3: Increase Distributed Electricity Storage

Move 1.E: Collaborate with SVCE to evaluate opportunities for community-scale 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 is a pooled resource that supports community energy demand compared to individual energy storage. Community-scale energy storage could maximize utilization of local solar supply, smooth out electricity supply and demand discrepancies and provide other benefits.

Move 1.F: Support a shared thermal energy system with energy storage at Moffett Park to serve as a potential model for other areas. Community-scale energy storage maximizes local solar supply and helps support a resilient power grid. In times of high-power demand, thermal energy systems operate as a storage method to reduce the load on the electrical grid[7]. Shared thermal energy systems with energy storage supports balancing energy demand and supply while reducing peak demand energy consumption[8].

Strategy 1:
Promoting Clean Electricity

Play 1.1: Promote 100% clean electricity

TARGET:

- **2030: 100% participation in clean electricity**
- **2045: 100% participation in clean electricity**

	Next Moves	Lead	Impacts	FY24	FY25	FY26	FY27	FY28
1.A	Continue to support and steer Silicon Valley Clean Energy (SVCE) in providing electricity from a mix of carbon-free and eligible renewable sources and decarbonization programs to the Sunnyvale community.	ESD		●	●	●	●	●
1.B	Collaborate with SVCE to target Direct Access (DA) customers to shift to 100% clean electricity.	ESD				●	●	
1.C	Implement an Organic Waste-to-Energy program at the Donald M. Somers Water Pollution Control Plant.	ESD					●	

Play 1.2: Increase local solar photovoltaics

TARGET:

- **2030: 3% of load from local solar**
- **2045: 5% of load from local solar**

	Next Moves	Lead	Impacts	FY24	FY25	FY26	FY27	FY28
1.D	Continue to enforce Reach Code solar panel requirements and Moffett Park Specific Plan policies to increase solar energy generation and storage in Moffett Park and throughout the community.	CDD		●	●	●	●	●

Play 1.3: Increase distributed electricity storage

TARGET:

- **2030: 2% of electricity demand stored in batteries locally**
- **2045: 5% of electricity demand stored in batteries locally**

	Next Moves	Lead	Impacts	FY24	FY25	FY26	FY27	FY28
1.E	Collaborate with SVCE to evaluate opportunities for community-scale energy storage to maximize utilization of local solar supply and to enhance resiliency.	ESD			●	●	●	●
1.F	Support a shared thermal energy system with energy storage at Moffett Park to serve as a potential model for other areas.	CDD		●	●	●	●	●

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 2045. As the City anticipates most of its land area will be developed by 2040, infrastructure put in place today will be critical in addressing both our 2030 and 2045 targets.

Sunnyvale's all-electric new construction requirements went into effect in 2021 (reach codes). As such, this Game Plan focuses on electrifying existing buildings to help further reduce emissions from natural gas use in buildings. 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.

Success in this sector will largely depend on collaboration and partnerships with community partners like SVCE and BayREN.

Strategy 2:
Decarbonizing Buildings

Play 2.1: Reduce energy consumption in existing buildings

Move 2.A: Research and develop energy disclosure and energy benchmarking requirements for existing 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)[9], 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 Ordinance[10]; City of Berkeley's Building Energy Saving Ordinance[11]) would extend the requirement to smaller buildings. Energy benchmarking provides valuable insights for 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: Update the local Green Building Program by FY 2024/25 to incentivize energy efficiency measures and the achievement of net zero energy in existing buildings. Sunnyvale's award-winning Green Building Program[12] 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 City's Green Building Program with more rigorous pathways to qualify for incentives will drive building developers to further decarbonize to all-electric designs. The program also incentivizes other sustainability design aspects like cool roofs, bicycle infrastructure, water efficiency, etc.

Move 2.C: Conduct a municipal GHG emissions inventory every three to five years and continue tracking measure implementation. The last municipal inventory for Sunnyvale was completed in 2014. Tracking municipal GHGs help Sunnyvale measure the GHG reductions achieved as buildings are made more efficient and energy resilient. By conducting and publicly sharing the inventory, the City is leading by example. Sunnyvale continues to renovate, remodel and build new facilities as infrastructures age. This inventory will help share the progress the City is making in reducing its own carbon footprint.

Play 2.2: Support electrification of existing buildings

Move 2.D: Develop an engagement and incentive program to accelerate the adoption of all-electric appliances. Heating space and water in buildings is the single largest use of natural gas[13]. 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, 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 organizations like SVCE and BayREN to teach the public about the benefits of electric appliances, while simultaneously offering incentives to conduct these upgrades, will accelerate adoption of all-electric technology.

Move 2.E: Eliminate non-electric sources of power in municipal buildings upon rebuild or significant remodel. Natural gas use is the largest source of GHG emissions in Sunnyvale's building sector. 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 Lakewood Library and Fire Station 2 are the next buildings up for remodel for City Facilities. Lakewood Library's will have an all-electric building design and the Library is anticipated to start construction in late 2023. Fire Station 2 is in starting design consultant procurement and the scope requires it to be all-electric.

Strategy 2:
Decarbonizing Buildings

Move 2.F: **Develop and implement an existing residential building electrification strategy (RBES).** The strategy should be supported by detailed existing building analysis and an electrification costs analysis to identify potential equity concerns and impacts. The analysis should also consider how to engage low and medium-income residents in electrification. The strategy will consider financing program options to support an equitable transition to all-electric buildings through additional incentives and rebates, no- or low-cost on-bill financing and innovative public-private funding models through partnerships with SVCE, BayREN and PG&E.

Move 2.G: **Adopt an electrification ordinance for existing residential buildings by 2026.** To be implemented through the building permit process which limits the expansion of natural gas infrastructure and is informed by the RBES. The ordinance can be implemented through a phased approach and could consider requiring replacement of HVAC systems, water heaters, stovetops and other appliances to be all-electric at time of replacement, upon major renovation or at time of sale. This ordinance is intended to prepare Sunnyvale residents for complying with BAAQMD Regulation 9, Rules 4 and 6.

Move 2.H: Conduct a study to evaluate the feasibility of adopting an end-of-flow ordinance for natural gas by 2045. Work with PG&E to identify opportunities for natural gas infrastructure pruning. It will be critical as the City electrifies to ensure we reduce the chance of stranded natural gas assets. There are methane leaks associated with the infrastructure supporting natural gas appliances. If not addressed, stranded assets will continue to leak methane.

Move 2.I: Develop and implement an existing commercial building electrification strategy (CBES). The CBES will support the development of a commercial building electrification ordinance. The strategy will be supported by a detailed commercial natural gas usage analysis, an analysis of potential impacts to the local commercial sectors via direct engagement to small and minority-owned businesses, and an electrification costs analysis. The strategy will include a financing program to support an equitable transition to all-electric buildings through additional incentives and rebates, no- or low-cost on-bill financing and innovative public-private funding models through partnerships with SVCE, BayREN and PG&E.

Move 2.J: Adopt an electrification ordinance for existing commercial buildings by 2026. Emissions from natural gas use in commercial buildings has been increasing over time and account for more than 20% of Sunnyvale's emissions. An electrification ordinance implemented through the building permit process that limits expansion of natural gas infrastructure and requires appliance replacements to be all-electric where technologically feasible (exceptions can be made where all-electric alternatives do not exist or are more than 100% more expensive than the natural gas-powered replacement) can reduce emissions from this sector significantly overtime.

Move 2.K: Enforce the residential and commercial electrification ordinance compliance by developing and implementing a comprehensive permitting compliance program. Compliance programs may include routine staff trainings, dedicating staff time to building inspections, charging fines for noncompliance, providing compliance checklists online and with permit applications and facilitating permitting online. A permitting compliance program is an enforcement tool to make sure adopted programs are implemented.

Move 2.L: Develop a Building Performance Standard (BPS) for existing buildings that requires electrification by 2030. Electrifying existing buildings is a critical change to transition from direct combustion of fossil fuels in favor of renewably sourced electricity. BPS requires existing buildings to meet energy performance targets. Move 2.A covers the research and groundwork for developing this type of ordinance, as well as setting a program in place. A reporting program should be developed and adopted prior to adoption of the BPS. This will allow for outreach and communication with impacted properties to be complete prior to the adoption of the ordinance.

Strategy 2:
Decarbonizing Buildings

Move 2.M: Partner with Santa Clara County, Bay Area Regional Energy Network (BayREN) and SVCE to create community-support programs to provide residents the resources and utility rate structures needed to convert to all-electric, energy efficient equipment and appliances. Providing community support programs through concierge services that may include free phone consultants, virtual and in-person assessments, turn-key installation by a city-supervised contractor, low upfront costs, on-bill financing options and labor warranties will strengthen existing partnerships with SVCE and BayREN while providing valuable resources for the community. In addition, partnering with SVCE to develop an equipment loaner program to loan out water heaters to community members while they complete electrical panel upgrades and shipping and installation of all-electric equipment will encourage more rapid conversions to all-electric equipment and appliances. Participation in these community-support programs could signify the initiation of the permit request process. The City is supporting residential electrification transition through SVCE's utility rate partnership and the community-support programs.

Play 2.3: Achieve all-electric new construction

Move 2.N: Continue implementing and augmenting Reach Codes through a phased approach. Sunnyvale adopted Reach Codes in 2021[14]. These codes go beyond the state requirements for green building and require all-electric new construction and increased EV and solar requirements. The Reach Codes program is intended to evolve over time to continue to support the transition from fossil-fuel to carbon free energy. Moves 2.K and 2.J are being considered as part of future iterations of Sunnyvale's Reach Codes.

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**
- **2045: 30% of existing homes and businesses receive deep energy retrofit**

	Next Moves	Lead	Impacts	FY24	FY25	FY26	FY27	FY28
2.A	Research and develop energy disclosure and energy benchmarking requirements for existing commercial and multi-family residential buildings to encourage property owners and managers to invest in energy efficiency upgrades and building information systems.	ESD			●	●	●	●
2.B	Update the local Green Building Program by FY 2024/25 to incentivize energy efficiency measures and the achievement of net zero energy in existing buildings.	CDD			●			
2.C	Conduct a municipal GHG emissions inventory every three to five years and continue tracking measure implementation.	ESD				●		

Play 2.2: Support electrification of existing buildings

TARGET:

- **2030: 44% of homes and businesses completely electrified**
- **2045: 92% of homes and businesses completely electrified**

	Next Moves	Lead	Impacts	FY24	FY25	FY26	FY27	FY28
2.D	Develop an engagement and incentive program to accelerate the adoption of all-electric appliances.	ESD		●	●	●	●	●
2.E	Eliminate non-electric sources of power in municipal buildings upon rebuild or significant remodel.	DPW		●	●	●	●	●
2.F	Develop and implement an existing residential building electrification strategy (RBES).	ESD			●	●	●	●
2.G	Adopt an electrification ordinance for existing residential buildings by 2026.	CDD				●		

Strategy 2:
Decarbonizing Buildings

Play 2.2: Support electrification of existing buildings

TARGET:

- **2030: 44% of homes and businesses completely electrified**
- **2045: 92% of homes and businesses completely electrified**

	Next Moves	Lead	Impacts	FY24	FY25	FY26	FY27	FY28
2.H	Conduct a study to evaluate the feasibility of adopting an end-of-flow ordinance for natural gas by 2045.	ESD					●	●
2.I	Develop and implement an existing commercial building electrification strategy (CBES).	ESD			●	●	●	●
2.J	Adopt an electrification ordinance for existing commercial buildings by 2026.	CDD				●		
2.K	Enforce the residential and commercial electrification ordinance compliance by developing and implementing a comprehensive permitting compliance program.	CDD				●	●	●
2.L	Develop a Building Performance Standard (BPS) for existing buildings that requires electrification by 2030.	ESD					●	●
2.M	Partner with Santa Clara County, Bay Area Regional Energy Network (BayREN) and SVCE to create community-support programs to provide residents the resources and utility rate structures needed to convert to all-electric, energy efficient equipment and appliances.	ESD			●	●	●	●

Play 2.3: Achieve all-electric new construction

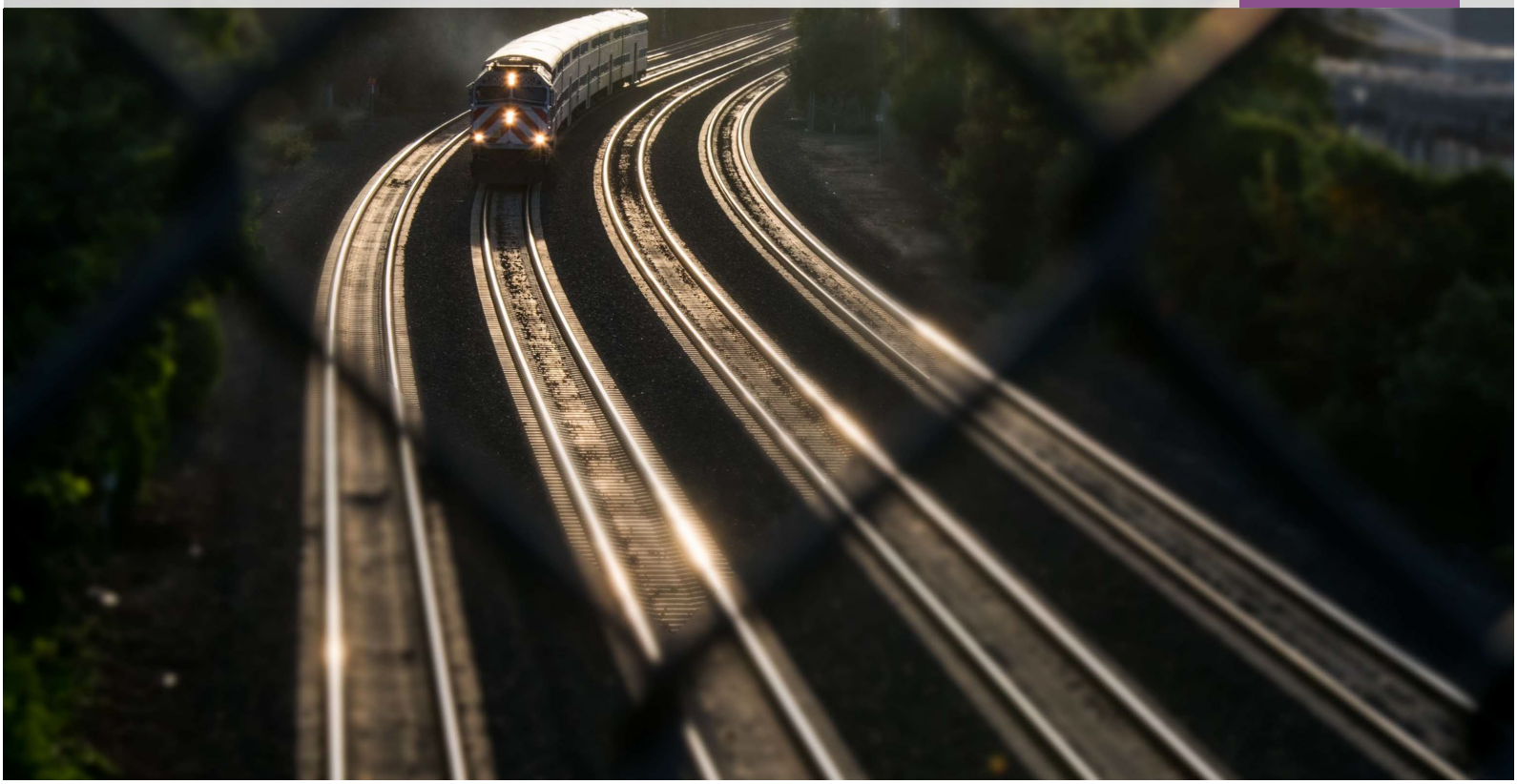
TARGET:

- **2030: 100% all-electric new buildings**
- **2045: 100% all-electric new buildings**

	Next Moves	Lead	Impacts	FY24	FY25	FY26	FY27	FY28
2.N	Continue implementing and augmenting Reach Codes through a phased approach.	CDD		●	●	●	●	●

GHG Avoided | Local Environmental Quality | Health & Livability | Community Savings | Partnerships

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 large companies to support alternative commuting style and 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 VMT, 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: Identify areas that are most appropriate for parking strategies that discourage vehicle use, such as pricing, time limits and supply reductions. 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 that decreases car trips and is important for reducing GHG emissions from VMT. This Move, when implemented, will limit parking opportunities in the appropriate locations while ensuring it does not create unintended disruptions.

Play 3.2: Increase transportation options and support shared mobility

Move 3.B: 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. TDM describes the holistic approach by which workplaces encourage their employees to commute via alternative means, reducing employees' inclination to drive. Existing TDM programs in Sunnyvale have mixed results. Better monitoring is needed to understand the effectiveness of current TDM programs, monitor compliance and enforce TDM requirements and implement regular data collection procedures. This data will be used to develop new TDM programs for residents and businesses.

Move 3.C: Advocate that regional service providers implement high quality transit service and sets of first- and last-mile (FLM) strategies in over two-thirds of the cross-city corridors. First- and last-mile strategies help fill in gaps in public transit networks. They range from improved transit frequency, interconnected route offerings and enhanced quality of local public transportation. FLM strategies are expected to increase ridership and reduce the number of cars on the road. Public transit will seem more attractive and viable in conjunction with FLM options that help residents and employees travel to and from transit stops seamlessly. 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 FLM mobility.

Move 3.D: Implement Active Transportation Plan (ATP) 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 FLM and TDM efforts. This Move will be particularly important for creating mode shift away from personal vehicles.

Move 3.E: Continue to evaluate the potential for the shared bicycle and scooter pilot program as a permanent program. 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 FLM challenges. This pilot will inform the feasibility of a bike or scooter share program in select areas of Sunnyvale.

Move 3.F: 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 or major employment areas will supplement and extend the reach of existing public transportation offerings. The shuttle(s) would allow more commuters and travelers to get around Sunnyvale without a car, thereby reducing VMT and GHG emissions.

Move 3.G: 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, 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[15].

Strategy 3:
Decarbonizing Transportation & Sustainable Land Use

Move 3.H: Create a TDM program for City staff to promote alternative transportation modes and carpooling to the greatest extent possible. Many City staff commute to Sunnyvale from surrounding cities in single occupancy vehicles. Providing a transportation incentive program for all regular, benefited City employees that use alternative transportation could motivate staff to prioritize alternative modes of travel. Using these alternative modes reduce transportation emissions. Alternative transportation includes riding the bus, riding a bicycle, walking, ridesharing (vanpools or carpools) or a combination of these modes of transportation.

Move 3.I: Establish and implement a plan to convert vehicle roadways to bicycle and pedestrian space to increase opportunities for active transportation in the community. Structural change to the vehicle roadways will encourage alternative transportation use. City staff will refer to the Active Transportation Plan[16] to determine priority roadways to convert to bicycle and pedestrian space. Conversion options may include buffer lanes, protected bikeways, trails, partial road closures and paths that connect to active transportation routes.

Move 3.J: Require employers with 1,000 employees and more to develop TDM Plans. This will likely require an ordinance to implement. The City will support the largest employers in Sunnyvale to develop and implement TDM programs to help reduce the incoming traffic to Sunnyvale.[17] Currently, only new developments and businesses in Sunnyvale are required to implement TDM programs. TDM plans should include subsidies for employees to bike, walk, or carpool, and consider providing free transit passes for employees.

Move 3.K: Establish tracking metrics to evaluate effectiveness of various Moves' impact on VMT and a monitoring schedule to report progress. The factors driving VMT reduction are parking strategies, transit improvements, TDM targeting commuters, and active transportation build out. Establishing tracking metrics and a monitoring schedule for these strategies will help ensure Sunnyvale stays on track and help inform future Game Plan Moves.

Play 3.3: Increase zero-emission vehicles registered in Sunnyvale

Move 3.L: Continue implementing the Drive Electric Program and providing resources to assist and encourage community adoption of EVs. EVs charged at residential, office or public locations in Sunnyvale run on carbon-free electricity, which drastically lowers transportation-related emissions. The City will continue to work with community groups and vendors to accelerate EV adoption communitywide and improve EV adoption for renters and low-income communities through resources and incentives. The Drive Electric program[18] educates the community on EV benefits and incentives by providing educational events to help the community experience the benefits, convenience and incentives available for EVs.

Move 3.M: Electrify the Municipal Fleet as existing vehicles need replacement and install EV infrastructure (EVI) at municipal properties to support the electric fleet. The City has an opportunity to be a local leader in transportation decarbonization by updating its municipal fleet to EVs. The City is committed to electrifying its vehicle fleet as old fleet vehicles are phased out. The City will partner with SVCE to obtain funding and technical support for enhancing public EVI throughout the city. In addition, the City will leverage resources and information from sustainability networks, such as Climate Mayors EV Purchasing Collaborative, 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. As of 2022, Sunnyvale has replaced 11 fleet vehicles with EVs and installed 10 EVI stations for fleet vehicles.

Move 3.N: Support the development of the Community EV Readiness and Infrastructure Plan and facilitate the installation of EVI. To support the development of the plan the City will: 1) Conduct a survey of existing publicly accessible EVI; 2) Identify a prioritized list of new locations for chargers with consideration for equitable distribution to low-income areas and non-single-family residents; 3) Quantify the number of publicly accessible chargers needed to support a fully electric community fleet in 2045; 4) Seek incentives and funding to support the EVI installation and work with SVCE and other partners to expand availability of funding for EVI. Begin implementation to install ~3,300

Strategy 3:
Decarbonizing Transportation & Sustainable Land Use

Photo credit: Felicia Kieselhorst

new publicly accessible chargers by 2030. City will also coordinate with PG&E and SVCE to understand infrastructure needs and challenges to installing EVI.

Move 3.O: Partner with SVCE to strengthen and expand their incentive program for EVI. In order to push Sunnyvale to a 40% adoption of EVs by 2030, the charging infrastructure will need to develop to match the pace of adoption. Incentives, technical assistance and partnerships will be key. SVCE currently is offering assistance to businesses and multifamily properties to install chargers. The City will continue to support and coordinate with SVCE to connect Sunnyvale community members to these and other similar programs.

Play 3.4: Decarbonize off-road equipment and vehicles

Move 3.P: Create a phased ordinance by 2026 to ban local operation of gasoline and diesel-powered off-road equipment by type, including banning local operation of gasoline and diesel-powered small off-road equipment (SORE) by 2028. SORE can range from leaf blowers, lawn mowers, construction equipment, etc. Operating a commercial lawn mower for one hour emits as much smog-forming pollution as driving a new light-duty passenger car for about 300 miles. Phasing gas and diesel-powered SORE out with clean, alternative equipment can significantly improve air quality and reduce increased emissions from this sector overtime. The ordinance should include a requirement for renewable diesel (e.g., RD99 which is a drop-in renewable fuel and readily available on West Coast) for equipment that cannot be decarbonized. California Air Resource Board (CARB) requires SORE[19] sold on or after Jan. 1, 2024, to be zero-emission.

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**
- **2045: 30% reduction in vehicle miles per person**

	Next Moves	Lead	Benefits	FY24	FY25	FY26	FY27	FY28
3.A	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**
- **2045: 30% reduction in vehicle miles per person**

	Next Moves	Lead	Benefits	FY24	FY25	FY26	FY27	FY28
3.B	Enhance City Transportation Demand Management (TDM) program implementation and monitoring to facilitate further reductions in single-occupant automobile trips, citywide.	DPW		●				
3.C	Advocate that regional service providers implement high quality transit service and a robust set of first- and last-mile (FLM) strategies in over two-thirds of the cross-city corridors.	DPW		●	●	●	●	●
3.D	Implement the Active Transportation Plan (ATP) to achieve a connected, safe and active network.	DPW		●	●	●	●	●
3.E	Continue to evaluate the potential for the shared bicycle and scooter pilot program as a permanent program.	DPW		●	●	●	●	●
3.F	Pilot shuttle service in Peery Park and consider options for expansion of a similar service in other areas undergoing redevelopment.	DPW		●				
3.G	Develop design standards for streets and parking lots to accommodate increased pick-up and drop-off for rideshare passengers and apply as appropriate.	DPW		●	●			

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**
- **2045: 30% reduction in vehicle miles per person**

	Next Moves	Lead	Benefits	FY24	FY25	FY26	FY27	FY28
3.H	Create a TDM program for City staff to promote alternative transportation modes and carpooling to the greatest extent possible.	HDR					●	●
3.I	Establish and implement a plan to convert vehicle roadways to bicycle and pedestrian space to increase opportunities for active transportation in the community.	DPW					●	●
3.J	Require employers with 1,000 employees and more to develop TDM Plans.	DPW						●
3.K	Establish tracking metrics to evaluate effectiveness of various Moves' impact on VMT and a monitoring schedule to report progress.	DPW ESD			●	●	●	●

Play 3.3: Increase zero-emission vehicles registered in Sunnyvale

TARGET:

- **2030: 42% of all vehicles on road are zero-emission vehicles**
- **2045: 90% of all vehicles on road are zero-emission vehicles**

	Next Moves	Lead	Benefits	FY24	FY25	FY26	FY27	FY28
3.L	Continue implementing the Drive Electric Program and providing resources to assist and encourage community adoption of EVs.	ESD		●	●	●	●	●
3.M	Electrify the Municipal Fleet as existing vehicles need replacement and install EV infrastructure (EVI) at municipal properties to support the electric fleet.	DPW		●	●	●	●	●
3.N	Support the development of the Community EV Readiness and Infrastructure Plan and facilitate the installation of EVI.	ESD			●	●	●	●
3.O	Partner with SVCE to strengthen and expand their incentive program for EVI.	ESD		●	●	●	●	●

GHG Avoided | Local Environmental Quality | Health & Livability | Community Savings | Partnerships

Strategy 3:
Decarbonizing Transportation & Sustainable Land Use

Play 3.4: Decarbonize off-road equipment and vehicles

TARGET:

- **2030: 30% of off-road equipment and vehicles are zero-emissions**
- **2045: 75% of off-road equipment and vehicles are zero emissions**

	Next Moves	Lead	Benefits	FY24	FY25	FY26	FY27	FY28
3.P	Create a phased ordinance by 2026 to ban local operation of gasoline and diesel-powered off-road equipment by type, including banning local operation of gasoline and diesel-powered small off-road equipment (SORE) by 2028.	ESD			●	●		

GHG Avoided | Local Environmental Quality | Health & Livability | Community Savings | Partnerships

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 the City's purchasing footprint 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, and expanding natural landscape areas in the community.

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. Implementation of the Green Stormwater Infrastructure Plan will help reduce the pollution and promote the retention of rainwater runoff.

Strategy 4:
Managing Resources Sustainably

Play 4.1: Achieve zero waste goals for solid waste

Move 4.A: Implement campaign for waste reduction. The City's Zero Waste Strategic Plan aims to reduce waste generated in Sunnyvale. As of 2021, the residential and commercial disposal rate is 3.6 pounds of landfill 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, particularly petroleum-based 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 disincentives to guide particularly impactful consumer actions.

Move 4.B: Conduct a pilot program with reusable foodware for dine-in and takeout orders. The City will work with Sunnyvale's food service community to pilot reusable foodware. The pilot program will help inform businesses of options for transitioning away from use of single-use foodware. These items use numerous resources during production and disposal. The pilot will also inform decisions for an ordinance to promote reusables rather than single use articles**.**

Move 4.C: Comply with SB 1383 requirements to help the state reduce organic waste disposal 75% by 2025. The City offers single-family and multi-family organics collection service. By summer 2024, the entire commercial sector will have this service as well in compliance with SB 1383[20].

Move 4.D: Expand the City's edible food recovery efforts to edible food generators beyond those required by SB 1383. SB1383 requires generators such as grocery stores, large businesses and restaurants to donate excess edible food to those in need. The County has a contract with Joint Venture Silicon Valley (JVSV) to recover edible food for donation, and the City currently is a part of the County's regional food recovery program. JVSV provides a local Food Recovery Matching Tool[21] to find services in the area. The City will continue to monitor progress and expand services where feasible.

Strategy 4:
Managing Resources Sustainably

Move 4.E: Continue to implement the mandatory waste diversion ordinance requiring all residents, visitors and businesses to place their discards in the appropriate container (i.e., recycle, food scraps or garbage). Sunnyvale's ordinances[21] achieve the following goals: 1) Utilizing one hauler for recycling, food scraps, yard trimmings and garbage services; 2) Establishes color-coded and labeled containers in convenient locations for patrons, employees, and residents; 3) Train and educate tenants, residents, contractors and janitors about how to properly sort waste; and 4) Sort waste into proper containers. These requirements were phased in over two years since Jan. 1, 2022, and include monitoring of contamination by the hauler's drivers.

Play 4.2: Ensure resilience of water supply

Move 4.F: Promote and seek incentives for making water conservation a way of life and set a water reduction target consistent with statewide requirements. California policy SB 606 and AB 1668[22] establish water use objectives, provide incentives for recycled water and require water budgets. The policies emphasize water conservation as a way of life. These policies will require more reporting and more stringent water conservation targets over time. This Move supports Sunnyvale achieving compliance with these policies and preparing the community for the more frequent and severe droughts expected to occur in the region.

Move 4.G: Partner with Valley Water to evaluate opportunities to expand water reuse. Expanding the existing use of recycled water 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. Sunnyvale will continue to explore partnership opportunities with Valley Water to expand water reuse as well as look at options for expansion within Sunnyvale.

Move 4.H: Conduct a feasibility study to assess the costs and benefits of implementing Advanced Metering Infrastructure (AMI) citywide and implement if determined feasible. This project will launch in 2023 to hire a consultant to assess the feasibility and cost for implementing AMI citywide. AMI will provide real time data to customers on their water consumption and will identify possible water leaks. By implementing AMI, the utility can detect water leaks, lower energy costs and address our energy distribution. Addressing the City's vulnerability and reliability concerns need to be prioritized as change in demands occur.

Move 4.I: Implement a policy that prohibits installation of non-functional turf in new commercial construction. As defined by the state, "non-functional turf"[23] is solely ornamental and not regularly used for recreation. It includes areas not in active use but still requiring maintenance, such as street medians and office parking lots. Non-functional turf does not include sports fields or turf regularly used for human recreational purposes or for civic or community events. Replacing turf with drought-tolerant, native plants can reduce landscape water needs by 70 to 80% at commercial sites[24].

Move 4.J: Streamline the permitting process for rainwater catchment, dual water piping and graywater systems. Collected rainwater, recycled water and wastewater from your shower, bathtub and washing machine can be used for outdoor landscaping. Outdoor water use can be the highest water use for homes in Sunnyvale. Streamlining the permitting process for water saving techniques will help residents save money and water. The City will conduct outreach to notify property owners of the streamlined processes. City staff will be trained so they are prepared to quickly and accurately assess the quality of installations that may combine aspects of electrical, plumbing, roofing, landscaping and construction.

Move 4.K: Adopt an ordinance requiring new construction to be built with dual plumbing, where allowable, in preparation for the availability of recycled water infrastructure. As the City looks for opportunities to expand recycled water infrastructure, buildings will need to be equipped to utilize the recycled water. In some cases, this might require dual plumbing. The ordinance should specify water efficiency design requirements and landscape design plans as well as irrigation system requirements.

Strategy 4:
Managing Resources Sustainably

Move 4.L: Continue to pursue recycled water expansion including advanced recycled water production. Sunnyvale's Clean Water Program Master Plan update will consider how the Water Pollution Control Plant can improve recycled water quality through additional treatment upgrades. Sunnyvale's Recycle Water Feasibility study aims to identify new recycled water alignments, expanding the distribution network to reach untapped customers, thereby diminishing dependence on potable water. Furthermore, it will scout funding prospects from both state and federal sources to support the recycled water system's expansion.

Play 4.3: Enhance natural carbon sequestration capacity

Move 4.M: 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, reduce stormwater runoff, serve as green features that can reduce flooding and provide an outlet to connect to nature in an urban environment. Continuing to protect and expand the tree canopy by implementing the Urban Forest Management Plan[25] will improve both environmental quality and quality of life**.**

Move 4.N: 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 stormwater 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[26]requires the City to develop and implement a 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

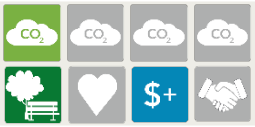
Move 4.O: Update the City purchasing policy to be aligned with Playbook goals and develop an implementation strategy. To ensure that the City's purchasing policies and products align with the City's Climate Action Playbook and Zero Waste Plan, updates to the purchasing policy may be required. This would include guidance such as purchasing all-electric appliances, reducing packaging, reducing single-use plastic purchases, purchasing zero-emission vehicles, etc.

Strategy 4:
Managing Resources Sustainably

Play 4.1: Achieve Zero Waste goals for solid waste

TARGET:

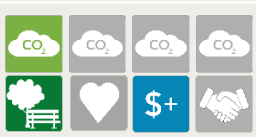
- **2030: Reduce landfilled garbage to 1 lb per person per day and achieve 75% diversion of landfilled organics**
- **2045: Reduce landfilled garbage to <1 lb per person per day and achieve 75% diversion of landfilled organics**

	Next Moves	Lead	Impacts	FY24	FY25	FY26	FY27	FY28
4.A	Implement campaign for waste reduction.	ESD		●	●	●	●	●
4.B	Conduct a pilot program with reusable foodware for dine-in and takeout orders.	ESD		●				
4.C	Comply with SB 1383 requirements to help the state reduce organic waste disposal 75% by 2025.	ESD		●	●	●		
4.D	Expand the City's edible food recovery efforts to edible food generators beyond those required by SB 1383.	ESD			●	●	●	●
4.E	Continue to implement the mandatory waste diversion ordinance requiring all residents, visitors, and businesses to place their discards in the appropriate container (i.e., recycle, food scraps or garbage).	ESD		●	●	●	●	●

Play 4.2: Ensure resilience of water supply

TARGET:

- **Targets will be determined as per state requirement**

	Next Moves	Lead	Impacts	FY24	FY25	FY26	FY27	FY28
4.F	Promote and seek incentives for making water conservation a way of life and set a water reduction target consistent with statewide requirements.	ESD		●	●	●	●	●
4.G	Partner with Valley Water to evaluate opportunities to expand water reuse.	ESD		●	●	●	●	●
4.H	Conduct a feasibility study to assess the costs and benefits of implementing Advanced Metering Infrastructure (AMI) citywide and implement if determined feasible.	ESD			●			

Strategy 4:
Managing Resources Sustainably

Play 4.2: Ensure resilience of water supply

TARGET:

- **Targets will be determined as per state requirement**

	Next Moves	Lead	Impacts	FY24	FY25	FY26	FY27	FY28
4.I	Implement a policy that prohibits installation of non-functional turf in new commercial construction.	CDD			●			
4.J	Streamline the permitting process for rainwater catchment, dual water piping and graywater systems.	CDD			●			
4.K	Adopt an ordinance requiring new construction to be built with dual plumbing, where allowable, in preparation for the availability of recycled water infrastructure.	CDD					●	●
4.L	Continue to pursue recycled water expansion including advanced recycled water production.	ESD		●	●	●	●	●

Play 4.3: Enhance natural carbon sequestration capacity

TARGET:

- **Supports broader net carbon reductions**

	Next Moves	Lead	Impacts	FY24	FY25	FY26	FY27	FY28
4.M	Implement the City's Urban Forest Management Plan and continue to protect and greatly expand tree canopy.	DPW		●	●	●	●	●
4.N	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	FY24	FY25	FY26	FY27	FY28
4.O	Update the City purchasing policy to be aligned with Playbook goals and develop an implementation strategy.	ESD				●	●	

GHG Avoided | Local Environmental Quality | Health & Livability | Community Savings | Partnerships

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 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. This initiative strengthens community, advances climate action and forms resilience for natural disasters. Participants in other Bay Area communities with this type of program cut their household carbon emissions by 30% on average[27]. Neighbors learn about climate action behaviors together and collectively shape a local ethic of environmental conscientiousness and preparedness.

Move 5.B: 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. Accessibility to information plays a large role in behavioral change. Sunnyvale's social media sparks discussions on climate action and frequently reminds followers in an approachable way about pro-environmental behaviors. Continually updating Sunnyvale's webpages and social media accounts makes the City a dependable source of information. By expanding existing efforts and creating messages in multiple languages, 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.C: Continue implementing the Sustainability Speaker Series. Since 2017, the Sustainability Speaker Series[28] 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.D: Cultivate relationship between City and youth groups to engage students 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. The City could begin with engaging the Library & Recreation Teen Advisory Board and Teen Advisory Committee as well as consider partnering with and supporting the Silicon Valley Youth Climate Action group.

Move 5.E: 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. The business sector is a large source of the City's carbon emissions. The City 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. Emissions from this sector can be reduced by providing incentives to replace gas-powered appliances, engaging with employees through training programs and changing employee behaviors, such as turning off lights and computers at night to commuting to work via alternative modes.

Move 5.F: Create demonstration projects within City operations to educate the community on ways to reduce emissions. The new Lakewood Branch Library[29] will be a demonstration site for electrification. The City Hall building will also have community engagement and education aspects. The City continues to lead by example and should consider educational opportunities in publicly accessible buildings.

Move 5.G: Continue to develop and implement educational programs at the Sunnyvale Public Library that focus on environmental and sustainability topics. The Sunnyvale Public Library is a significant learning hub for residents and visitors. Expanding its existing services to include environmental education, speakers, community workshops, and energy efficient loaner programs are instrumental in reaching Sunnyvale's carbon neutrality goals.

Strategy 5:
Empowering Our Community

Play 5.2: Track and share data and tools

Move 5.H: Continue reporting climate action data for the public. The City publishes emissions reduction progress on the Sunnyvale Climate Action Scoreboard[30]. The City will continue to build on the functionality and storytelling components of the Scoreboard. To reflect Sunnyvale's progress towards our climate action targets, metrics and data will be updated on the Scoreboard annually.

Move 5.I: Publish annual 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	FY24	FY25	FY26	FY27	FY28
5.A	Pilot a targeted grassroots community engagement strategy to create stronger connections between neighbors to advance climate action and emergency preparedness.	ESD		●	●			
5.B	Create a stronger social media and web presence for Sunnyvale climate action.	ESD		●	●	●	●	●
5.C	Continue implementing the Sustainability Speaker Series.	ESD		●	●	●	●	●
5.D	Cultivate relationship between City and youth groups to engage students on climate, building on current engagement with school classrooms and green teams.	ESD		●	●	●	●	●
5.E	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			●	●	●	●
5.F	Create demonstration projects within City operations to educate the community on ways to reduce emissions.	ESD		●	●	●	●	●
5.G	Continue to develop and implement educational programs at the Sunnyvale Public Library that focus on environmental and sustainability topics.	LRS		●	●	●	●	●

Play 5.2: Track and share data and tools

TARGET:

- **Supports all other Plays**

	Next Moves	Lead	Impacts	FY24	FY25	FY26	FY27	FY28
5.H	Continue reporting climate action data for the public.	ESD		●	●	●	●	●
5.I	Publish annual GHG inventory.	ESD		●	●	●	●	●

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: 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 during climate disasters. Organized regional conversations on climate adaptation are emerging, such as Bay Area Climate Adaptation Network (BayCAN), Bay Conservation & Development Commission (BCDC) 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 and legislation.

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

Move 6.B: 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 its 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 Project[31], 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.C: Develop strategies and projects to restore, protect and expand our tidal/salt marshes and natural water ways to the Bay using as much of the existing dredged materials from the Bay as possible. Sea level rise leaves the bay shoreline vulnerable to impacts on our infrastructure, environment and community. To expand the City's resilience to the threat of sea level rise, strategies should be implemented to focus on maintaining and increasing the depth of our water ways. Strategies include using the existing dredged materials and nature-based solutions to restore our tidal zones and salt marshes that are natural barriers to sea level rise[32].

Play 6.3: Strengthen community resiliency

Move 6.D: 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 responses to extreme weather events, which may increase in frequency and severity due to climate change. These include heat waves, intense rainstorms, and flooding. This Move calls for cross-departmental collaboration to expand current community-oriented emergency preparedness plans. This will aid response to such events, with particular attention to vulnerable populations living in identified climate risk zones during natural disasters.

Move 6.E: Develop and implement a community resiliency plan. Climate resiliency means that residents and businesses have proactively prepared for extreme weather events such that they can withstand the duration and aftereffects 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 using an equity lens to develop strategies to help the most vulnerable populations be prepared to weather the storms of climate change.

Move 6.F: Implement a Resilience Hub Initiative. Collaborate with the community to create a network of community centers, neighborhoods, schools, businesses, places of worship and other trusted community sites that are models for resilience and are "ready for anything" (meaning better prepared for natural disasters, climate change and other stresses in our community as described by the USDN and NorCal Resilience Network)[33]. Climate resiliency boosts local capacity to recover and rebuild from natural disasters and other emergencies. Resilience Hubs are community-serving facilities that provide infrastructure, resources and supportive programming.

Strategy 6:
Adapting to a Changing Climate

Play 6.1: Assess climate vulnerabilities for Sunnyvale

TARGET:

- **No quantifiable targets**

	Next Moves	Lead	Impacts	FY24	FY25	FY26	FY27	FY28
6.A	Participate in regional forums on climate vulnerability and adaptation.	ESD DPW		●	●	●	●	●

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

TARGET

- **No quantifiable targets**

	Next Moves	Lead	Impacts	FY24	FY25	FY26	FY27	FY28
6.B	Collaborate with Valley Water to advance a shoreline protection project with the US Army Corps of Engineers or other partners.	DPW ESD		●	●	●	●	●
6.C	Develop strategies and projects to restore, protect and expand our tidal/salt marshes and natural water ways to the Bay using as much of the dredged materials from the Bay as possible.	ESD DPW OCM				●	●	●

Play 6.3: Strengthen community resiliency

TARGET

- **No quantifiable targets**

	Next Moves	Lead	Impacts	FY24	FY25	FY26	FY27	FY28
6.D	Update existing emergency preparedness and response plans to address climate-related impacts such as heat events, air quality issues and flooding.	DPS ESD		●				
6.E	Develop a community resiliency plan.	ESD		●	●			
6.F	Implement a Resilience Hub Initiative.	ESD				●	●	●

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 85x45. 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 from this Game Plan forward. 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 carbon 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 Scoreboard.

In order to align to the City's annual budget cycle, Game Plan 2028 addresses implementation through fiscal year 2024-28. An update to the emissions inventory, based on community performance through 2026, and a proposal for the next Game Plan will be presented to the City Council in late 2027 to inform the budget cycle for the next implementation timeframe, commencing with fiscal year 2028-29.

For Game Plan 2028, staff has evaluated the resource impacts across City departments and identified resources needed for implementation. Some of the Moves will be absorbed and integrated into existing departmental operating or projects budgets. Year one of this Game Plan consists of these Moves and staff have continued progress on these with existing resources while Game Plan 2028 was finalized and developed. One-time costs needed over the next four years of the Plan total $2.1 million which includes consultant services, advertising, infrastructure needs and one temporary position. Four new permanent staff positions to implement Game Plan Moves are adding approximately $800,000 per year in ongoing costs. Game Plan resource needs have been refined and finalized through the annual budget process, approved by City Council on June 18, 2024.
One full-time permanent position and an additional $310,000 was requested as part of the budget process, but not approved. These additional resources were proposed to optimally implement the Game Plan Moves related to building electrification, including some Moves expected to directly reduce greenhouse gas emissions. The City will proceed with implementation of Game Plan 2028 with existing and approved staff and non-personnel resources and return to City Council in future budget cycles if additional resources are needed.

Terms and Acronyms

40x30	State's 40% greenhouse gas reductions by 2030.
56x30	Sunnyvale's 56% greenhouse gas reduction by 2030.
85x45	85% greenhouse gas reductions by 2045; equivalent to "carbon neutral"
ATP	Active Transportation Plan
AMI	Advanced Metering Infrastructure
ABAG	Association of Bay Area Governments
BAU	Business-as-usual
BayCAN	Bay Area Climate Adaptation Network
BayREN	Bay Area Regional Energy Network
BPS	Building Performance Standard
CAP	Climate Action Playbook (2019)
CAP 1.0	Climate Action Playbook (2014)
CAP 2.0	Initiative to Update Climate Action Playbook 1.0; Playbook is the product of the CAP 2.0 Initiative
Carbon neutrality	GHG emissions reduced by 85% from 1990 levels by 2045, with potential for remaining emissions to be addressed by carbon sequestration
DA	Direct Access
EV	Electric vehicle
EVI	Electric vehicle infrastructure
FLM	First and Last mile
GHG	Greenhouse gas
JVSV	Joint Venture Silicon Valley
$MTCO_2e$	Metric tons of carbon dioxide equivalent
PG&E	Pacific Gas and Electric Company
PV	Photovoltaic (solar energy)
SVCE	Silicon Valley Clean Energy
TNC	Transportation Network Company (e.g., Uber, Lyft)
TDM	Transportation Demand Management
USACE	US Army Corps of Engineers
VMT	Vehicle miles traveled

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Appendices

Appendix A: Retired Moves

Game Plan 2023 Retired Moves

The below listed Moves from Game Plan 2023 did not continue on to Game Plan 2028. Some Moves were marked complete and therefore were no longer required. Others were not pursued for reasons that became apparent after the adoption of Game Plan 2023.

Strategy 1: Promoting Clean Electricity		
1.C	Research a mandatory solar roof ordinance for new commercial developments. *- Complete, solar requirements were added with Reach Codes*	✓
Strategy 2: Decarbonizing Buildings		
2.B	Advocate to regional providers of energy efficiency programs (such as BayREN, Silicon Valley Energy Watch or SVEW) that their offerings are more aggressively promoted to Sunnyvale residents and businesses. *- Complete, integrated into operations and no longer needed to be called out.*	✓
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. *- Dropped, after further research staff not supportive of implementing*	○
Strategy 3: Decarbonizing Transportation & Sustainable Land Use		
3.A	Plan for additional housing, with the goal of diverse housing, to reduce long-distance commutes *- Complete, multiple area plans adopted in the last three years prioritized diverse housing near transit. Integrated into City planning process.*	✓
3.I	Monitor autonomous vehicle testing and deployment to inform proactive policy. *- Complete, the state is leading policy development on this and Sunnyvale does not anticipate needed local policy.*	✓
Strategy 4: Managing Resources Sustainably		
4.A	Implement and expand food scraps diversion programs to include additional businesses and multi-family residences. *- Complete, food scraps roll out to all multi-family residences is complete and only a few businesses remain and will be complete in 2023.*	✓
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. *- Complete, all major renovations and improvements and planned and budgeted for. These will continue on an ongoing basis.*	✓
4.H	Promote consumer awareness of sustainable food choices. *- Complete, sustainable food choice awareness is integrated into messaging and outreach efforts.*	✓
4.I	Work with large businesses to identify best practices for implementing local food gardens. *- Dropped, the City will focus more on large business sustainability goals broadly. COVID-19 pandemic changed the way and from where employee in the community work.*	○

Game Plan 2023 Retired Moves

Strategy 5: Empowering Our Community		
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). *- Complete, SVCE launched the eHub which provides resources to assist with electrification*	✓

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. *- Complete, the County presented on the 2.0 tool update and Sunnyvale staff utilize the findings within policy and program development.*	✓
6.D	Identify shoreline protection solutions as part of Moffett Park Specific Plan update. *- Complete, the Moffett Park Specific Plan was adopted in 2023 with considerations of resilience to sea-level rise and flooding.*	✓

Appendix B: Ideas Roster

Ideas Roster

The Climate Action Playbook draws on more than 240 ideas, the majority of which were sourced from our community through the OpenIDEO online challenge and the large in-person community workshop. Ideas also originated from City staff, leading City best practices, as well as CAP 1.0 actions that were identified for ongoing implementation. This appendix contains the complete list of ideas evaluated for the Climate Action Playbook. Each idea is identified by a randomly assigned, unique Idea ID#. The Next Moves (presented in *Game Plan 2022: Our Next Moves*) were developed by staff drawing inspiration from chosen elements of these ideas, and based on their feasibility, cost, and alignment with the City's overall goals and departmental programmatic priorities. The Next Move ID# is indicated where selected ideas from this list contributed to the development of the Next Moves for implementation by year 2020.

Strategy 1: Promoting Clean Energy		
Idea ID #	**Idea Description**	**Next Move(s) ID#**
1	Continue to support and steer SVCE (Sunnyvale's community choice energy provider) in providing clean power for Sunnyvale's residents and businesses.	1.A
2	Target direct access shift to 100% RE	1.B
266	Organics to energy at Donald M. Somers Water Pollution Control Plant.	1.C
415	Work with SVCE to maintain a SVCE GreenPrime opt-out rate of no more than 3% in line with 2019 and provide educational materials to community members on available incentives and benefits of the program.	1.D
417	Implement policies to support the development of pervasive solar arrays in Moffett Park to increase the overall energy capacity of the planned new development.	1.E
5	Incentivize local solar, efficiency, and storage	1.F
419	Pilot a district thermal energy system with energy storage at Moffett Park to serve as a potential model for other areas.	1.G
3	Solar roofs: We need to require developers to install solar panels on all new office buildings, just like San Francisco, Santa Monica and Lancaster.	
4	Require solar for new construction	
6	Partner with SVCE to boost 100% RE participation	
7	Pilot new technologies (e.g., microgrids)	
8	Improve the Electric Power Mix	
244	Evaluate the feasibility of adding solar panels to the WPCP pond (floatovoltaics)	
252	Evaluate the feasibility of adding solar panels to the closed landfill	
254	As part of the Cleanwater Masterplan we should look at opportunities to generate more electricity, minimize electricity purchased, and lower the peak load	
259	Evaluate adding solar panels to water tanks	
274	Homeowners with rooftop solar should be incented to put the maximum number of panels on their roof to generate more clean energy to sell to the grid.	
276	Support for solar panels, even on apartments	
278	Change Sunnyvale rules around solar installs, allow for off-grid installations with batteries (currently not allowed).	

Strategy 1: Promoting Clean Energy		
Idea ID #	**Idea Description**	**Next Move(s) ID#**
282	Green Electricity: Add incentive for 24x7 actual green electricity supply. So actual delivered electricity is directly green, not just gray electricity that has been greenwashed by purchasing a carbon offset somewhere else. Report results to each consumer monthly	
283	Building Code: Residential roof (new or re-shingle) to move penitrations (e.g. vent pipes) away from southish facing portion to make clear space easy & less expensive for installation of more solar panels	
285	Support alternative solar such as thermal and awning solar. What is lacking is true support with staff and vendors in Ground based, pole mount solar and awning solar mounting (not roof) and thermal water heater. City and its vested interest vendors are doing their best to impede my solar needs.	
286	Encourage rooftop solar panel installations by various ways: attractive subsidies, buy back the excess produced electricity at a good rate. Sunnyvale is a very sunny city with many spread-out houses BUT with so few rooftop solar panels.	
291	Solar PV should become required retrofit by 2028 for each existing residential dwelling, at least .75kW per bedroom, roof area and shading permitting. Micro-inverters should be required if shading is an issue.	
312	More incentives and programs for residential and commercial solar systems. Ensuring barriers for manufactured homes and HOA communities to adopt solar are removed.	
318	We should study Palo Alto's incomplete and bumpy ride towards banning gas leaf blowers, which will be banned in the whole state in 2024 with AB1346. The PA mayor has suggested having friendly letters for neighbors to print and hand out when they run into a home-owner which hires a gas-leaf blower to encourage constructive communication between neighbors instead of cops with guns.	
321	I urge the Council to join other cities throughout California to urge the California Public Employees Retirement System to kill its fossil fuel investments. Put those holdings instead into sustainable and renewable holdings.	
337	Streamline permitting for solar, battery storage, and electrification upgrades.	
346	Carbon Tax. Implement a local carbon tax on 1) the direct access electricity component that is generated with fossil fuels (dirty electricity UUT), 2) gasoline & diesel sales, 3) natural gas sales (Utility User Tax increase), and 4) embedded carbon in new construction (Carbon Impact Developer Fee). Utilize the revenue to fund, finance or incentivize local electricity storage, low income home electrification retrofits, MUD electrification retrofits, and addition of EV charging to MUDs. Justification for the tax is to improve public health, support electrification for low and moderate income families, and prepare for an end of gas flow date.	
353	Allow alternative solar installation methods such as ballasts and pergolas.	
360	Offices usually use so much unnecessary energy, during Covid the most, with there being only a few people in the office, office lights remained on and even in the night. If we require tech companies to put solar panels on the roof of the building, it will be long term cost efficient for the company and save energy at the same time.	
364	Turning off lights at schools during the night and add solar panels on every school building.	
364	Turning off lights at schools during the night and add solar panels on every school building.	
405	Partner with regional entities like SVCE to incentivize switching residential homes, multi-family homes and businesses from gas to all electric. Depending on where the valves are, and what would be most efficient, set target dates for gas system delivery shut off to neighborhoods and finally to the whole city.	

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Strategy 2: Decarbonizing Buildings		
Idea ID #	**Idea Description**	**Next Move(s) ID#**
9	Benchmarking Requirement: Require commercial properties to benchmark their energy consumption annually and require energy audits every five year with implementation.	2.A

Strategy 2: Decarbonizing Buildings		
Idea ID #	**Idea Description**	**Next Move(s) ID#**
10	Energy Benchmarking and Retrofit Policy/Programs for Energy Benchmarking: Characterize building stock and analyze feasibility for various energy efficiency programs per building type. Draft Energy Benchmarking Ordinance to improve overall system performance in the existing building stock and contribute to city-wide energy use reductions. Include stakeholder outreach, trades training and education, and prepare financing and incentive options. Establish energy score program and performance standards. Public awareness campaign and incentives for building performance.	2.A
273	Subsidized energy efficiency upgrades for existing homes such as insulation, dual pane windows, or appliance and HVAC upgrades. Ensure barriers for manufactured homes and HOA communities are removed.	2.B
246	Conduct a municipal buildings greenhouse gas inventory. Last one was conducted in 2014.	2.C
12	Outreach and Incentives for Electrification program (Heat pump water and space heaters): Build atop city's free energy audit program: launch a Score card program for single-family residents to track and reduce energy use; and include electrification incentives and options at time of audit.	2.D, 2.N
13	Pay for the Panel Program: Remove financial obstacles for the adoption of clean energy technologies.	2.D, 2.N
14	Kick Out Carbon: Develop and Publicize electrification Incentives.	2.D, 2.N
15	ZNE + All-Electric Incentives and Recognition program: While ZNE is mandatory for new construction in 2020, existing building stock will also need to be addressed to achieve GHG goals. incentivize and tell the success stories.	2.D, 2.N
16	Municipal facility leadership by example: Upgrade muni. facilities as ZNE demonstration projects using win-win financing strategy.	2.E, 2.N
250	Research and develop a financing method/program to support electrification of existing buildings.	2.F
290	Gas or propane fired space heating should be phased out by 2028, in favor of heat pump technology. Also, ICE-based vehicles should no longer be permitted to be sold in Sunnyvale after 2028.	2.G
388	Require electrification for any remodel involving more than 25% of home sq. ft. or any HWH, HVAC or kitchen replacement. Require energy audit disclosure/filing for every home/building at sale, with electrification required within 2 years. Sunset new gas installs by 2025. Shut off residential access to gas by 2030.	2.H
421	Develop a commercial building electrification strategy (CBES) to aid in development of a commercial building electrification ordinance with a detailed commercial natural gas usage analysis, an analysis of potential impacts to the local commercial sectors via direct engagement to small and minority-owned businesses, and an electrification costs analysis.	2.I
422	Adopt an electrification ordinance for existing commercial buildings by 2023 to be implemented through the building permit process, which bans expansion of natural gas infrastructure and requires appliance replacements to be all-electric where technologically feasible (exceptions can be made where all-electric alternatives to do not exist or are more than 100% more expensive than the natural gas-powered replacement).	2.J
423	Enforce residential and commercial electrification ordinance compliance by developing and implementing a comprehensive permitting compliance program which includes routine staff training, dedicating staff time to building inspections, charging fees for noncompliance, providing easy to understand compliance checklists online and with permit applications, and facilitating permitting online.	2.K

Strategy 2: Decarbonizing Buildings		
Idea ID #	**Idea Description**	**Next Move(s) ID#**
243	Gas Utility Franchise Agreements: Can the franchise agreement re-negotiation be used to incentivize/fund climate action goals. Enter into shorter term agreements to allow for future opportunities to reduce gas in cities.	2.L
426	Join the World Green Building Council's Net Zero Carbon Buildings Commitment by requiring all new residential and commercial buildings are net zero carbon (in terms of embodied carbon and operational carbon) by 2030.	2.M
334	Develop an existing buildings electrification strategy to analyze the existing building stock of the City, with a focus on low-rise residential, and identify a pathway for an equitable transition to all-electric buildings. This transition includes replacing natural gas burning appliances and equipment in existing buildings with high efficiency electric powered versions. See Berkeley's draft existing buildings electrification strategy.	2.N
11	Establish a residential energy conservation program that encourages or incentivizes homeowners to perform energy and water audits, with an emphasis on leveraging homeowner decision-making during home sale, purchase, and remodel.	
17	Improve permit process and ordinance requirements: Maximize GHG reductions and coordinate improvement of permit process in accordance with new ordinance requirements such as Green Building Program Update or others. For example, expand the streamlined solar permitting process to include all rooftop solar project in the city (residential multi-family, commercial and industrial).	
18	No New Fossil Infrastructure: City would not purchase new capital eqpt., permit new comm. or res. development, or implement infrastructure that directly uses fossil fuels.	
19	Differential Utility Tax Rate: Work with other cities and PG&E to enable Sunnyvale to implement a lower Utility User Tax on electricity and to raise the tax on natural gas.	
20	Evaluate and update the 2009 Zoning Code for Green Buildings for single-family, multi - family, and non-residential building construction and major remodels every three to five years.	
21	Connect businesses and residents with rebate programs that give priority to appliances with smart grid technology.	
22	Sunnyvale residents can get paid to save energy: OhmConnect is a free service in Sunnyvale that rewards you for saving energy when it matters most to the grid and the environment.	
23	Identify businesses that are likely to be the largest consumers of energy within the city and target City outreach to these businesses.	
24	Home Smart Track: A piece of hardware that monitors a user's energy usage for smarter consumption through visualization of aggregated user data.	
25	Home Energy Clock: A display, like a clock on the kitchen wall, that shows real time use of electricity, gas and water in kw, therms and cft plus dollars.	
26	Free energy audit for home and building owners: Building and home owners will be offered free-of-charge energy audit to identify best efficiency opportunities.	
27	Incentive-based policy for carbon capture and sequestration in building materials: Sunnyvale should create an incentive-based approach to encouraging construction using building materials that sequester carbon.	
28	Eco Housing: Convert the Sunken Garden golf course into a farm and eco housing condos.	
29	GHG>15%! Replace risky, toxic, inefficient (10%Eff!) Fireplaces and BBQ with 80%Eff. NG sealed-safe FP-Inserts & 90%Eff. hot water heaters.: GHG>15% Replace smoggy 10%Efficient Fireplaces & BBQs with 80%E NG(Without Solar-PVC) fireplace Inserts and >90%E hot water heaters.	

Strategy 2: Decarbonizing Buildings		
Idea ID #	**Idea Description**	**Next Move(s) ID#**
30	Reducing Air Conditioner Use in Sunnyvale.: This proposal will consider strategies to reduce air conditioner use in existing buildings and new construction in Sunnyvale, including tree planting and shading of buildings.	
31	One Stop Trusted Energy Shop: City energy consultants for residents and businesses for one on one help on implementation of solutions	
32	Turn Lights Off: I turn my lights off as I use them, maybe the many office buildings who leave their lights on 24/7 could do the same.	
33	Green Certification for businesses in Sunnyvale: Businesses can receive certifications that they are conserving energy to provide them incentives to do so.	
34	Green lease program: City provides recognition program for commercial developers or building managers who offer green leases. Green leases allow developers/property managers to invest in energy efficiency features and pass on a portion of the cost to the tenants. Tenants, in turn, pay for the energy use and are motivated to save energy.	
35	Revenue Neutral Carbon Tax on Natural Gas: Add carbon tax per therm to every SV user of Natural Gas which is used to provide rebates for switching to electric for space heating, etc.	
36	Streamline Permitting for Carbon Neutral Building: Accelerate the update of carbon-neutral building.	
37	Solar Hot Water: Make free non Co2 energy from the Sun.	
38	Fast install solar: Modular, possibly prefabricated, standardized approach to solar installation.	
39	Tours and Demos of Decarbonized homes/businesses: Once a year set a day where folks can tour homes + businesses that have innovated in reducing energy use & promoted low or no carbon tech.	
40	ZNE New Construction Policy: Enforce compliance with ZNE New Residential Construction goals of 15% above Title 24 standards for single-family residences and 10% above for high-rise properties with accompanying solar mandates. Incentivize and recognize commercial ZNE.	
41	Updated Green Building Code and Developer's Carbon Impact Fee: Utilize city's Green Building Code & impose Carbon Impact fee to encourage green building feat. that go beyond state's standards.	
42	Require all new and resurfaced parking lots, sidewalks, and crosswalks to be made of materials with high reflectivity, such as concrete or reflective aggregate in paving materials.	
43	Commit to using a warm aggregate mix for all asphalt patching, overlay, and reconstruction.	
44	Adoption of CALGreen Tier 1 or Tier 2 reach codes.	
241	Use eco-brick or eco-concrete.	
242	Develop a plan to phase out fossil fuel infrastructure.	
243	Gas Utility Franchise Agreements: Can the franchise agreement re-negotiation be used to incentivize/fund climate action goals. Enter into shorter term agreements to allow for future opportunities to reduce gas in cities.	
245	Add electrification consideration into the purchasing policy	
269	More incentives / encouraging for energy saving. More encouragement of electric vehicles (or bicycles or scooters). Run dishwashers and laundry on cold wash. Install better windows or solar shades that reduce need for heating/cooling	
271	Change building codes to allow solar on manufactured homes	

Strategy 2: Decarbonizing Buildings		
Idea ID #	**Idea Description**	**Next Move(s) ID#**
279	Incentive for light colored roofing materials. White or tan roofs will safe energy and reflect heat upward as the climate warms.	
281	Building Code: Residential roof design to increase southish facing portion to promote installation of more solar panels.	
287	Higher tax on energy to incentives people to be more mindful of energy consumption and conserve. I see so much energy waste among most households. Then the proceeds can be used to subsidize home improvements related to more energy efficiency, as well as rooftop solar panels.	
289	Solar PV should become required for each new residential construction, at least 1kW per bedroom, roof area and shading permitting. Micro-inverters should be required if shading is an issue.	
294	Starts family dwelling gas to electric. 1. On-site review of homes identify air leaks, insulation needs, lighting updates, etc.. 2. Provide incentives for transition to induction stove tops, instant electric water heaters, electric heating, etc. 3. Provide current status with cost trades for electric automobiles. 4. Update Sunnyvale electrical grid to reduce transmission loss.	
299	Go beyond current reach codes in phasing out gas cooking. Ban the installation of gas cooktops in commercial and retail establishments. Charge a substantial fee on gas cooktops installed in residences. Use the proceeds to fund more Cool Cooktops (and maybe air quality monitors and thermal imagers) for Library patrons to check out	
304	Promote heat pump HVAC units	
309	Encourage more free energy audits at home	
314	No new residential buildings with fossil-fuel appliances	
323	Whenever SVCE makes a menu of model policies available for decarbonizing buildings (e.g. Reach Codes 2.0), commit to implementing the most aggressive option(s) available from that menu.	
324	Identify criteria (market readiness, equity, etc.) for implementing an "electrify on burnout" ordinance for natural gas appliances, and pass such an ordinance including mechanism for regular review of the criteria until they are met and the ordinance can go into effect.	
325	Implement a revenue-positive differential Utility Use Tax, with new revenue dedicated to decarbonization programs focused on electrification for low-income residents.	
334	Develop an existing buildings electrification strategy to analyze the existing building stock of the City, with a focus on low-rise residential, and identify a pathway for an equitable transition to all-electric buildings. This transition includes replacing natural gas burning appliances and equipment in existing buildings with high efficiency electric powered versions. See Berkeley's draft existing buildings electrification strategy.	
340	Expand the reach code to include existing buildings. Consider building standards for utilizing low carbon materials in construction	
347	Support electrification of existing homes and businesses at sale. Rebates and incentives in Game Plan 2028 will likely not be enough to get on track to achieve the goal of 20% of homes and businesses completely electrified by 2030. Some combination of mandatory measures such as 'replace on burnout', 'electrify upon sale', or require electrifying any appliance touched by any size remodel or Tenant Improvement, will be needed. Equity supports for low and medium income should be implemented.	

Strategy 2: Decarbonizing Buildings		
Idea ID #	**Idea Description**	**Next Move(s) ID#**
347	This may include funding for direct installation of heat pumps and electric panel improvements, no or low-cost on-bill financing for electrification, and innovative public-private funding models. Other policy possibilities include: a) prohibit any all-electric property from connecting to a gas line, b) require any new air conditioning to be two-way (heat pump that can both heat and cool). Before 2028 there will likely be regional (BAAQMD) or statewide restrictions on purchasing appliances or systems running on natural gas. Beginning this transition now will allow contractors to train their workforce and gain experience in replacing gas appliances with electric ones.	
348	Set an 'end of gas flow' date for the city- not later than 2045 when 'carbon neutrality' is supposed to be achieved statewide. This is an important signal to send to residents and businesses since gas powered appliances that are installed today may still be functioning in 2045. Develop a plan to phase out fossil fuels infrastructure.	
354	Incentivize building denser housing - there are too many single family homes in Sunnyvale. I would love to see more mixed-zoned neighborhoods, with things like small community corner stores with apartments on top. This would get people closer to things they need, so they will be able to walk more and drive less.	
367	It is important to create incentives to promote the decarbonization of buildings and to encourage people to use less energyâ€”such as using OhmConnect to pay residents for saving energy, using a Home Energy clock, etc.	
371	Develop an all-out campaign on the benefits of building electrification, switching from burning methane to electricity displays in the permit shop, library, rec center, and city hall; social media; Library speakers; tabling at farmers market and city events; art contests; utility bill inserts; articles in the Quarterly; newspaper and bus ads, presentations to school kids, Scouts, realtors, HOAs	
384	Ban all future natural gas hookups. Induction cooktops work just as well as gas. Heat pump water and air heaters work just as well. This is not a hardship. Climate Change is real and happening very fast while we dicker.	
386	Establish specific, aggressive goals and actions, with continuous measurements, metrics and action adjustments, so most SV homes and commercial establishments are electrified by 2030, starting with an aggressive program with outreach and code changes over time directed at phasing out gas and replacing existing HWHs since gas HWH's generate half of the carbon footprint in the typical home.	
387	Sunset gas HWH/furnace/stove top replacements/installation by 2025. Establish a program for residents to proactively replace their HWH (taking advantage of SVCE and other rebates/resources). Establish a training/promotion program with local suppliers/installers re: HWH heat pumps with an expedited permitting process. Game-ify/publicize goals/achievement by neighborhood and commercial buildings.	
390	Require all new developments to use sustainable HVAC refrigerants. Some refrigerant fluids are strong GHGs when they leak into the atmosphere. We should be requiring/incentivizing developers to only use sustainable refrigerants. https://en.wikipedia.org/wiki/Refrigerant	
399	Barber hair clippings collection for oil catching looms to line storm drains to prevent pollution going into waterways.	
400	More aid to transition older homes to electric stoves and water heaters. This will also reduce gas-related sickness in homes, as well as be more eco-friendly.	

Strategy 2: Decarbonizing Buildings		
Idea ID #	**Idea Description**	**Next Move(s) ID#**
401	One idea is requiring larger commercial buildings to be powered by at least (for example) 25% solar electricity (or wind, but there isn't much wind in Sunnyvale :). This should also be required for newly constructed houses or apartment buildings in the area too, so the public will be more involved in this effort.	
412	Incentivize re-piping and submetering for multi-family buildings with shared plumbing. Communal water usage is very difficult to control as people don't directly feel the pain of over usage. Grants or even low interest loans would be fantastic.	
424	Electrify the Sunnyvale's Below Market Rate (BMR) housing stock at a neighborhood level by 2040. Establish a plan and schedule for implementing this action by 2024. Develop a Building Performance Standard for existing buildings that requires electrification by 2030.	
425	Conduct periodic cost studies and direct engagement to restaurants to minimize exemptions upon readoption of the new building electrification ordinance each code cycle.	

Strategy 3: Decarbonizing Transportation & Sustainable Land Use		
Idea ID #	**Idea Description**	**Next Move(s) ID#**
45	Promote Medium Density Housing Options in Existing Neighborhoods to Help Reduce Vehicle Miles Traveled: Enact policies to promote infill development at modestly higher dens. than existing neighborhoods, house more people in SV to reduce VMT.	3.A
46	Facilitate the development of affordable housing near transit.	3.A
47	Sunnyvale Employees live here: Sunnyvale Employees become residents to reduce mobile traffic. This will also maximize their community involvement and cohesion.	3.A
48	Reform Residential Minimum Parking Requirements to Reduce VMT by Allowing More People to Live in Sunnyvale Near Jobs: Update Municipal Code to relax reqs. for dwellings to provide min. number of parking spaces, to support car-light lifestyles & reduce VMT.	3.B
49	Create maximum parking requirements and reduce minimum parking requirements for mixed-use development. Require parking lot sharing for mixed-use or commercial development with complementary hours of operation	3.B
50	Support car light lifestyles with limited parking supply lower vehicle ownership. Actively manage parking supply with parking pricing and unbundled parking	3.B
51	Let's get serious about Transportation Demand Management & Fair Value Commuting: Reduce SOV trips in commuting by strengthening TDM policies, "carrot/stick" commute clubs & community shuttles.	3.C
52	Transportation Demand Management strategies are implemented, mandated, enforced, and promoted actively, and used widely by everyone in Sunnyvale	3.C
53	Promote telecommuting to decrease solo drivers during commute time periods. Leverage technology to decrease need for driving and increase public/ride-sharing travel options	3.C
54	Require trip reduction programs in new residential, commercial, and mixed use development.	3.C
55	Require existing and future major employers to utilize a variety of transportation demand management (TDM) measures such as flexible work schedules, telecommuting, guaranteed rides home, low- or no-cost transit passes, parking "cash-out" incentives, and other programs that provide employees with alternatives to single-occupant commutes	3.C
56	Implement high quality transit service and a robust set of first/last mile strategies for at least two-thirds of the cross-city corridors	3.D

Strategy 3: Decarbonizing Transportation & Sustainable Land Use		
Idea ID #	**Idea Description**	**Next Move(s) ID#**
57	Advocate for transit service improvements by area transit providers consistent with established performance standards, with an emphasis on coordinating public transit schedules and connections and for subsidies for a higher level of transit service and/or more transit passes for residents and/or employees	3.D
58	Coordinate Connections to Mass Transit: Create a simple way for employers to coordinate getting employees to and from mass transit, to reduce car commutes to and from Sunnyvale.	3.D
59	Fully fund the City's bicycle and pedestrian improvement plans for completion by 2035.	3.E
60	Improve bicycle facilities and perceptions of comfort through pavement marking/coloring, physical separation specialized signs and markings, and other design elements	3.E
61	Implement projects and programs to improve the safety of cyclists and pedestrians through increased enforcement of pedestrian right-of-way laws, removing crossing impediments, improving crossing time at signalized intersections for pedestrians and cyclists, requiring drive-through food establishments to serve bicyclists, and providing center refuge areas for pedestrians and bicyclists to pause when crossing arterials	3.E
62	Support the creation of walking school bus programs in coordination with schools and parent organizations.	3.E
63	Continue to implement a Safe Routes to School program for increased bicycle and pedestrian safety to and from schools	3.E
64	Improve pedestrian safety and comfort through design elements such as landscaped medians, pedestrian level amenities, sidewalk improvements, and compliance with Americans with Disabilities Act (ADA) design standards, particularly for areas serving high volumes of traffic	3.E
65	Complete and connect low stress bicycle network in Sunnyvale: Best way to get people out of cars is to create easily accessed bike lanes and separate routes in a comprehensive cross-city network.	3.E
66	Fully implement bicycle and pedestrian projects throughout Sunnyvale to achieve a connected safe active network	3.E
67	Dockless Bicycle System For Better Transit Access: Provide means for citizens to travel to transit stops using city sponsored dockless bicycle system, for boarding transit instead of driving.	3.F
68	Support business efforts to plan and implement a bike-sharing program for major commercial and industrial areas	3.F
69	E-shuttle (electric) bus to move staff and employees around City: A free shuttle bus that moved people to major work hubs like Moffet Park would cut down on vehicles moving in directions where public transportation modes currently don't exist. Providing free or cheap transportation, WIFI, bike racks and regularly scheduled buses could reduce some of the traffic impacts. A mobile app showing the bus schedule could be created as well.	3.G
70	Free or Reduced Cost Green Shuttle: A shuttle (electric) bus from specific locations (City Hall, downtown) to Moffett Park or other business heavy areas!	3.G
71	Design streets and parking lots to accommodate increased pick-up and drop-off passenger and commercial demand	3.H
72	Create separate facilities and/or road pricing or priority schemes for autonomous vehicles and/or HOV, or Paid Express Lane	3.I
73	Determine if a cap on number of lanes or areas available to autonomous vehicles is appropriate	3.I

Strategy 3: Decarbonizing Transportation & Sustainable Land Use		
Idea ID #	**Idea Description**	**Next Move(s) ID#**
74	Sunnyvale Spice and Slice: Food festival and expo featuring locally grown food where Sunnyvale cooks and gardeners show off their skills and compete forfun.	3.I
75	Local food promotion	3.I
76	Rooftop gardens in Sunnyvale: We can plant rooftop gardens on some public or private buildings in Sunnyvale.	3.I
77	Support the conversion to a clean vehicle fleet with supporting infrastructure and incentives for individuals	3.J
78	Implement Policies to Accelerate EVI Installation Throughout Sunnyvale: Implement required strategies for accelerating EV Charging Infrastructure (EVCI) install. based on Palo Alto & related recommendations from PAEC.	3.J, 3.K
413	Secure funding to install electric vehicle recharging stations or other alternative fuel vehicle support infrastructure in existing public and private parkinglots.	3.J
80	Sunnyvale Goes EV!: Educate and support Sunnyvale residents in the biggest action they can take to reduce their carbon emissions: driving electric!.	3.K
81	Sunnyvale EV mobility or Zero-Emission Fleet: Convert city vehicles to EV and install proper infrastructure.	3.L
82	Increase the number of efficient or alternatively fueled vehicles in the City fleet as vehicles are turned over	3.L
83	Solar on DPS covered parking and EVs/plug-in hybrid vehicles for DPS	3.L
311	More public charging stations for EV, especially for non-single family residents.	3.M
345	Partner with SVCE to strengthen and expand their incentive program for EVI.	3.N
442	Create a phased ordinance by 2024 to ban local operation of gasoline and diesel-powered off-road equipment by type, including banning local operation of gasoline and diesel-powered small off-road equipment (SORE) by 2028.	3.O
84	Integrated housing at job centers: Require job centers (business parks, corporate campuses) to provide on-site housing for employees.	
85	Create walkable and bikeable neighborhoods with a diversity of services and entertainment options, and a diverse mix of residential and office developmenttypes.	
86	Require new development to reduce the need for external trips by providing useful services/facilities on-site such as an ATM, vehicle refueling, shopping	
87	Continue to plan for most new residential, commercial and industrial developments to be developed in specific plan areas, near transit, and close to employment and activity centers.	
88	Encourage the establishment and even distribution of neighborhood-serving facilities such as day care providers, banking/ATM locations, markets and drug stores in existing residential, commercial, and industrial areas in order to reduce the need for vehicletrips	
89	The Urban Village: Live without driving (except maybe work).	
90	Support on-demand ridesharing services that provide point-to-point access for all community members, especially the elderly, children, and the disabled	
91	Prepare for what is now parking to become available and design any future urban parking facility for eventual conversion	
92	High Density Housing near transit corridors to achieve housing and job parity by 2050: Sunnyvale adopts a high density housing near transit ordinance with a goal of achieving a one to one job / housing balance by 2050.	

Strategy 3: Decarbonizing Transportation & Sustainable Land Use		
Idea ID #	**Idea Description**	**Next Move(s) ID#**
93	Anti-Idling: My objective is to reduce the amount of GHG's and air pollution in Sunnyvale through reducing unnecessary vehicle idling.	
94	Achieve a jobs to housing ratio consistent with the regional average of less than 0.5 jobs per resident	
95	Continue to provide density and other zoning incentives or procedural or financial incentives to developments for establishment of alternative transportation infrastructure within the private as well as adjacent public right-of-way, such as increased bicycle parking, separated sidewalks, bike lanes and signage, and change and shower facilities	
96	Ensure that every village core has opportunities for growing produce locally	
97	Retain a residential parking permit program for residential areas adjacent to commercial areas of the City where parking is in higher demand	
98	Designate street parking stalls in the vicinity of key commercial and multi-family residential locations for efficient or alternatively fueled vehicles.	
99	Increase signal coordination as warranted to facilitate traffic flow along arterials and major collectors	
100	Deploy intelligent transportation systems measures for managing traffic of large-scale construction projects and at major City and private events	
101	Support, streamline, and incentivize the retention and expansion of local anchor and growth industries.	
102	Long-term rental homes: Convert short-term (<6months) rentals and empty investment homes into affordable long-term housing without costly construction and GHG.	
103	Address numbers: Require address numbers be clearly visible and legible from the street.	
104	Sunnyvale Bicycle Highway: As part of the Western Channel redevelopment, build a continuous bicycle highway from the bay, through downtown, past El Camino.	
105	Flexible work schedules: More flexibility in work schedules to allow employees to lessen the burden and stress of commuting and reduce emissions from congestion.	
106	Lunch Delivery Service: City can have contract with restaurants and fast food places to deliver work day lunches based on preorders (made by individual staff on a daily basis) to different locations of the City offices. This will reduce the number of vehicles on road during lunch time. City can also solicit restaurants incentives for bulk order.	
107	48/96 DPS Fire Schedule: Implement a 48-96 work schedule consists of a 6-day rotation period where each platoon works two consecutive 24-hour shifts, followed by four days off. For any given day of the week, an employee would work that day two weeks in a row, then have the next 4 off. Creates 50% reduction in commuting for all Sunnyvale Fire Service personnel and the resulting economic and environmental benefits this would create.	
108	Implement Congestion Management pricing in business parks: Convince fewer people to drive solo by charging a fee for each personal automobile entering business parks.	
109	Encourage More Ridership by Helping Change Public Perception of Public Bus System by Merging VTA Bus System with Corporate Bus System: Bring together Santa Clara VTA, large businesses & institutions to create efficient, clean electrical bus transportation system.	

Strategy 3: Decarbonizing Transportation & Sustainable Land Use		
Idea ID #	**Idea Description**	**Next Move(s) ID#**
110	City Mobility Strategy: A mobility strategy for the city would identify in clear and easy to understand language, the variety and volume of major commute routes to and from the city. As one example if a sizeable portion of the city's work force commutes from the East Bay, what are the current and future alternatives for commuters to get to and from Sunnyvale. Does the city have a workable strategy to help relieve highway congestion to and from that area? If not, what alternatives can the city contemplate in cooperation with other cities in the region, as well as regional transportation agencies to identify and address current gaps.	
111	Encourage and subsidize shared mobility autonomous vehicles	
112	Car-free lifestyle & Mobility as a Service: Promote the benefits of a car-free lifestyle and support 'mobility as a service' for city residents and businesses.	
113	Create a TDM program for City staff to promote alternative transportation modes and carpooling to the greatest extent possible	
114	Continue sponsoring projects to provide transit rider amenities at bus stops and rail stations.	
115	Work with the Valley Transportation Authority and neighboring jurisdictions to provide transit priority signal timing in order to decrease travel time	
116	Encourage schools to link employees and guardians of students with an online system such as 511.org that provides carpool matching	
117	Require sidewalks to be a minimum of six feet wide in order to allow side by side walking at identified locations that currently serve high pedestrian traffic volumes, or locations planned to serve high pedestrian traffic.	
118	Require secure bicycle parking at public and large private events	
119	Increase awareness of the city's bicycle facilities by updating the city bicycle map to show locations of public and private bicycle parking, creating a web-based application for members of the public to identify locations of private parking, and establishing information kiosks at key city locations to provide maps and highlight alternative modes of transportation	
120	Improve bike lanes, bike racks, and bike security: Making bike lanes safer and providing better resources to people who bike will incentivize bike transportation.	
121	Modernize Residential streets' speed limits and parking to increase capacity, improve mobile safety and reduce GHG: Prohibit speeding and parking on bike path streets. Prohibit visually impairing vehicles' parking risks to cars, cyclists & pedestrians.	
122	Green light for bikes/Idaho stop: Create more bike corridors where cyclists (almost) never have to stop at intersections.	
123	Increase Green Mobile and shrink carbon footprint: New home/buildings donate permanent green space property to connect safe bike/pedestrian paths, remove GHG inefficient, same-size structures.	
124	Metrics for Non-car travel within Sunnyvale: Create data for non-car travel comparable to that currently maintained by the City for car-based travel.	
125	WayWatchers: Mobile application that tracks how people move around the city and gives points towards tokens for rewards.	

Strategy 3: Decarbonizing Transportation & Sustainable Land Use		
Idea ID #	**Idea Description**	**Next Move(s) ID#**
126	Creative Parking Permits for all Street Parking and Per Use Fees for Public Parking Facilities: Require parking permits for all parking on streets and public parking facilities on; use modern technology for easy fee collection.	
127	Vehicle Tax on mileage, weight, and wheels: Tax vehicles based on mileage, weight, and number of wheels (while driven with audible/visible reminders).	
128	Replace 4-way stops with mini-roundabouts when possible: Mini-roundabouts reduce emissions when compared to stop-and-go traffic pattern of 4-way stops, and are more friendly on bike traffic.	
129	Flashing Yellow Left Turn Arrows: Replace red left turn arrows with flashing yellow left turn arrows to allow drivers to turn when their direction of traffic has the green.	
130	Sustainable Commuter Punchcard: This idea uses incentives to motivate commuters to carpool, use public transit, bike, or walk to work or school.	
131	New Civic Center: Re-design the future civic center to reduce planned parking in Option 1 (which is designed for today's transportation).	
132	Making Biking (More) Attractive/Fun: Community activities that encourage biking.	
133	Financing Better Mobility: A universal pass (daily, monthly, and/or yearly) paid for by all residents, for local, multi-modal, carbon-free public transportation.	
134	Improve walkability to Fair Oaks park: Make it easy to walk to Fair Oaks park for people living between Fair Oaks, Arques and Taylor.	
135	Affordable 100% solar power for EV mobility solutions (cars, shuttles, buses): Fuel all future Evs (cars, shuttles, buses) with 100% clean, local, and affordable renewable energy.	
136	48/96 DPS Fire Schedule: City should consider discounting the electricity charging rates or providing free EV charging for a certain number of hours per employee per year. Incentivizing cleaner vehicles will help reduce the impact of the carbon emissions produced from employee commutes.	
137	Establish Electric Car Sharing Programs as Supplement to City Fleet: Partner with private car-sharing networks, like Envoy, to bring more EVs and EV infrastructure to City properties. Envoy provides a private, car-sharing network dedicated to a location where people live (e.g., apartment building) or work. Envoy will install chargers, supply and maintain EVs, and provide insurance for monthly subscription fees.	
138	Designate preferred parking stalls for electric, hybrid, and other alternative fuel vehicles in all public and private parking lots consistent with the California Green Building Code	
139	Facilitate new fueling stations that offer alternative fuels	
140	Incentivize gas stations to offer E85: Offer incentives for gas stations to offer more alternative fuels like ethanol (E85), hydrogen, or charging stations for EVs.	
141	[Regulate] Gas powered garden equipment: Regulate and enforce rules that reduce the amount of particles that pollute our air from gas powered garden equipment.	
142	Car pool lanes for all-electric vehicles: A 24-hour express lane for all-electric vehicles on all major roads.	
143	Sustainable electric school buses for Sunnyvale's children and environment: We will help Sunnyvale's schools and community to adopt electric buses and innovative, affordable charging solutions.	

Strategy 3: Decarbonizing Transportation & Sustainable Land Use		
Idea ID #	**Idea Description**	**Next Move(s) ID#**
248	Track 308gas sales as a way to measure the transition away from fossil fuels.	
249	Prohibit new gas stations within City limits	
251	Develop a plan for Fleet Electrification, specifically ensuring that charging station infrastructure can be installed to meet future fleet needs.	
256	Evaluate alternative fuel options when Waste Collection Vehicles are up for replacement	
275	More pedestrian streets (like Murphy) and bike lanes.	
288	We live across the street from a city park where SV trucks, large and small, often stop for lunch or to use restrooms. Truck engines often run the entire time they are parked thus polluting and wasting expensive fuel, surely not in line with SV's climate action plan. The City should adopt and enforce a policy requiring its parked vehicles be turned off unless operation is needed for ongoing.	
296	Incentives to purchase green/electric vehicles, electric bicycles, and bicycles.	
298	Free up parking spaces. Amend Sunnyvale Multi-Family and Nonresidential Parking Requirements to allow secure bicycle parking to count for up to 50% (rounded down) of required parking spaces. Allow residents of neighborhood streets to designate up to 50% of street parking for protected play or recreation.	
300	Promote transportation choice. Embrace Mr. Barricade and use paint, signs, and plastic to protect existing bike lanes and add new ones to El Camino. Create bus-only lanes on El Camino. Reach out to VTA to determine what would incentivize them to add service beyond El Camino.	
301	More bike ways and cross walks over busy streets and intersections.	
306	Create incentives to buy EVs	
308	Require planes to use unleaded gas	
310	More cycling and walking, less cars. Just look how other cities transformed themselves in the last 2 years, Sunnyvale only closed down the tiny stretch of Murphy Street to traffic	
315	Reduce barriers to bicycling. Make it safe and easy to bike anywhere. Provide bicycle parking in front of all businesses. Promote biking for errands (shopping, groceries, etc). Build all new roads with safe bike lanes and add them to existing roads. Even better is to have separated bike paths.	
319	We definitely need more EV chargers. I live in a condo complex off Evelyn W. and drive a full-electric car. I have to walk 15 minutes minimum to charge it since my condo complex is older and hard to refit with chargers. The city/county/state needs to help pay for this type of installation.	
320	We need a campaign against idling engines. So many people have the bad habit of turning on their gas-car engines then looking at their phone or claim that their engines need to warm up. We need banners, signs especially for delivery trucks or around schools, speakers at PTA meetings, informative slips of paper for offenders. This should include City Fleet vehicles as well.	

Strategy 3: Decarbonizing Transportation & Sustainable Land Use		
Idea ID #	**Idea Description**	**Next Move(s) ID#**
322	Because of cost or access reasons many bike lanes or roadsides don't get cleaned, or very rarely, which makes them unsuitable for riders. I have been working on bike lane sweeper prototypes at bikelanesweeper.com to address this issue. It may not replace current full-size sweepers but may be a clean and cost-effective addition to consider to keep our bikeways clean.	
326	Fully build out the improvements specified in the Active Transportation Plan.	
327	Identify the bike/ped network improvements needed beyond the current Active Transportation Plan to achieve the city's transportation mode share goals.	
329	Add secured bike parking in high-traffic areas (e.g., the BikeLink lockers that used to be under Target, now are only at Caltrain)	
330	Explore whether a regular community shuttle (in conjunction with local public transit) could decrease car trips and provide a more accessible "last mile" closure	
339	Ensure new construction includes parking and level 1 charging for e-bikes and scooters. Re-adopt the 2021 Reach Code and increase MUD EV charging coverage.	
342	Double down on implementing the Active Transportation Plan to accelerate project deployment. Prioritize Bicycle and Pedestrian projects over single occupancy vehicle infrastructure.	
343	Reduce parking minimums for new construction. Implement paid parking downtown. Utilize funds to support a free or low-cost electric shuttle to downtown.	
355	Prioritize walking, biking, and public transit over car transit - Cars have too many negative externalities, not just climate-wise, even when electric. If biking and walking is more viable, we can reduce parking requirements for buildings without seeing increased traffic. And it has other positive externalities, like people are happier and healthier!	
357	Add meters/required payment for all city-owned parking spaces, including at City Hall	
358	Create a more robust incentive program for City staff to take alternative transportation to work; add City bicycles to the "pool vehicle" fleet that staff can reserve	
359	Unfreeze the TDM coordinator public works position and adopt more stringent ordinances in that regard	
361	Replacing 4 way stops with mini roundabouts, reduces carbon emissions from cars and is a better solution to traffic	
362	Increasing awareness about the possible transportations nearby is useful, it will increase the usage and security of public transportation. Public (Transportation becomes more reliable)	
365	Ticket for car idling.	
366	We should prioritize safety of student bikers to and from schools, thus encouraging the decarbonization of transportation. This includes creating a safe, connected network of bike paths and implementing full-time bike lanes on the main streets leading up to schools. Heavy bike traffic, paired with a large number of cars picking up kids for school, leads to lots of unsafe situations.	
372	Promote attending the Saturday farmer's market more and incentivize taking public transportation or shuttle to get there.	
373	Expand bus routes/times with citizen input through survey on where buses routes should expand to. The more accessible bus routes are, the more people will want to utilize the service.	

Strategy 3: Decarbonizing Transportation & Sustainable Land Use		
Idea ID #	**Idea Description**	**Next Move(s) ID#**
375	Sunnyvale only consolidated electric car charging station map	
377	Get a lot more funding and to implement the Active Transportation Plan much more quickly. It should not take eons to get this done. We are in a climate emergency and are moving far too slowly.	
378	Do much more to prioritize active transportation -- walking and biking.	
379	Reduce motor vehicle parking, require all motor vehicle parking to be paid, switch motor vehicle parking over to secure bike parking (Bike Link lockers)	
380	Create an e-bike and cargo bike rental program run by community services to allow residents to experience these eco-friendly forms of transportation as little or no cost. Brisbane runs their program via their library.	
381	I support idea 59. Fully fund the City's bicycle and pedestrian improvement plan completion by 2035.	
382	I support Sunnyvale running a dockless e-bikeshare system. Similar to Idea 67: Dockless e-Bicycle System For Better Transit Access. Sunnyvale should provide e-bikeshare system to enable residents to travel to transit stops and local trips using city sponsored dockless e-bicycle system. Ideally the system would be managed by VTA and would work countywide.	
385	Fully fund the Active Transportation Plan. Help people get out of their cars. Many of us want to bike more but are afraid to share roads with cars. Find the money! Increase developer fees! The developers bring more cars to Sunnyvale, they can fund much more of the resulting costs.	
389	Use Transportation Impact Fees for funding bicycle infrastructure. The goal of TIFs is to reduce traffic, and by building more safe bicycle facilities, people will choose to bike instead of drive, reducing congestion and helping the planet.	
391	GET MORE MONEY FOR BICYCLE INFRASTRUCTURE	
392	Build bike lanes with barriers and buffers on major streets so that bicyclists can be safe riding with cars.	
393	Need to connect bike lanes. Currently, bike lanes just end along streets, leaving bicyclists stranded.	
394	Build dedicated lanes for bikes across busy intersections like freeway on ramps and off ramps, so that bicyclists don't have to compete with cars in such dangerous intersections.	
398	Government funds/participation for bike rental/repair locations like the library for bikes, aid for purchasing new bikes or e-bikes. In sync with pedestrian/bike safety accessories like lights (solar powered), reflective vests, helmets etc. and develop bike & pedestrian lanes.	
410	telecommute	
413	Incentivize installation of DCC-9 type devices to support electric vehicle charging. It can be costly for tenants of condo buildings to run electrical from their subpanel to their carport, plus subpanels often are not rated for the load of a high-amperage charger. This device detects total power consumption of the main circuit breaker and de-energizes the charger. My complex just approved our first install for a resident if anyone is interested in seeing it.	

Strategy 3: Decarbonizing Transportation & Sustainable Land Use		
Idea ID #	**Idea Description**	**Next Move(s) ID#**
427	Establish a new citywide parking ordinance that provides a parking maximum on all new development and institutes parking fees for all commercial areas.	
428	Evaluate and update the City's zoning code, Transportation Demand Management program (on hold), and building code to ensure the City requires installation of bicycle parking for new commercial development and retrofits. Also, update codes to require bike facilities with lockers and showers at all businesses that employ over 50 people.	
429	Update city ordinances to prioritize safety and connections for pedestrians, bikes and micromobility over cars.	
430	Conduct a pilot program that converts vehicle roadways into active transportation corridors and conduct a study to identify potential corridors that would extend safe active transportation routes from residential areas into the downtown core.	
431	Adopt an EV reach code requiring new commercial and multifamily construction to install the minimum number of EV chargers based on Tier 2 CalGreen requirements (20% of total parking spaces)	
441	Plan for additional housing, within the goal of diverse housing, to reduce long-distance commutes.	

Strategy 4: Managing Resources Sustainably		
Idea ID #	**Idea Description**	**Next Move(s) ID#**
146	Waste Audits, education and outreach	4.A
260	Advance policy and programs to further reduce single-use plastics	4.B
443	Comply with SB 1383 requirements to help the state reduce organic waste disposal 75% by 2025.	4.C
444	Expand the City's edible food recovery program to edible food generators beyond those required by SB 1383.	4.D
445	Continue to implement the mandatory waste diversion ordinance requiring all residents, visitors, and businesses to place their discards in the appropriate container (i.e., recycle, compost, or garbage).	4.E
147	Stop Wasting Water & Reduce GHG!: Enact new water efficiency methodologies and policies that combine to greatly reduce Sunnyvale's consumption and lead California by example.	4.F
148	Water conservation: Get the best use out of every drop of water.	4.F
149	Promote existing SCVWD efficiency/conservation rebates	4.F
150	Promote "purple pipe" (reclaimed water) infrastructure in new construction or major renovation in preparation for a growing, usable network.	4.G
151	Create a purple pipe network for citywide use of recycled water for irrigation and other outdoor purposes.	4.G
188	Realtime Home Water Metering: A prototype water meter with iOS app showing instant usage.	4.H
316	Remove requirements that renters have to keep the lawn green by watering. Encourage more climate appropriate yards and gardens.	4.I

Strategy 4: Managing Resources Sustainably		
Idea ID #	**Idea Description**	**Next Move(s) ID#**
345	Streamline Permitting. This suggested idea combines aspects of all 6 strategies. Ensure permitting for battery storage, local rooftop solar (Clean Electricity), microgrids (Adapting to a Changing Climate), rainwater catchment, dual water piping, graywater systems (Managing Resources sustainably), electric panel upgrades, conversion of gas appliances to electric (water heating, HVAC, cooking and clothes drying) (Decarbonizing Buildings), and EV Charging sites (Decarbonizing Transportation) is as streamlined, easy and inexpensive as possible. Encourage property owners to make these improvements and promote the benefits of these changes for health, safety, comfort, climate, and security (Empowering our Community). Notify property owners of the streamlined processes. Train inspectors so they are prepared to quickly and accurately assess the quality of installations that may combine aspects of electrical, plumbing, roofing, landscaping and/or construction....	4.J
383	Eliminate plastic to-go containers, period. There are options that actually compost. This is not a hardship. If there are increased costs then the restaurants can add that amount on and I doubt anyone would notice. Eventually with increase in quantity the price of the sustainable materials would decrease.	4.K
152	Continue to implement the City's Tree Preservation requirements.	4.L
153	Clarify codes and policies to maximize the preservation of the largest longest-living trees, and ensure the expansion of the urban forest over time as appropriate for the site.	4.L
154	Increase Tree Coverage: Increase tree coverage in Sunnyvale to sequester carbon, regulate temperature, manage water runoff.	4.L
155	Implement City's Green Infrastructure Plan	4.M
446	Update the City Purchasing Policy to be aligned with Playbook goals and develop an implementation strategy.	4.N
144	Suggestions on how to implement the FoodCycle program into schools: The Sunnyvale FoodCycle program is moving into public schools and businesses, here are some thoughts on how we can better incorporate it.	
145	Select materials to be targeted for diversion and diversion methods, services, or technologies based on the results of the Zero Waste Strategic Plan.	
156	Carbon Cost Food Labeling: Encourage consumers to make choices that min. environ. impact, req. restaurants & grocers to label food & menu items w/ assoc. carbon emissions.	
157	Business: In the mood for food: Encourage businesses to grow food at their corporate sites.	
158	Tower Garden- a vertical, aeroponic growing system- 90% less water and space, 30% greater yield and 3x faster: I am a mom on a mission to promote education regarding healthy living and how to use urban farming that is productive and sustainable.	
159	Urban Agricultural Internships & Design Program: A system of academic credit for students to design and run urban farms/food stands with paid internships.	
160	Develop and implement a purchasing policy that requires food and other appropriate materials purchased by the City to be purchased from as local a supply as possible.	
161	CityTree Moss Wall: CityTree is a company that installs self-sustaining moss units that can have the equivalent of up to 275 trees per year for air cleaning.	
162	Tree Lined Street: Trees are efficient and aesthetic sequesters of CO2; trees add beauty while removing CO2 and replenishing O2.	

Strategy 4: Managing Resources Sustainably		
Idea ID #	**Idea Description**	**Next Move(s) ID#**
163	GHG>15%! Reduce Factory-Farm-Animals!: Discourage Farm-Animals' products to reduce global GHG>15% Redirect wasted resources to increase credible organic plant food supply.	
164	Expand existing park, open space, and boulevard tree inventory through the replacement of trees with a greater number of trees when trees are removed due to disease, park development, or other reasons.	
165	Develop and implement canopy coverage requirements for City-owned parking lots, with exceptions for solar installations.	
166	Construction & demolition debris diversion	
167	Pricing increases/penalties for not recycling/composting	
168	Single-use plastics ban	
169	Straws Suck!: Ban plastic straws in eating and drinking establishments in Sunnyvale.	
170	Environmentally Preferable Purchasing Policy ('Default to Green'): Create a comprehensive Environmentally Preferable Purchasing policy for the city.	
171	3D printed homes: Bring affordable 3D printed homes to Sunnyvale.	
172	Ban the sale or dispersal of disposable, single use plastic water bottles at public events permitted by the City.	
173	Green city procurement: Use modern data science tools (ProductBIO.com or other) to evaluate and strategically reduce the impacts of the city's procurement spending.	
174	Reduce take-out plastics: Sunnyvale restaurants only give straws, plastic cup lids, and plastic utensils upon request from patrons for in-store or to go orders.	
175	CJF [Disposables Fee on Plastic Cups and Straws]: Would like to have local business be taxed on single use plastic cups and straws like shopping bag tax to incentivize individuals BYO cup.	
176	Sunnyvale The Green Shopping capital of the world!: List and patronize stores and businesses that decrease packaging and enable Bring Your Own Packaging when shopping.	
177	Require bottle water fillers at all drinking fountains.: Place water fillers at all drinking fountains and stand alone to encourage people to not use plastic bottles and to drink right amount.	
178	Bring your own produce bags: Reduce grocery store plastic bag use for fruits and vegetables by consumers brining in their own containers.	
179	Trash to Cash: Composting for cash.	
180	Stop the wasted paper mailings: I would like help from the Sunnyvale community to get "Retail me not everyday" to d/c the paper mailings they send out that get trashed.	
181	Fewer Trash Cans, Less Litter?: Make trash cans as we know them non-existent.	
182	Multi-family program for composting, gardens	
183	Promote Reuse/repair and circular economy	
184	Water neutrality ordinance for new construction	
185	repurposing golf courses: convert City golf courses into agrihoods.	
186	Provide supplemental funding to existing rebates	
187	Require new development to reduce potable indoor water consumption by 30% (Tier 1 CALGreen) and outdoor landscaping water use by 40%.	

Strategy 4: Managing Resources Sustainably		
Idea ID #	**Idea Description**	**Next Move(s) ID#**
189	Discourage Use of Bottled Water: Plastic bottle disposal is a huge problem in the ocean and bottled water an economic problem. See Maude Barlow's book "Blue Future.".	
190	Dollars for Natives: incentivize homeowners to plant California native landscapes.	
191	Control Water Usage: A Timer operated shower will reduce water usage.	
192	Implement the City's Urban Water Management Plan to facilitate a 20% reduction in per capita water use by 2020.	
193	Create flexible provisions and encourage residents and businesses to collect rainwater to use for irrigation purposes.	
194	Revise development standards to ensure the use of greywater, recycled water, and rainwater catchment systems is allowed in all zones.	
195	Sustainable Landscaping Program: Encourage sustainable landscaping through integrated program including electric landscape equipment & lead by example with city operations.	
196	The Sunnyvale Urban Forest: Host community tree planting events around Sunnyvale until trees outnumber residents.	
253	Feasibility of utilizing compost for carbon sequestration	
257	Update the Zero Waste Plan to reassess waste reduction goals based on current technology	
258	Update the Sustainable Purchasing Policy to be aligned with Playbook goals and develop an implementation strategy	
261	Pilot a reusables program with a food service business in Sunnyvale	
262	Conduct a feasibility study and develop an implementation strategy for expanding water reuse in Sunnyvale	
263	Evaluate opportunities to partner with large developments for onsite water treatment and reuse	
264	Encourage the reuse and recycling of textiles	
267	Increased tree canopy in Sunnyvale. As drought conditions and hot weather continues tree cover can substantially reduce outdoor and indoor temperatures. Shade will also reduce evaporation of soil moisture and decrease water required for landscaping. Increase tree budget, require more trees for new construction and parking lots, and incentivize homeowners to plant drought tolerant species	
268	Increased recycling and reuse efforts. Fabric recycling like mountain view. Encourage restaurants to reduce utensil provisions or to accept container returns. At home, encourage reusable materials instead of disposables (eg regular towels instead of disposable paper towels or napkins). Discourage businesses and schools from tchotchkes and swag or trinkets that mostly end up in landfills.	
292	Increase awareness and initiate incentives for customers to recycle in online grocery or delivery services. Labeling on the product itself or leaving a container fee might not be efficient way to increase awareness. Many delivery and grocery services have been moved to online since the pandemic and asking websites and apps to increase awareness for recycling is presumably way more efficient.	
293	Requirement for store recycling programs for plastics - Target, Lucky, Safeway, and Home Depot have the plastic recycling stations - These should be a requirement for retailers in Sunnyvale.	

Strategy 4: Managing Resources Sustainably		
Idea ID #	**Idea Description**	**Next Move(s) ID#**
295	Plant more trees - replace diseased or deceased trees/shrubs. During drought, trees have fallen/been removed, but few have been replaced. Good to have additional trees in the city to increase oxygen, reduce carbon dioxide, provide shade, and beautify the city. With additional trees, a good irrigation plan needs to be put into place (drip watering, for instance). Potable water could be used.	
297	Collection of compostables from apart. dwellings. More aparts/condos units are being built in Sunnyvale. Capturing compostables would keep more trash from going to the landfill. With increased compostables, perhaps a new system for storing the compostables and/or reselling them to the public or local nurseries.	
302	Managing resources sustainably: Prohibit unsolicited paper advertisements via mail to residents. Most if not all just throw those away without reading anyway. Will save emissions on mail trucks and garbage trucks.	
303	Managing resources sustainably: Promote paper bag and recycled cardboard packaging for groceries over plastic clamshells. The plastic clamshells can't even be recycled (in Sunnyvale).	
305	Do a local "lawn busters" program with fixed cost assistance for design and landscaping	
307	Ban gas gardening equipment; it is choking us all day long/24/7	
313	In the interim of multi-family food cycle rollout, or maybe in addition, could we establish composting stations within the community? We could leverage community gardens like Charles St. or have multi-resident compost stations.	
328	Identify and implement steps needed to meet the City's tree canopy goals from the Urban Forest Management Plan equitably. Ensure trees are replaced when removed. This could include creating a tree inventory.	
332	Divest from fossil fuels. No longer make investments in the oil and gas industries. Examples include San Diego County and San Mateo County	
333	Create a tree inventory to equitably achieve an urban tree canopy.	
336	Carbon neutrality. Set a carbon neutrality goal by 2030 or 2045.	
338	Work with large businesses to coordinate a waste reduction pilot for City operations and/or citywide.	
341	Update the City Purchasing Policy to consider and reduce GHG emissions, landfill waste and water usage associated with contracts, materials, supplies, equipment, food and air travel. Set a City Intention to not purchase anything that runs on fossil fuels. Exceptions would require extensive justification. Potential examples: 1) require all contract bids to document expected greenhouse gas emissions in fulfilling the contract, 2) require re-usables and prohibit single use plastic, 3) require 100% post-consumer recycled paper, 4) reduce air travel (set standards for determining whether air travel is needed), 5) purchase food from local suppliers 6) Fleet vehicle replacement to consider gasoline or diesel as the last resort (not the default). Preference would be given to electric vehicles including potentially relaxing equipment specifications, paying up to x% in additional upfront cost, and delaying replacement through enhanced maintenance and spare parts (up to x months/years) until viable electric solutions become available, 7) Replacement of HVAC, water heating, and landscape equipment would default to electric, 8) Road repaving would utilize low-carbon concrete and/or light colored materials to reduce the urban heat island effect, 9) major fossil fuel infrastructure such as underground fuel tanks would be decommissioned and not replaced.	

Strategy 4: Managing Resources Sustainably		
Idea ID #	**Idea Description**	**Next Move(s) ID#**
344	Identify regional opportunities for carbon sequestration and nature based solutions that could be used as verifiable offsets for remaining 20% of emissions to achieve 'carbon neutrality'. Examples may include forest protection, wetlands restoration, regenerative agriculture, or possibly carbon capture technologies.	
350	HFCs in refrigerants. Methane leaks from stoves in the house. Someway to promote the reduction of HFCs (in refrigerators) at restaurants, groceries stores, etc. in homes as well.	
352	Invest in expanded recycling facilities - adding capabilities to recycle Styrofoam and types of plastic not currently recycled	
356	Incentivize having a desert/drought-friendly lawn - there are so many options for lawns that are not typical grass that would save a lot of water in comparison and would be better for the soil.	
368	We must improve recycling and food waste systems at schools. Schools should require composting bins, in alliance with the recycling bins and trash cans already present.	
374	Promotion of classes at the community garden to educate on how to grow our own food. Promote food sovereignty!	
376	Prohibit plastic produce bags at grocery stores and farmers markets	
395	Eliminate plastic to-go containers, period. There are options that actually compost. This is not a hardship. If there are increased costs then the restaurants can add that amount on and I doubt anyone would notice. Eventually with increase in quantity the price of the sustainable materials would decrease.	
396	Form a sub-committee to study and then influence national policy on farm subsidies, effects of pesticides, soil degradation, food quality and nutrition, investing in small farmers, food waste and transport costs. We may not have farms in Sunnyvale, but we want everyone to have access to healthy locally grown food.	
397	Encourage home owners to grow their own food under fruit trees, with eco-friendly irrigation. The shade will reduce the amount of water needed as temperatures continue to rise. Fund incentives for multiple dwelling building owners to provide community garden spaces. Plant trees like avocado in parks and as street trees.	
404	Regenerative gardening and agriculture: method for sequestering carbon, minimizing water use and water loss. This s also organic, with little or no use of pesticides, herbicides, or chemical fertilizers. Incentivize back yard gardeners w/free classes. Partner with the UC Davis Master Gardeners Co-op, and change the heritage orchard into an organic/regenerative teaching/demonstration site.	
406	Expand our salt marshes and natural water ways to the bay. This is a high carbon sequestration biome; restore, protect, and expand. Use as much of the dredged materials from the bay as possible.	
411	Incentivize installation of hot water re-circulators for multi-family (and single family) buildings. The simpler models do not require a return line. They drip hot water into the cold water line, speeding up delivery of hot water to fixtures located further away from the water heater.	
432	Adopt an ordinance requiring new construction to be built with dual plumping, where allowable, in preparation for the availability of recycled water infrastructure.	
433	Replace all non-functional lawn areas under municipal ownership/care including all medians, pocket parks and plazas with native, low-water alternatives by 2025.	
434	Conduct a compost application pilot in Moffett Park and promote it on the City's website and at City events.	

Strategy 4: Managing Resources Sustainably		
Idea ID #	**Idea Description**	**Next Move(s) ID#**
438	Conduct waste characterization studies every 10 years to understand the waste stream, inform waste programs and policies, and update the Zero Waste Strategic Plan to increase diversion and reduce contamination.	
439	Work with waste haulers to determine the data necessary to meet zero waste goals and establish protocol for regular collection and reporting of associated metrics.	

Strategy 5: Empowering Our Community		
Idea ID #	**Idea Description**	**Next Move(s) ID#**
197	The Cool Block: Reinvent the world. The journey begins on the block where you live.	5.A
198	Develop and encourage a mechanism for neighborhoods to share equipment and resources to improve sustainability.	5.A
199	Create a structure or partner with other groups for volunteers, residents, and other organizations to help achieve Sunnyvale's sustainability goals.	5.A
200	Sunnyvale Strong Blocks: Create a program similar to the City of Palo Alto's Cool Blocks to engage neighbors in taking action together on climate and disaster preparedness.	5.A
201	Use the City's Sustainability Commission and outreach staff as a structure to coordinate with other groups for volunteers, residents, and other organizations to help achieve Sunnyvale's sustainability goals.	5.A, 5.D
202	Accelerating Clean Electrification for Sunnyvale Residents: YellowTin educates & empowers homeowners to make informed decisions on clean energy choices such as Solar, Battery, EV, Space & Water Heater.	5.B
203	BE Ready to Electrify (Residential SF & MF): Increase readiness for planned, economic migration from fossil-fuel use to efficient, clean electricity use in residential homes.	5.B
204	Provide a toolkit of resources, including web based efficiency calculators, for residents and businesses to analyze their GHG emissions in comparison to their neighborhood, the city, and the region.	5.B
205	[Online Neighbor Forum for] Energy Outreach and Education: Ways to involve more people in adopting clean energy technologies.	5.B
206	Raising Awareness for CAP and Environmentalism: Create data-driven, specialized campaigns and programs that generate awareness and support for fighting climate change and being environment.	5.B
207	Inform the community of metering options, such as online applications and in-home monitors.	5.B
208	Sunnyvale Green@Home: Free SmartMeter analysis and personalized recommendations for how to reduce home energy waste and lower energy bills.	5.B
209	Dedicate a page of the City's website to climate change and climate change adaptation.	5.C
210	Green Warriors in Training: Teach them while they're young, so they can become eco leaders.	5.E
211	Recommend and advocate for schools to use the Air District curriculum or other programs for local school teachers to teach children about climate change GHG emissions, and local actions.	5.E
215	Create demonstration projects within City operations to educate the community on ways to reduce emissions by leading by example.	5.F
370	Task Library and Parks and Rec with developing ongoing programs to support our Climate Playbook, in consultation with the Sustainability Commission and ESD.	5.G
213	Visualizing Community Progress: Visual graphics that show progress towards sustainability goals.	5.H, 5.I

Strategy 5: Empowering Our Community		
Idea ID #	**Idea Description**	**Next Move(s) ID#**
214	Climate Action - Project Tracking: Treat city GHG emissions & projects designed to reduce them w/ same rigor (planning, improv., controls, metrics) as city finances.	5.H, 5.I
212	Actively engage with Sunnyvale businesses to identify areas for GHG reduction and financial savings.	
215	Use sustainability initiatives within City operations to educate the community of ways to achieve sustainability by example.	
216	Next Door App for Community Utility Data: Share data and conservation success through an online forum.	
217	Dry your clothes for Free - Use a Clothesline!: All you need is enough space in your backyard to string a clothesline. You'd be amazed how much energy is saved.	
218	GHG Reduction Planning: Develop action road maps for individual households.	
219	Provide regular communication with schools, business, faith groups, community members and neighborhood groups to increase participation in the City's progress toward sustainability.	
220	Develop and implement a competitive GHG reduction program between groups of citizens in the City with an award component.	
221	Actively promote use of alternative modes of transportation as safe modes of travel. When applicable, promote on the City's web site and publications about viable programs sponsored by 511, the Air District and other recognized agencies.	
222	Through selected projects and efforts to improve City operations, demonstrate how sustainability efforts are possible and successful.	
223	Make comparison an intrinsic part of consumption. Bring awareness of how our consumption compares to other communities, regions, and others in our neighborhood.	
224	Manage Your Metrics, Manage Your Money: This concept would help Sunnyvale residents understand and use their data to manage their energy.	
225	SustainTimes.net - Sustainable Actions Made Easy!: Educate and Implement Sustainability Actions for the Mainstream Community.	
226	Environmental Fair: Provide idea for City of Sunnyvale CAP 2.0 plan. Volunteer during the fair with own booth.	
227	Kid's Workshop: Treasuring Our Resources: Events that includes live cam to a farm and workshops for kids to encourage behavior change in sustainability.	
228	Art for the Climate: Emphasize Climate and the natural world in the City's "1% for Art" program and build on the successful Earth Day Poster and Film contest.	
229	Consolidate single function devices into multifunction: Evaluate usage and spending on single function devices and determine if consolidation into multifunction devices is cost efficient. Determine if follow me printing, authenticated printing, print management, and/or scan to email/folder are beneficial and cost effective.	

Strategy 5: Empowering Our Community		
Idea ID #	**Idea Description**	**Next Move(s) ID#**
230	Planning and Building staff will work with project applicants to limit GHG emissions from construction equipment by selecting one of the following measures, at a minimum, as appropriate to the construction project: a. Substitute electrified or hybrid equipment for diesel- and gasoline-powered equipment where practical. b. Use alternatively fueled construction equipment on-site, such as compressed natural gas (CNG), liquefied natural gas (LNG), propane, or biodiesel. c. Avoid the use on on-site generators by connecting to grid electricity or utilizing solar-powered equipment. d. Limit heavy-duty equipment idling time to a period of 3 minutes or less, exceeding CARB regulation minimum requirements of 5 minutes.	
231	Deep Time Walk: The Deep Time Walk is a walking audio book where one meter walked represents one million years of Earth history.	
265	Develop next Game Plan (2033), including detailed greenhouse gas emissions forecast.	
270	More climate change education	
277	Trash pick up. Perhaps volunteer events. Penalties for littering	
280	Incentivize local neighborhood recipe books to eat less meat and share vegetarian recipe ideas.	
317	Provide penalties and incentives to get people to take the right action. Penalties to stop behaviors and incentives to start/encourage behavior.	
351	Conducting a consumption based emissions inventory for the City, assessing whether this can be done on a regional level	
363	Having competitions (with prize) within neighborhoods for energy and water consumption or have a city wide objective.	
369	Provide a more accurate and complete representation of our emissions by including consumption-based emissions in our GHG inventory those from the things we buy that are manufactured or grown outside our city limits (includes transportation outside Sunnyvale, including flights). Omitting what may be the largest part of our emissions can lead to inaccurate understandings.	
370	Task Library and Parks and Rec with developing ongoing programs to support our Climate Playbook, in consultation with the Sustainability Commission and ESD. Programs may include speakers on climate science and solutions, classes (e.g. on healthy diets, safe biking, electrifying the home), events (for example Open Streets, induction cooking demonstrations). Climate requires all of government.	
402	I go to Sunnyvale Middle School, and one idea is to involve the schools in having greener efforts. Such as, installing solar panels so at least (for example) 25% of the building is supported by Solar energy. Or, teaching and involving the students about this issue that affects us more. For example, this "Game Plan" survey could have been talked about at school so we could put our voices in it.	
403	Publicly announcing efforts that the people of Sunnyvale can try to have greener footprints. For example, there could have been posters or signs put up in local stores about this survey so more people would know about it. Also, flyers, and announcements could be used to spread the word about simple actions that could be taken at home. Like, saving water, matching the pot to the burner, and more.	

Strategy 5: Empowering Our Community		
Idea ID #	**Idea Description**	**Next Move(s) ID#**
435	Integrate the Gameplan Moves into the routine operations and planned projects of each City Department.	

Strategy 6: Adapting to a Changing Climate		
Idea ID #	**Idea Description**	**Next Move(s) ID#**
232	Regularly train and inform the Department of Public Safety Office of Emergency Services (OES) on potential climate change risks and hazards.	6.A
233	On a regular basis, assess adaptation efforts of the City, region, and state and identify goals or gaps to be addressed.	6.A, 6.B
234	Appoint a staff liaison to attend and participate in regional meetings focusing on adaptation and resilience and to report back to staff on a regular basis	6.B
235	Analyze and disclose possible impacts of climate change on the project or plan area with an emphasis on sea level rise.	6.C, 6.D
236	Integrate climate change adaptation into future updates of the Zoning Code, Building Code, General Plan, and other related documents.	6.D, 6.E
237	Update the City Emergency Plan and Emergency Preparedness Workbook to address climate change impacts.	6.E
247	Consider developing a buildings resiliency plan/map	6.F
335	Resilience Hub Initiative. In collaboration with the community to create a network of community centers, neighborhoods, places of worship and other trusted community sites that are models for resilience and “ready for anything” – better prepared for natural disasters, climate change and other stresses in our community. For more information, visit USDN or NorCal Resilience Network.	6.F
238	Require buildings, homes and properties achieve the best Fire prevention methods to reduce fire accident caused GHG	
239	Underground residential power, cable and gray water ecology to reduce GHG	
240	Regenerate the tidal marshlands	
255	Evaluate microgrid feasibility between WPCP and SMaRT station	
331	Promote native and pollinator-friendly plants to increase resiliency to drought and sea level rise.	
349	Implement the Community Resiliency Plan and Shoreline Protection Plans.	
414	Develop and Implement a Shoreline Protection Plan.	
436	Participate in the County’s Climate Collaborative and align City initiatives with ongoing County initiatives.	
437	Establish climate resilience financing districts using SB 852 to undertake and raise revenue for projects and programs to address climate change including wildfire, sea level rise, extreme heat, drought, flooding, and other impacts.	
440	Review and summarize assessment products developed by the County's Silicon Valley 2.0 project and by the State.	

Appendix C: GHG Emissions Reductions Technical Report

Sunnyvale Playbook Update

Greenhouse Gas Emissions Reductions Technical Report
Final

prepared by

City of Sunnyvale

505 West Olive Avenue
Sunnyvale, California 94086
Contact: Madeline Khair, Environmental Programs Manager

prepared with the assistance of

Rincon Consultants, Inc.
449 15th St #303
Oakland, California 94612

June 2024

RINCON CONSULTANTS, INC.
Environmental Scientists | Planners | Engineers
rinconconsultants.com

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1 Introduction

This technical report presents the quantification and substantial evidence that support the greenhouse gas (GHG) emissions reduction potential of the City of Sunnyvale's Climate Action Playbook Update (**Playbook Update**) and supports its classification as a qualified GHG reduction plan. The Playbook Update is Sunnyvale's updated plan to reduce GHG emissions and address climate change. It includes measures (called "**Plays**") with measurable targets to reduce GHG emissions and the **Game Plan 2028** which is a list of actions (called "**Next Moves**") that the City will implement in the next five years to reduce GHG emissions.

Section 15183.5(b)(1) of the California Environmental Quality Act (CEQA) guidelines establishes several criteria which a plan must meet to be considered a qualified GHG reduction plan and allow for programmatic CEQA streamlining of project GHG emissions. This report details the evidence substantiating the GHG emissions reductions associated with the Plays of the Playbook Update pursuant to Subsection (D) which requires measures (i.e., Plays) or a group of measures, including performance standards, that substantial evidence demonstrates, if implemented on a project-by-project basis, would collectively achieve the specified GHG emissions level. This report demonstrates the Plays and Moves in the Playbook Update provide the GHG emission reductions necessary to meet the City's 2030 GHG emission reduction target, which exceeds the State's GHG emission reduction goal established by Senate Bill (SB) 32 and make substantial progress towards the City's 2045 target which aligns with the State's goal established Assembly Bill (AB) 1279.[1] The City's 2045 target was established as part of the Playbook Update to align with best practices and California's current long-term goal, which was accelerated from a goal of reducing GHG emissions 80 percent below 1990 levels by 2050.[2] More information is provided in Section 1.1, GHG Emissions Reductions.

The quantification and substantial evidence in this report are specifically intended to illustrate a reasonable approach to achieve Sunnyvale's 2030 GHG emission reduction target and make substantial progress towards Sunnyvale's 2045 target based on the Plays and Next Moves established in the Playbook Update and Game Plan 2028. While the Game Plan 2028 is intended to achieve the City's 2030 target, it is not intended to achieve the 2045 target. Rather, the Game Plan 2028 is intended to make substantial progress towards the City's 2045 target and a Game Plan with new Moves will be developed in alignment with department work plans and current best practices (including use of available technology) every five years, to develop Moves that, once implemented, will achieve the City's 2045 target.

Mechanisms to monitor the implementation of the Game Plan 2028 and its progress toward achieving the GHG emission reductions are included in the Playbook, as required in CEQA Guidelines Section 15183.5(b)(e). If, based on the tracking of community GHG emissions, the City is not on track to reach the 2030 GHG emission reductions specified in this report, the Playbook as a whole or specific Moves in the Game Plan 2028 will be amended. Based on these amendments, a new

[1] SB 32 established the State goal to reduce GHG emission 40 percent below 1990 levels by 2030. AB 1279 established the State goal to achieve carbon neutrality by 2045. The State defines carbon neutrality as net zero carbon emissions, which is achieved by reducing GHG emissions at least 85 percent below 1990 levels and removing the remaining emissions.

[2] The State's previous goal of reducing GHG emissions 80 percent below 1990 levels by 2050 was set by Executive Order S-3-05 at the time that the first Playbook was developed. AB 1279 accelerates this State goal to reducing GHG emissions 85 percent below 1990 levels by 2045.

Playbook Update and/or Game Plan 2028 will be prepared that includes altered or additional Plays and Moves, with evidence that their implementation can achieve the City's 2030 GHG emission reduction target.

1.1 GHG Emission Reduction Targets

The City of Sunnyvale's GHG emission reduction targets exceed California's goal to reduce GHG emissions 40 percent below 1990 levels by 2030 (SB 32) and align with California's goal to achieve carbon neutrality by 2045 (AB 1279) defined as reducing GHG emissions at least 85 percent below 1990 levels and removing or sequestering the remaining GHG emissions.

Sunnyvale's short- and long-term GHG emission reduction targets are:

- Reduce GHG emissions 56 percent below 1990 levels by 2030; and
- Reduce GHG emissions 85 percent below 1990 levels by 2045.

1.2 Measures and Actions Organization

As part of the Playbook Update process, the City of Sunnyvale has developed a comprehensive set of Plays and Next Moves to reduce communitywide GHG emissions to achieve the City's 2030 GHG emission reduction target and make substantial progress towards the City's 2045 target. The Plays are organized around a set of six strategies to reduce GHG emissions. Each Play is then supported by a set of Moves from the Game Plan 2028. The structure of the Strategies, Plays, and Moves are as follows:

- **Strategies**: establish approaches to reduce GHG emissions.
- **Plays**: identify areas for action. Plays have measurable targets that will help assess progress towards goals.
- **Moves:** define specific actions the City and community can collectively take to address climate change.

The Plays and Moves can be either quantitative or supportive, defined as follows:

- **Quantitative:** Quantitative Plays result in direct and measurable GHG emissions reductions when their Moves, backed by substantial evidence, are implemented. GHG emissions reductions from these Plays and Moves are justified by case studies, scientific articles, calculations, and other third-party substantial evidence that establish the effectiveness of the reduction Moves. Quantitative Plays can be summed to quantify how the City of Sunnyvale will meet its 2030 GHG emission reduction target and demonstrate progress towards the 2045 target.
- **Supportive:** Supportive Plays may also be quantifiable and have substantial evidence to support their overall contribution to GHG emission reductions. However, due to one of several factors – including a low GHG emission reduction benefit, indirect GHG emission reduction benefit, or potential for double-counting– they have not been quantified and do not contribute directly to achieving and making progress towards the City's GHG emission reduction targets. Despite not being quantified, supportive Plays are nevertheless critical to the overall success of the Playbook and provide support so that the quantitative Plays will be successfully implemented.

This report identifies both the quantitative and supportive Plays and provides a complete description of their contribution to achieving the City of Sunnyvale's 2030 GHG emission reduction

target. This report, however, only details the quantitative Moves that enable each Play. The supportive Moves are excluded from this report because they do not contribute directly to achieving and making progress towards the City's GHG emission reduction targets. These supportive Moves are nevertheless critical to the overall success of each Play. Detail on these supportive Moves can be found in the Game Plan 2028.

1.3 GHG Emissions Reductions

Table 1 summarizes the Plays and their associated targets for 2030 and 2045. It also presents a summary of the 2030 GHG emissions reductions calculated for each Play which are supported by the Game Plan 2028 Moves.

As part of the Playbook Update, the Play targets for 2030 and 2045 were updated to demonstrate the level of action needed in each area to guide the City towards the 2030 GHG reduction target and the new, accelerated 2045 GHG emission reduction target. The Play targets were updated using the GHG emission forecast, which was completed in 2023 using the most recently available and accurate data, and detailed calculations to quantify GHG emission reductions feasible for Sunnyvale based on best practices.

Together, the Plays and Moves in Game Plan 2028 provide Sunnyvale with the GHG emission reductions necessary to achieve Sunnyvale's 2030 GHG emission reduction target (see

Table 2). Since the Game Plan 2028 Moves are intended to be implemented within the next five years and then updated and supplemented with a new or updated set of Moves (e.g., in the Game Plan 2033) based on new information and future technologies, the Moves do not account for progress after 2030. Therefore, due to the evolving nature of the City's program, this report does not quantify GHG emission reductions for 2045. The Moves will be updated in future Game Plan iterations based on information the City gains from implementing Game Plan 2028, new technologies that emerge over the time period, and new State programs and regulations that are established to reduce GHG emissions. The Game Plan 2028 Moves do, however, make substantial progress on the City's 2045 GHG emission reduction target by exceeding the State's goal for 2030 (SB 32) to put Sunnyvale on a path to acheiveing the 2045 target (AB 1279).

Table 1 Sunnyvale Playbook Update 2030 GHG Emission Reduction Summary

Play ID	Play	2030 Play Target	2045 Play Target	2030 GHG Emission Reductions (MT CO_2e)
Strategy 1: Promoting Clean Energy				
Play 1.1	Promote 100% clean energy	100% clean energy	100% clean energy	3,320
Play 1.2	Increase local solar photovoltaics	3% of electrical load from local solar	5% of electrical load from local solar	3
Play 1.3	Increase distributed electricity storage	2% of electricity demand stored in batteries locally	5% of electricity demand stored in batteries locally	Supportive
Strategy 2: Decarbonizing Buildings				
Play 2.1	Reduce energy consumption in existing buildings	5% of existing homes and businesses receive deep energy retrofit	30% of existing homes and businesses receive deep energy retrofit	Supportive

Play ID	Play	2030 Play Target	2045 Play Target	2030 GHG Emission Reductions (MT CO_2e)
Play 2.2	Support electrification of existing buildings	44% reduction in residential natural gas consumption; and 38% reduction in commercial natural gas consumption	92% reduction in residential natural gas consumption; and 86% reduction in commercial natural gas consumption	108,935
Play 2.3	Achieve all-electric new construction	100% all-electric new construction	100% all-electric new construction	75,786
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	20% reduction in vehicle miles per person	30% reduction in vehicle miles per person	66,162
Play 3.2	Increase transportation options and support shared mobility			
Play 3.3	Increase zero-emission vehicles	42% of all vehicles on road are zero-emission vehicles	90% of all vehicles on road are zero-emission vehicles	98,079
Play 3.4	Decarbonize off-road vehicles and equipment	30% of all vehicles and equipment off road are zero-emission	75% of all vehicles and equipment off road are zero-emission	15,753
Strategy 4: Managing Resources Sustainably				
Play 4.1	Achieve Zero Waste goals for solid waste	Reduce landfilled garbage to 1 pound per person per day and achieve 75% diversion of landfilled organics	Reduce landfilled garbage to <1 pound per person per day and achieve 75% diversion of landfilled organics	45,258
Play 4.2	Ensure resilience of water supply	TBD	TBD	Supportive
Play 4.3	Enhance natural carbon sequestration capacity	N/A	N/A	Supportive
Play 4.4	Promote awareness of sustainable good and services	N/A	N/A	Supportive
Strategy 5: Empowering Our Community				
Play 5.1	Enhance community awareness and engagement	N/A	N/A	Supportive
Play 5.2	Track and share data and tools	N/A	N/A	Supportive
Strategy 6: Adapting to a Changing Climate				
Play 6.1	Assess climate vulnerabilities for Sunnyvale	N/A	N/A	Supportive

Play ID	Play	2030 Play Target	2045 Play Target	2030 GHG Emission Reductions (MT CO_2e)
Play 6.2	Protect shoreline area from seal level rise and coastal flooding	N/A	N/A	Supportive
Play 6.3	Strengthen community resiliency	N/A	N/A	Supportive
Total				**413,274**

Notes: TBD = to be defined per State requirements; N/A = not applicable

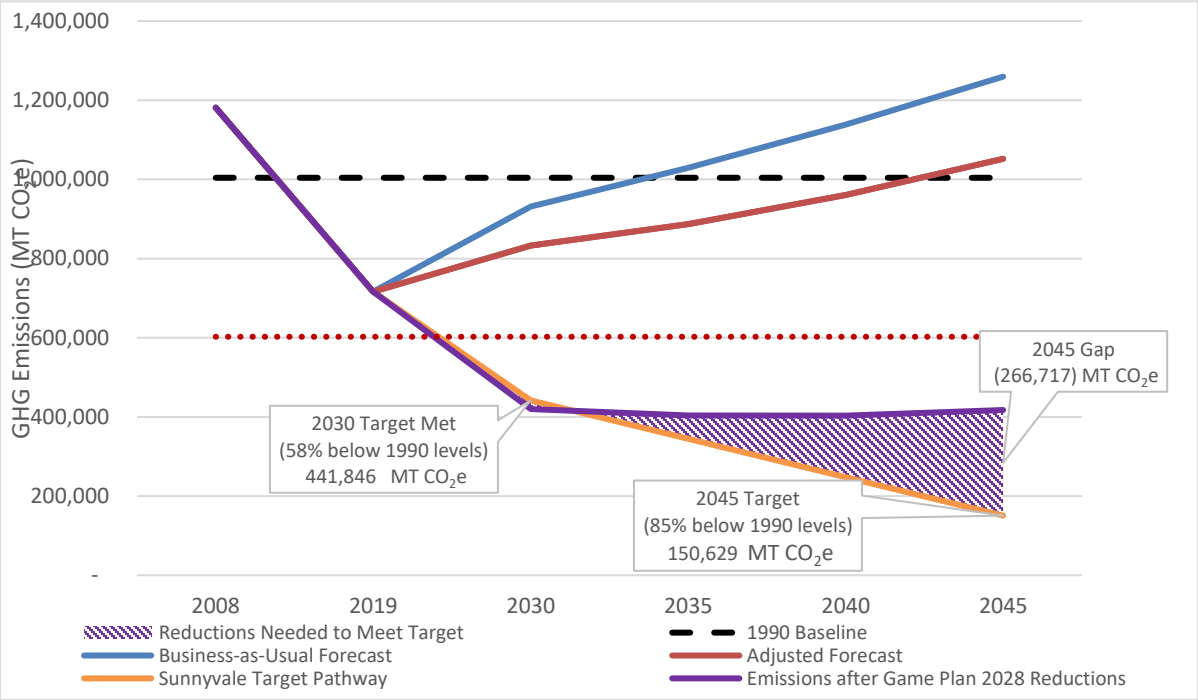
Table 2 City of Sunnyvale's GHG Emissions Reductions Pathway

GHG Emission Forecast or Reduction Target	2030 GHG Emissions (MT CO_2e)
Business-as-usual Forecast	931,298
Adjusted Forecast	833,092
GHG Emissions Reductions (from full implementation of Moves)	413,274
GHG Emissions Remaining (after Move reductions)	419,818
GHG Emission Reduction Target	441,846
GHG Emissions Gap (between remaining GHG emissions and target)	(22,027)
Target Anticipated to be Met	**Yes**

Notes: Numeric numbers donated in parathesis represent negative numbers.

Figure 1 shows the GHG emission reduction targets in relation to the City's GHG emissions after implementation of the Plays and Moves included in Game Plan 2028. The implementation progress achieved by 2030 is assumed to remain constant through 2045. Future Game Plan updates will include additional Plays and Moves as necessary and increase the rate at which Plays and Moves are implemented to reduce the gap through 2045 and achieve the long-term target. A complete description of each Play and its quantitative Moves is included in the remainder of the report.

Figure 1 City of Sunnyvale's GHG Emissions Reductions Pathway



2 Strategy 1: Promoting Clean Energy

The City of Sunnyvale's strategy to promote clean energy focuses on leveraging the renewable and carbon-free electricity provided by Silicon Valley Clean Energy (SVCE) along with increasing the generation of local solar energy and increasing distributed electricity storage.[3] Through continued reduction of non-SVCE and direct access usage rates along with installation of solar photovoltaic and energy storage systems, Sunnyvale will continue increasing the use of renewable and carbon-free electricity, reducing the GHG emissions associated with the community's residential and commercial electricity consumption. This strategy will further amplify GHG emission reductions achieved through electrification of the City's building stock (Strategy 2: Decarbonizing Buildings) and transportation system (Strategy 3: Decarbonizing Transportation & Sustainable Land Use) by providing renewable and carbon-free electricity to meet the additional electricity demand resulting from these strategies. Based on this strategy, the Playbook Update's clean energy strategy consists of the following Plays presented in Table 3. The table also indicates which Plays are quantitative and which Plays are supportive. The following subsections detail the substantial evidence and calculation methodologies of the quantitative Plays and the role of the supportive Plays.

Table 3 Strategy 1: Promoting Clean Energy 2030 GHG Emission Reduction Summary

Play ID	Play	2030 Play Target	2030 GHG Emission Reductions (MT CO_2e)
Strategy 1: Promoting Clean Energy			
Play 1.1	Promote 100% clean energy.	100% clean energy	3,320
Play 1.2	Increase local solar photovoltaics.	3% of load from local solar	3
Play 1.3	Increase distributed electricity storage.	2% of electricity demand stored in batteries locally	Supportive
Total			**3,323**

[3] Distributed energy storage consist smaller capacity energy storage units distributed close to end consumers. These storage systems can support the transition to renewable energy by smoothing out the timing differences between the supply of renewable energy and demand for energy.

Play 1.1: Promote 100% clean energy.

Play 1.1 aims to increase the share of Sunnyvale's residential and nonresidential electricity consumption sourced from clean energy to 100 percent. The primary Move that enables this target is **Move 1.A** which directs the City to continue to support and steer SVCE in providing electricity sourced 100 percent from a mix of carbon-free and eligible renewable sources to the Sunnyvale community.[4]

SVCE currently offers an electricity option with a GHG emission rate lower than the other electricity options offered in the region. This electricity option, known as GreenPrime, supplies electricity sourced 100 percent from solar and wind at a GHG emissions rate of zero.[5] Currently, electricity customers in Sunnyvale are automatically enrolled in SVCE's GreenStart electricity option but are allowed to opt-up to SVCE's GreenPrime electricity option, opt-out to receive electricity directly from PG&E, or opt-out to procure electricity at wholesale directly from electricity generators (i.e., direct access). However, as of 2023, SVCE enrollment in GreenPrime has been closed due to current constraints in obtaining enough carbon-free and eligible renewable energy to accept more customers to this tier.[6] SVCE is currently evaluating future and additional sources for carbon-free electricity and eligible renewables and anticipates being able to offer this tier to additional customers in the near future. Additionally, by 2030, SVCE plans to have an energy portfolio that will allow them to source 65 percent of their electricity from eligible renewables, while maintaining a 100 percent carbon-free energy portfolio on an annual basis.[7] This Play assumes Sunnyvale will support SVCE in achieving this energy portfolio by 2030, supplying all Sunnyvale SVCE customers with electricity sourced 100 percent from a mix of carbon-free and eligible renewable sources for an electricity GHG emissions rate of zero.

Since SVCE's inception and the move to automatically enroll Sunnyvale customers in SVCE, Sunnyvale has seen a two percent opt-out rate for residential customers and a three percent opt-out rate for commercial customers. For this reason, an opt-out rate of three percent is assumed for this Play's quantification.

This low opt-out rate will be supported by education and available financial assistance programs. The City understands cost is often the deciding factor for residents and businesses when making energy provider choices.[8] For this reason, Sunnyvale will focus educational efforts on available financial assistance programs to keep customers in SVCE. Studies have also shown informational programs can result in up to a 70 percent implementation rate of recommended practices by participants.[9] The City will, therefore, include education on the benefits of clean energy for residents and businesses to encourage customers to remain in SVCE. With these factors it is assumed the City will be able to maintain the SVCE opt-out rate to a minimum of three percent.

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[4] 'Eligible renewable sources' refers to renewable energy sources that are eligible for the Renewable Portfolio Standard.

[5] California Energy Commission. 2021 Power Content Label: Silicon Valley Clean Energy. Accessed at: https://www.energy.ca.gov/filebrowser/download/4672.

[6] SVCE. Upgrade to GreenPrime. Accessed at: https://svcleanenergy.org/greenprime/.

[7] SVCE. 2022 Integrated Resource Plan (2022). Accessed at: https://svcleanenergy.org/wp-content/uploads/svce_irp_public_v1.pdf.

[8] Villasenor, Karen. The City of Rancho Mirage Launches Community Choice Aggregation Program with Low Opt-Out Rate (2018). Accessed at: https://www.civicbusinessjournal.com/city-rancho-mirage-launches-community-choice-aggregation-program-low-opt-rate/.

[9] Laquatra, Joseph et al. The Consumer Education Program for Residential Energy Efficiency (2009). Accessed at: https://archives.joe.org/joe/2009december/a6.php.

Table 4 shows the parameters and data sources that support these clean energy GHG emission reductions and Table 5 shows the calculations as outlined in Equations 1 through 1.1.

SVCE Clean Energy Equations

Equation 1 $CO_2e\ Reduction_{Elec,y,i}=Total\ Elec_{y,i}*(1-Opt\text{-}Out\ Rate)*(EF_{elec,y,i}-EF_{CF\ and\ ER,y})$

Equation 1.1 $Total\ Elec_{y,i}=Elec_{y,i}+Total\ Elec\ Converted_{y,i}$

Table 4 SVCE Clean Energy Parameters and Data Sources

Variable	Definition	Value	Unit	Data Source
Equation 1				
$CO_2e\ Reduction_{Elec,y,i}$	Electricity GHG emission reductions	See calculation table	MT CO_2e	Calculated
$Total\ Elec_{y,i}$	Total electricity consumption	See calculation table	kWh	Calculated
Opt-Out Rate	SVCE opt-out rate	3%	percentage	Estimated to account for potential opt-out from SVCE, minimized by education on incentives and benefits.[8, 9]
$EF_{elec,y,i}$	Forecasted electricity emission factor	See calculation table	MT CO_2e/kWh	Forecast
$EF_{CF\ and\ ER,y}$	Electricity emission factor of SVCE carbon-free and eligible renewable electricity	0	MT CO_2e/kWh	California Energy Commission[10]
y	Year	2030	year	N/A
i	Subsector	Residential or Nonresidential	N/A	N/A
Equation 1.1				
$Elec_{y,i}$	Forecasted electricity consumption	See calculation table	kWh	Forecast
$Total\ Elec\ Converted_{y,i}$	Total electricity usage from conversions	See calculation table	kWh	Play 2.2, Play 2.3, and Play 3.3. See Section 3 (Strategy 2: Decarbonizing Buildings) and Section 4 (Strategy 3: Decarbonizing Transportation & Sustainable Land Use) of this report.

[10] California Energy Commission. 2021 Power Content Label: Silicon Valley Clean Energy.

Table 5 SVCE Clean Energy GHG Emission Reduction Calculations

Definition	Definition	Units	Sector	2030
Equation 1				
$Elec_{y,i}$	Forecasted electricity consumption	kWh	Residential	333,108,881
			Nonresidential	1,520,790,248
Total Elec Converted$_{y,i}$	Total electricity usage from conversions	kWh	Residential	309,650,488
			Nonresidential	168,600,685
Total Elec$_{y,i}$	Total electricity consumption	kWh	Residential	642,759,369
			Nonresidential	1,689,390,933
				Equation 1
$EF_{elec,y,i}$	Forecasted electricity emission factor	MT CO_2e/kWh	Residential	0.0000016
			Nonresidential	0.0000014
CO_2e Reduction$_{NG,y,i}$	**Electricity GHG emission reductions**	**MT CO_2e**	**Residential**	**1,005**
			Nonresidential	**2,316**

Play 1.2: Increase local solar photovoltaics.

Play 1.2 sets Sunnyvale up to transition three percent of the community's electrical load to local solar energy by 2030. The primary Move that enables this target is **Move 1.D** which directs the City to enforce the solar panel requirements of the new building reach codes and the Moffett Park Specific Plan.

In 2021, Sunnyvale adopted reach codes for residential and commercial developments that require new construction projects to include solar panels. The codes require the residential buildings (including low-rise multi-family buildings) install a solar panel system with a generation capacity greater than or equal to the anticipated dwelling's annual electrical usage and nonresidential buildings (including high-rise multi-family buildings) must install a minimum of three-kilowatt or five-kilowatt solar photovoltaic system based on square foot thresholds. The reach codes include an exemption to the solar photovoltaic requirement for nonresidential buildings (including high-rise multi-family buildings) that allows for a solar hot water system (i.e., solar thermal) instead of the solar photovoltaics.[11, 12] In 2030, the residential reach codes alone have the potential to generate six percent of the City's total electricity consumption with solar energy. This estimate makes three percent a conservative implementation goal for the Play since the estimate is higher than the implementation level even though it excludes potential solar installations on nonresidential buildings due to potential exemptions.[13] Since these reach codes were adopted in 2021, they were not included in Sunnyvale's 2019 inventory nor the adjusted forecast and are instead included in the Playbook Update as part of Move 1.D to allow the City to accurately account for the GHG emissions reductions.

The Moffett Park Specific Plan, adopted in July of 2023, also encourages the installation of solar photovoltaic systems in Moffett Park as part of the plan's goals for energy and healthy, climate-ready site and building design (i.e., Policy IU-5.2, DS-4.7, and DS-4.8).[14] These goals will further encourage local solar energy generation in Sunnyvale and support the Play's target.

Table 6 shows the parameters and data sources that support these electrification ordinance GHG emission reductions and Table 7 shows the calculations as outlined in Equations 2 through 2.1. To remain conservative and avoid potential double counting (with Play 1.1), the calculations only apply the three percent implementation factor to the City's non-SVCE electricity after Play 1.1.

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[11] City of Sunnyvale. Single-Family, Duplex, and Townhome Reach Codes (Rev 1/2023). Accessed at: https://www.sunnyvale.ca.gov/home/showpublisheddocument/1780/637820861891230000.

[12] City of Sunnyvale. Nonresidential and Multifamily Reach Codes (2021). Accessed at: https://www.sunnyvale.ca.gov/home/showpublisheddocument/1496/637820847520270000#:~:text=BUILDINGS%20%2D%20HIGH%2DRISE-,Electric%20appliances%20are%20required.,Gas%20lines%20are%20prohibited.

[13] The six percent coverage by the residential reach codes was estimated by multiplying the number of new households expected to be built by 2030 (since reach code adoption in 2021) by the estimated annual system output of a solar system in Sunnyvale. The resulting annual kilowatt-hours of solar electricity was divided by the total forecasted electricity consumption (including residential electricity, nonresidential electricity, and additional electricity from electrification—see Play 2.2, Play 2.3, and Play 3.3) to calculate the share of electricity this potential solar electricity covers. New households were estimated using Sunnyvale's adjusted forecast (i.e., change in projected households between 2030 and 2021). Estimated annual system output was calculated using the National Renewable Energy Laboratory's PVWatts Calculator for a four-kilowatt system in Sunnyvale. A four-kilowatt system is considered conservative for a household and the low end of the calculator's outputs was used to remain conservative.

National Renewable Energy Laboratory. PVWatts Calculator. Accessed at: https://pvwatts.nrel.gov/pvwatts.php.

[14] City of Sunnyvale. Moffett Park Specific Plan (2022). Accessed at: https://www.moffettparksp.com/.

Local Solar Equations

Equation 2 $CO_2e\ Reduction_{Elec,y,i} = Non\text{-}SVCE\ Elec_{y,i} * Converted\ Solar_y * (EF_{elec,y,i} - EF_{solar,y})$

Equation 2.1 $Non\text{-}SVCE\ Elec_{y,i} = Total\ Elec_{y,i} * Opt\text{-}Out\ Rate$

Table 6 Local Solar Parameters and Data Sources

Variable	Definition	Value	Unit	Data Source
Equation 2				
$CO_2e\ Reduction_{Elec,y,i}$	Electricity GHG emission reductions	See calculation table	MT CO_2e	Calculated
$Non\text{-}SVCE\ Elec_{y,i}$	Electricity consumption from PG&E (aka. non-SVCE electricity)	See calculation table	kWh	Calculated
$Converted\ Solar_y$	Percent of load converted to local solar energy	3%	percentage	Estimated based on conservative coverage of reach codes.
$EF_{elec,y,i}$	Forecasted electricity emission factor	See calculation table	MT CO_2e/kWh	Forecast
$EF_{solar,y}$	Electricity emission factor of solar electricity	0	MT CO_2e/kWh	N/A
y	Year	2030	year	N/A
i	Subsector	Residential or Nonresidential	N/A	N/A
Equation 2.1				
$Total\ Elec_{y,i}$	Total electricity consumption	See calculation table	kWh	Play 1.1
Opt-Out Rate	SVCE opt-out rate	3%	percentage	Play 1.1

Table 7 Local Solar GHG Emission Reduction Calculations

Definition	Definition	Units	Sector	2030
Equation 1.1				
$Total\ Elec_{y,i}$	Total electricity consumption	kWh	Residential	642,759,369
			Nonresidential	1,689,390,933
$Non\text{-}SVCE\ Elec_{y,i}$	Electricity consumption from PG&E (aka. non-SVCE electricity)	kWh	Residential	19,282,781
			Nonresidential	50,681,728
Equation 1				
$EF_{elec,y,i}$	Forecasted electricity emission factor	MT CO_2e/kWh	Residential	0.0000016
			Nonresidential	0.0000014
$CO_2e\ Reduction_{NG,y,i}$	**Electricity GHG emission reductions**	**MT CO_2e**	**Residential**	**0.93**
			Nonresidential	**2.15**

Play 1.3: Increase distributed electricity storage.

Play 1.3 aims to increase distributed electricity storage in Sunnyvale to store two percent of electricity demand in batteries locally by 2030. Distributed electricity storage consists of smaller capacity energy storage units located close to end consumers rather than in a few centralized locations. These systems support the transition to renewable and carbon-free electricity—and in turn support the GHG emission reductions from Play 1.1 and Play 1.2—by providing flexible, carbon-free electricity.

First, these systems prevent power fluctuations and power quality problems that may occur with renewable and carbon-free sources in the grid. The systems smooth out the timing differences between the supply of carbon-free, renewable energy (i.e., solar and wind) and the demand for energy. Solar and wind energy have variable output characteristics that mean supply will not match the energy demand at every time. Distributed electricity storage systems allow customers the flexibility to store energy when wind and solar supply is high and dispatch the stored energy when supply is low. This characteristic allows them to maintain consistent, high-quality power with a renewable grid and reduce GHG emissions by conserving renewable energy for use during times when renewable energy is not available, thereby offsetting fossil fuel-powered electricity generation.[15] Similarly, distributed energy storage systems can shield customers from outages during extreme weather events. The stored renewable and carbon-free energy can be dispatched during supply outages, increasing resilience without requiring customers to switch to fossil fuel-based energy sources.[16]

[15] Aktas, Ahmet. The Importance of Energy Storage in Solar and Wind Energy, Hybrid Renewable Energy Systems (2020). Accessed at: https://www.sciencedirect.com/science/article/abs/pii/B9780128212219000104.

[16] International Energy Agency. Unlocking the Potential of Distributed Energy Resources (2022). Accessed at: https://www.iea.org/reports/unlocking-the-potential-of-distributed-energy-resources.

3 Strategy 2: Decarbonizing Buildings

The City of Sunnyvale's strategy to decarbonize buildings leverages renewable and near-zero or zero-carbon electricity (provided by Strategy 1: Promoting Clean Energy) through building electrification and energy efficiency improvements. Electrifying Sunnyvale's building stock consists of transitioning natural gas stationary equipment—the equipment that heats the water we use and heats and cools the spaces we live and work in—to electric alternatives. When combined with renewable and zero-carbon electricity, all-electric buildings eliminate GHG emissions from natural gas consumption and transition to a zero-emission operational energy footprint. Further, when accounting for the increased energy efficiency of modern appliances, building electrification can be cost-effective for the community and minimize electricity demand increases. Based on this strategy, the Playbook Update's building decarbonization strategy consists of the following Plays presented in Table 8. The table also indicates which Plays are quantitative and which Plays are supportive. The following subsections detail the substantial evidence and calculation methodologies of the quantitative Plays and the role of the supportive Plays.

Table 8 Strategy 2: Decarbonizing Buildings 2030 GHG Emission Reduction Summary

Play ID	Play	2030 Play Target	2030 GHG Emission Reductions (MT CO_2e)
Strategy 2: Decarbonizing Buildings			
Play 2.1	Reduce energy consumption in existing buildings.	5% of existing homes and businesses receive deep energy retrofit	Supportive
Play 2.2	Support electrification of existing buildings.	44% reduction in residential natural gas consumption; and 38% reduction in commercial natural gas consumption	108,935
Play 2.3	Achieve all-electric new construction.	100% all-electric new construction	75,786
Total			**184,720**

Play 2.1: Reduce energy consumption in existing buildings.

Play 2.1 aims to reduce energy consumption in existing buildings by providing deep energy retrofits to five percent of existing buildings by 2030. While this reduction in energy consumption may provide GHG emission reductions, there is a high potential for double counting these GHG emission reductions as buildings are electrified (Play 2.2 and Play 2.3) and 100 percent renewable and carbon-free electricity is achieved (Strategy 1: Promote Clean Energy). Therefore, this Play is classified as supportive rather than quantified as it does, support these clean energy and electrification Plays.

When combined with electrification, energy efficiency improvements can support electrification by reducing utility bills over the long run and enabling better grid management by making room for added electrical load.[17, 18] The Cost Effectiveness Explorer for California local governments demonstrates that energy efficiency measures—such as light-emitting diode (LED) installations, ductwork sealing, insulation improvements, and heat pump installations—make electrification cost-effective in Sunnyvale for existing and new buildings—especially when combined with the installation of solar photovoltaics.[19] These energy efficiency improvements also decrease the demand existing appliances put on electrical infrastructure, making room for additional electricity demand from electrification projects.

[17] American Council for an Energy-Efficient Economy (ACEEE). Electrification and Efficiency: Crafting an Enduring Relationship (2019). Accessed at: https://www.aceee.org/blog/2019/01/electrification-and-efficiency.

[18] Institute for Market Transformation (IMT). Stronger Together: Why Efficiency with Electrification Catalyzes Systems Change (2020). Accessed at: https://www.imt.org/news/stronger-together-why-efficiency-with-electrification-catalyzes-systems-change/.

[19] California Energy Codes & Standards. The Cost Effectiveness Explorer. Accessed at: https://explorer.localenergycodes.com/jurisdiction/sunnyvale-city/study-results/4-PGE?only_study_type=existing-buildings.

Play 2.2: Support electrification of existing buildings.

Play 2.2 puts Sunnyvale on a path to reduce residential natural gas consumption 44 percent and commercial natural gas consumption 38 percent by 2030 to reduce GHG emissions. The primary Moves that enable this level of adoption include both the Moves for the adoption and enforcement of replace on burnout ordinances (Move 2.G, Move 2.J, and Move 2.K) and the Moves that achieve early retirement of natural gas appliances and equipment (Move 2.D, Move 2.L, and Move 2.M).

Move 2.G and **Move 2.J** commit the City to adopting residential and commercial electrification ordinances by 2026 to require HVAC system and hot water heater replacements to be all-electric; and **Move 2.K** commits the City to increasing community compliance with the ordinances by implementing a comprehensive permitting compliance program.

These ordinances will prepare Sunnyvale residents and businesses to comply with the Bay Area Air Quality Management District's (BAAQMD) amendments to Rule 9-4: Nitrogen Oxides from Fan Type Residential Central Furnaces and Rule 9-6: Nitrogen Oxides Emissions from Natural Gas-Fired Boilers and Water Heaters. These rules govern point of sale emission standards for space and water heating systems starting January 1, 2027. The only technologies currently available that meet the amended indoor air quality rules are electric space and water heating systems. Although there are a range of electric alternatives (e.g. electric resistance space heating), heat pump HVAC and heat pump water heaters are the most cost-effective option on the market due to their significantly higher efficiency (300 to 400 percent) and resulting lower operating costs.[20] These Moves target electric HVAC and water heater replacements specifically to prepare property owners and contractors for the BAAQMD rules and require electrification to save homeowners and property owners costs from duplicative or future infrastructure upgrades.

The City's permit compliance program will work to increase compliance with the electric replacements required by the ordinances. Although permits are required for many energy efficiency improvements (e.g., water heaters, insulation, HVAC systems, duct replacement) many jurisdictions face permit evasion issues, with permitted HVAC systems only accounting for eight to about 30 percent of total installations.[21, 22] This trend in permit evasion means jurisdictions face issues determining compliance with building ordinances and codes. Strategies that have proven effective at improving permit compliance in various states and local jurisdictions include streamlining the compliance process, improving third-party enforcement, and advanced training for enforcement staff—all actions Sunnyvale's permit compliance program will implement to compliment the electrification ordinances.[23] Sunnyvale will monitor permit numbers to estimate compliance rates and adjust the permit program strategies as needed to achieve a 85 percent compliance rate with

[20] Redwood Energy. A Pocket Guide to All-Electric Retrofits of Commercial Buildings (2022). Accessed at: https://assets-global.website-files.com/62b110a14473cb7777a50d28/6377e7c7fd6f8cc30f88afa7_Redwood%20Energy-s%20Pocket%20Guide%20to%20All-Electric%20Commercial%20Retrofits.pdf.

[21] Emily Alvarez and Bruce Mast. BayREN Codes & Standards Program. Local Government Policy Calculator for Existing Single-Family Buildings – User Guide (2021). Accessed at: https://www.bayrencodes.org/wp-content/uploads/2021/11/BayREN-Policy-Calculator-User-Guide_10.29.2021.pdf.

[22] California Public Utilities Commission (CPUC). Final Report: 2014-16 HVAC Permit and Code Compliance Market Assessment (Work Order 6) Volume I – Report (2017). Accessed at: http://www.calmac.org/publications/HVAC_WO6_FINAL_REPORT_VolumeI_22Sept2017.pdf.

[23] Ryan Meres et al. American Council for an Energy-Efficient Economy (ACEEE). Successful Strategies for Improving Compliance with Building Energy Codes (2012). Accessed at: https://www.aceee.org/files/proceedings/2012/data/papers/0193-000112.pdf.

the electrification ordinances.[24] Sunnyvale will also work with SVCE and Bay Area Regional Energy Network (BayREN) to design comprehensive outreach efforts to educate contractors on requirements and techniques for electric and heat pump replacements; and help property owners identify qualified/knowledgeable contractors.

Together, these Moves, will reduce residential natural gas consumption by 20 percent and commercial natural gas consumption by 17 percent by 2030 through the replace on burnout ordinances and the permit compliance program.

Table 9 shows the parameters and data sources that support these electrification ordinance GHG emission reductions and Table 10 shows the calculations as outlined in Equations 3 through 3.5.

Existing Building Electrification Ordinance Equations

Equation 3 $CO_2e\ Reduction_{NG,y,i}=(Fuel\ Avoided_{NG,y,i}*EF_{NG})-(Elec\ Converted_{y,i}*EF_{elec,y,i})$

Equation 3.1 $Fuel\ Avoided_{NG,y,i}=Fuel_{NG,y,i}*Reduction_{NG,y,i}$

Equation 3.2 $Reduction_{NG,y,i}=(EOL_{NG,y,i,wh}*Fuel\ Share_{NG,i,wh})+(EOL_{NG,y,i,HVAC}*Fuel\ Share_{NG,i,HVAC})$

Equation 3.3 $EOL_{NG,y,i,wh}=1/LSP_{i,wh}*(y\text{-}imp.y_i)*(1\text{-}NCR_i)$

Equation 3.4 $EOL_{NG,y,i,HVAC}=1/LSP_{i,HVAC}*(y\text{-}imp.y_i)*(1\text{-}NCR_i)$

Equation 3.5 $Elec_{convert,y,i}=Fuel_{AvoidedNG,y,i}*CF_{elec}/Eff_{elec}$

Table 9 Existing Building Electrification Ordinance Parameters and Data Sources

Variable	Definition	Value	Unit	Data Source
Equation 3				
$CO_2e\ Reduction_{NG,y,i}$	Natural gas GHG emission reductions	See calculation table	MT CO_2e	Calculated
$Fuel\ Avoided_{NG,y,i}$	Natural gas consumption avoided	See calculation table	therms	Calculated
EF_{NG}	Natural gas emission factor	0.005321	MT CO_2e/therm	Inventory & Forecast
$Elec\ Converted_{y,i}$	Electricity usage from conversion	See calculation table	kWh	Calculated
$EF_{elec,y,i}$	Forecasted electricity emission factor	See calculation table	MT CO_2e/kWh	Forecast
y	Year	2030	year	N/A
i	Subsector	Residential or Nonresidential	N/A	N/A
Equation 3.1				
$Fuel_{NG,y,i}$	Forecasted natural gas consumption after new building electrification (Play 2.3)	See calculation table	therms	Forecast
$Reduction_{NG,y,i}$	Natural gas reduction percent	See calculation table	percentage	N/A

[24] BAAQMD recently adopted zero nitrogen oxide (NOx) standards for building appliances. These rules require natural gas-fired furnaces and water heaters installed in 2027 and onward to emit zero NOx emissions. These rules will compliment Sunnyvale's electrification ordinance (because electric appliances meet the standards) and strengthen the need for permit compliance in Sunnyvale to demonstrate compliance to BAAQMD. BAAQMD. Air District Strengthens Building Appliance Rules to Reduce Harmful NOx Emissions, Protect Air Quality and Public Health (2023). Accessed at: https://www.baaqmd.gov/news-and-events/page-resources/2023-news/031523-ba-rules.

Equation 3.2				
$EOL_{NG,y,i,wh}$	Percent of water heaters reaching end-of-life	See calculation table	percentage	N/A
Fuel $Share_{NG,i,wh}$	Percent of sector natural gas consumption from water heaters	See below rows		
Fuel $Share_{NG,Residential,wh}$	Percent of residential natural gas consumption from water heaters	50%	percentage	SVCE. Buildings Baseline Study. Appendix C (2020).[25]
Fuel $Share_{NG,Nonresidential,wh}$	Percent of nonresidential natural gas consumption from water heaters	35%	percentage	Ibid.
$EOL_{NG,y,i,HVAC}$	Percent of HVAC units reaching end-of-life	See calculation table	percentage	
Fuel $Share_{NG,i,HVAC}$	Percent of sector natural gas consumption from HVAC units	See below rows		
Fuel $Share_{NG,Residential,HVAC}$	Percent of residential natural gas consumption from HVAC units	44%	percentage	SVCE. Buildings Baseline Study. Appendix C (2020).[25]
Fuel $Share_{NG,Nonresidential,HVAC}$	Percent of nonresidential natural gas consumption from HVAC units	35%	percentage	Ibid.
Equation 3.3				
$LSP_{i,wh}$	Average water heater lifespan in sector	See below rows		
$LSP_{Residential,wh}$	Average residential water heater lifespan	13	years	U.S. Energy information Administration. Updated Buildings Sector Appliance and Equipment Costs and Efficiencies (2023).[26]
$LSP_{Nonresidential,wh}$	Average nonresidential water heater lifespan	10	years	Ibid.
$imp.y_i$	Ordinance implementation year	See calculation table	year	N/A
NCR_i	Ordinance noncompliance rate	15%	percentage	Estimate based on permit evasion rates and strategies to increase building code compliance.[21, 22, 23]
Equation 3.4				
$LSP_{i,HVAC}$	Average HVAC unit lifespan in sector	See below rows		
$LSP_{Residential,HVAC}$	Average residential HVAC unit lifespan	21.5	years	U.S. Energy information Administration. Updated Buildings Sector Appliance and Equipment Costs and Efficiencies (2023).[26]

[25] SVCE. Appendices Buildings Baseline Study. Accessed at: https://www.svcleanenergy.org/wp-content/uploads/2020/02/Appendices-SVCE-Buildings-Baseline-Study_FINAL.pdf

[26] U.S. Energy Information Administration. Updated Buildings Sector Appliance and Equipment Costs and Efficiencies (2023). Accessed at: https://www.eia.gov/analysis/studies/buildings/equipcosts/pdf/full.pdf

$LSP_{Nonresidential,HVAC}$	Average nonresidential HVAC unit lifespan	23	years	Ibid.
Equation 3.5				
CF_{elec}	Electricity to therms conversion factor	29.3	kWh/therm	Metric Conversions[27]
Eff_{elec}	Efficiency factor of electric equipment relative to natural gas equipment	3	unitless	European Copper Institute[28]

[27] Metric Conversions. Therms (US) to Kilowatt-hours. Accessed at: https://www.metric-conversions.org/energy-and-power/therms-us-to-kilowatt-hours.htm.

[28] European Copper Institute. Heat Pumps: Integrating technologies to decarbonise heating and cooling (2018). Accessed at: https://help.leonardo-energy.org/hc/en-us/articles/203047881-How-efficient-is-a-heat-pump-.

Table 10 Existing Building Electrification Ordinance GHG Emission Reduction Calculations

Definition	Definition	Units	Sector	2030
Equation 3.1				
$Fuel_{NG,y,i}$	Forecasted natural gas consumption after new building electrification (Play 2.3)	therms	Residential	21,357,897
			Nonresidential	29,325,481
$Reduction_{NG,y,i}$	Natural gas reduction percent	percentage	Residential	20%
			Nonresidential	17%
$Fuel\ Avoided_{NG,y,i}$	Natural gas consumption avoided	therms	Residential	4,298,957
			Nonresidential	5,007,007
Equation 3.3 & Equation 3.4				
$EOL_{NG,y,i,wh}$	Percent of water heaters reaching end-of-life since ordinance implementation	percentage	Residential	26%
			Nonresidential	34%
$EOL_{NG,y,i,HVAC}$	Percent of HVAC units reaching end-of-life since ordinance implementation	percentage	Residential	16%
			Nonresidential	15%
$imp.y_i$	Ordinance implementation year	year	Residential	2026
			Nonresidential	2026
Equation 3.5				
$Elec\ Converted_{y,i}$	Electricity usage from conversion	kWh	Residential	41,986,476
			Nonresidential	48,901,769
Equation 3				
$EF_{elec,y,i}$	Forecasted electricity emission factor	MT CO_2e/kWh	Residential	0.0000016
			Nonresidential	0.0000014
$CO_2e\ Reduction_{NG,y,i}$	**Natural gas GHG emission reductions**	**MT CO_2e**	**Residential**	**22,809**
			Nonresidential	**26,575**

The remaining 24 percent of residential natural gas consumption and 21 percent of commercial natural gas consumption that is planned to be reduced by 2030 will occur through voluntary replacements of gas appliances with electric appliances due to a combination of factors.

First, currently available incentives will help continue the natural growth in electric space and water heaters seen in California over the past decade. According to Opinion Dynamics' *California Heat Pump Residential Market Characterization and Baseline Study* (2022), electric space heaters have grown from a five percent market share in 2009 to a 20 percent market share in 2019. Likewise, electric water heaters have grown from a six percent market share in 2009 to an 11 percent market share in 2019.[29] This natural trend is not only expected to continue through 2030 as electric appliances become more efficient and more cost-effective, but also be accelerated when coupled with the large amount of federal, State, regional, and SVCE funding available for Sunnyvale community members to replace their space and water heating appliances with electric or heat pump alternatives. While the total amount of funding available will change with sunset dates and

[29] Opinion Dynamics. California Heat Pump Residential Market Characterization and Baseline Study (2022). Accessed at: https://pda.energydataweb.com/#!/documents/2625/view.

budget cycles, the currently available federal (i.e., High Efficiency Electric Home Rebate [HEEHRA], Homeowner Managing Energy Savings [HOMES] Rebate, Inflation Reduction Act), State (i.e., TEHC Clean California), regional (i.e., BayRENHome+ Program, Bay Area Multifamily Building Enhancements [BAMBE] Program), and local (i.e., SVCE's rebates for California Alternate Rates for Energy [CARE] and Family Electric Rate Assistance Program [FERA] customers) funding incentivizes low- and middle-income residents in Sunnyvale to install heat pump space and water heaters at no additional cost compared to gas space and water heaters. In some cases, such customers will even be able to install the heat pump water heaters for free.[30] This substantial amount of funding available to Sunnyvale residents and businesses will help drive the voluntary market trend for electric space and water heating appliances through 2030.

Second, Sunnyvale will support these trends to accelerate electrification by supporting a series of technical assistance programs and direct incentives to achieve early retirement of natural gas equipment. **Move 2.D** directs the City to work with SVCE and BayREN to offer robust incentives for residents and businesses to replace natural gas equipment with electric alternatives and upgrade supporting infrastructure before the natural gas equipment reach their end-of-life. This Move will continue and expand the local funding (i.e., SVCE's rebates for CARE and FERA customers) currently available in Sunnyvale. The Move also direct the City to work with SVCE and BayREN to educate the community about the benefits of heat pumps and availability of incentives. **Move 2.L** directs the City to develop a Building Performance Standard for large, existing commercial buildings that requires electrification before 2030 by setting GHG emissions requirements (e.g., GHG emissions per square foot) in line with the City's GHG emissions reductions targets. Lastly, **Move 2.M** directs the City to work with community partners to implement community-support programs that provide the technical assistance and incentives needed to make residential building electrification accessible and affordable to the community. It also directs the City to work with community partners to supply utilities at rates that support electrification because heat pump adoption in the U.S. is strongly correlated with electricity prices.[31]

With a focus on outreach, incentives, cost-effective utility rates, and technical assistance, these Moves, along with the existing market trends and available incentives, will help capture the remaining equipment replacements needed to reduce GHG emissions from natural gas consumption that the electrification ordinances do not cover (i.e., replacements before equipment reaches end-of-life). These Moves will help accelerate equipment replacements in Sunnyvale, as demonstrated as possible in Europe where, in 2022 alone, heat pump sales grew by over 40 percent.[32] Because early retirement of natural gas appliances and equipment is more aggressive than actions needed to align with State goals and regulations, the City will need to monitor and scale their level of effort over time to meet the ambitious targets of this Play. The Moves will be monitored, scaled, and adjusted (through the Game Plan Update process outlined in "The Playing Field" section of the plan) to reach the targeted level of residential and commercial natural gas consumption reductions.

Table 11 shows the parameters and data sources that support these electrification programs and incentives for early retirement and Table 12 shows the GHG emissions reductions as outlined in Equations 4 through 4.2.

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[30] Rincon Consultants, Inc. Installation Costs for Zero-NOx Space and Water Heating Appliances (2024).

[31] Davis, Lucas W. The Economic Determinants of Heat Pump Adoption (2024). National Bureau of Economic Research. Accessed at: https://faculty.haas.berkeley.edu/ldavis/Davis%20NBER%20EEPE%202024.pdf.

[32] International Energy Agency. Heat Pumps. Accessed at: https://www.iea.org/energy-system/buildings/heat-pumps.

Existing Building Technical Assistance and Incentive Program Equations

Equation 4 $CO_2e\ Reduction_{NG,y,i} = (Fuel\ Avoided_{NG,y,i} * EF_{NG}) - (Elec\ Converted_{y,i} * EF_{elec,y,i})$

Equation 4.1 $Fuel\ Avoided_{NG,y,i} = Fuel_{NG,y,i} * Reduction_{NG,y,i}$

Equation 4.2 $Elec_{convert,y,i} = Fuel_{AvoidedNG,y,i} * CF_{elec} / Eff_{elec}$

Table 11 Existing Building Technical Assistance and Incentive Program Parameters and Data Sources

Variable	Definition	Value	Unit	Data Source
Equation 4				
$CO_2e\ Reduction_{NG,y,i}$	Natural gas GHG emission reductions	See calculation table	MT CO_2e	Calculated
$Fuel\ Avoided_{NG,y,i}$	Natural gas consumption avoided	See calculation table	therms	Calculated
EF_{NG}	Natural gas emission factor	0.005321	MT CO_2e/therm	Inventory & Forecast
$Elec\ Converted_{y,i}$	Electricity usage from conversion	See calculation table	kWh	Calculated
$EF_{elec,y,i}$	Forecasted electricity emission factor	See calculation table	MT CO_2e/kWh	Forecast
y	Year	2030	year	N/A
i	Subsector	Residential or Nonresidential	N/A	N/A
Equation 4.1				
$Fuel_{NG,y,i}$	Forecasted natural gas consumption after new building electrification (Play 2.3)	See calculation table	therms	Forecast
$Reduction_{NG,y,i}$	Natural gas reduction percent for sector			
$Reduction_{NG,y,i}$	Residential natural gas reduction percent	24	percentage	Estimated based on the level of residential reductions targeted from early retirement of natural gas equipment by monitoring, scaling, and adjusting outreach, incentives, utility rates, and technical assistance programs.
$Reduction_{NG,y,i}$	Nonresidential natural gas reduction percent	21	percentage	Estimated based on the level of nonresidential reductions targeted from early retirement of natural gas equipment by monitoring, scaling, and adjusting outreach, incentives, utility rates, and technical assistance programs.
Equation 4.2				
CF_{elec}	Electricity to therms conversion factor	29.3	kWh/therm	Metric Conversions[33]
Eff_{elec}	Efficiency factor of electric equipment relative to natural gas equipment	3	unitless	European Copper Institute[34]

[33] Metric Conversions. Therms (US) to Kilowatt-hours.

[34] European Copper Institute. Heat Pumps: Integrating technologies to decarbonise heating and cooling (2018).

Table 12 Existing Building Technical Assistance and Incentive Program GHG Emission Reduction Calculations

Variable	Definition	Units	Sector	2030
Equation 4.1				
$Fuel_{NG,y,i}$	Forecasted natural gas consumption after new building electrification (Play 2.3)	therms	Residential	21,357,897
			Nonresidential	29,325,481
Fuel Avoided$_{NG,y,i}$	Natural gas consumption avoided	therms	Residential	5,184,036
			Nonresidential	6,037,861
Equation 4.2				
Elec Converted$_{y,i}$	Electricity usage from conversion	kWh	Residential	50,630,750
			Nonresidential	58,969,781
Equation 4				
$EF_{elec,y,i}$	Forecasted electricity emission factor	MT CO_2e/kWh	Residential	0.0000016
			Nonresidential	0.0000014
CO_2e Reduction$_{NG,y,i}$	**Natural gas GHG emission reductions**	**MT CO_2e**	**Residential**	**27,505**
			Nonresidential	**32,046**

Play 2.3: Achieve All-electric new construction.

Move 2.E commits the City to continue implementing and augmenting the reach codes that require all-electric new construction. In 2021, Sunnyvale adopted reach codes for residential and commercial developments that require new construction to be all-electric. The reach codes include exemptions for certain high-rise multi-family buildings and nonresidential buildings (i.e., F, H, and L occupancies, unavoidable gas applications, Emergency Operation Centers, commercial dryers in large hotels) but require the exempt buildings be prewired for future electric appliances.[35, 36]

Since these reach codes were adopted in 2021, they were not included in Sunnyvale's 2019 inventory nor the adjusted forecast and are instead included in the Playbook Update as part of **Move 2.N** to allow the City to accurately account for the GHG emissions reductions. While the reach codes currently have exemptions that allow some buildings to be constructed with natural gas, this Play assumes 100 percent of new construction will be all-electric. To account for the new construction that may utilize the exemptions, this assumption is also incorporated into Sunnyvale's CEQA GHG Emissions Thresholds and CEQA GHG Emissions Analysis Compliance Checklist. This means new buildings that utilize the exceptions will need to mitigate the GHG emissions associated with their natural gas use below the GHG emissions level that they would have with all-electric construction. Thus, the GHG emission reductions from this Play are based on the forecasted residential and commercial building growth in the City and the assumption that 100 percent of new buildings will be all-electric. Table 13 shows the parameters and data sources that support these electrification GHG emission reductions and Table 14 shows the calculations as outlined in Equations 5 through 5.1.

All-electric New Construction Equations

Equation 5 $CO_2e\ Reduction_{NG,y,i}=(Fuel\ Avoided_{NG,y,i}*EF_{NG})-(Elec\ Converted_{y,i}*EF_{elec,y,i})$

Equation 5.1 $Fuel\ Avoided_{NG,y,i}=Fuel_{NG,y,i}-Fuel_{NG,imp.yi}$

Equation 5.2 $Elec_{convert,y,i} = Fuel_{\ AvoidedNG,y,i}*CF_{elec}/Eff_{elec}$

35 City of Sunnyvale. Single-Family, Duplex, and Townhome Reach Codes (Rev 1/2023).

36 City of Sunnyvale. Nonresidential and Multifamily Reach Codes (2021).

Table 13 All-electric New Construction Parameters and Data Sources

Variable	Definition	Value	Unit	Data Source
Equation 5				
$CO_2e\ Reduction_{NG,y,i}$	Natural gas GHG emission reductions	See calculation table	MT CO_2e	Calculated
$Fuel\ Avoided_{NG,y,i}$	Natural gas consumption avoided	See calculation table	therms	Calculated
EF_{NG}	Natural gas emission factor	0.005321	MT CO_2e/therm	Inventory & Forecast
$Elec\ Converted_{y,i}$	Electricity usage from conversion	See calculation table	kWh	Calculated
$EF_{elec,y,i}$	Forecasted electricity emission factor	See calculation table	MT CO_2e/kWh	Inventory & Forecast
y	Year	2030	year	N/A
i	Subsector	Residential or Nonresidential	N/A	N/A
Equation 5.1				
$Fuel_{NG,y,i}$	Forecasted natural gas consumption	See calculation table	therms	Forecast
$Fuel_{NG,imp.y}$	Forecasted natural gas in implementation year	See calculation table	therms	Calculated
$imp.y_i$	Ordinance implementation year	See calculation table	year	N/A
Equation 5.2				
CF_{elec}	Electricity to therms conversion factor	29.3	kWh/therm	Metric Conversions.[37]
Eff_{elec}	Efficiency factor of electric equipment relative to natural gas equipment	3	unitless	European Copper Institute[38]

[37] Metric Conversions. Therms (US) to Kilowatt-hours.

[38] European Copper Institute. Heat Pumps: Integrating technologies to decarbonise heating and cooling (2018).

Table 14 All-electric New Construction GHG Emission Reduction Calculations

Definition	Definition	Units	Sector	2030
Equation 5.1				
$Fuel_{NG,y,i}$	Forecasted natural gas consumption	therms	Residential	29,421,612
			Nonresidential	35,543,481
$imp.y_i$	Ordinance implementation year	year	Residential	2021
			Nonresidential	2021
$Fuel_{NG,imp.y}$	Forecasted natural gas in implementation year	therms	Residential	21,357,897
			Nonresidential	29,325,481
$Fuel\ Avoided_{NG,y,i}$	Natural gas consumption avoided	therms	Residential	8,063,714
			Nonresidential	6,218,000
Equation 5.2				
$Elec\ Converted_{y,i}$	Electricity usage from conversion	kWh	Residential	78,755,609
			Nonresidential	60,729,135
Equation 5				
$EF_{elec,y,i}$	Forecasted electricity emission factor	MT CO_2e/kWh	Residential	0.0000016
			Nonresidential	0.0000014
CO2e Reduction $_{NG,y,i}$	**Natural gas GHG emission reductions**	**MT CO_2e**	**Residential**	**42,783**
			Nonresidential	**33,003**

4 Strategy 3: Decarbonizing Transportation & Sustainable Land Use

The City of Sunnyvale's strategy to decarbonize transportation aims to reduce vehicle miles traveled (VMT) and leverage renewable and zero-carbon electricity (provided by Strategy 1: Promoting Clean Energy) to reduce GHG emissions from the transportation system. Reducing VMT consists of transitioning Sunnyvale residents and visitors out of single-occupancy vehicles and into active transportation mode options (i.e., walking and biking) and public and shared transit options (e.g., public buses, rail, carpools) by improving these mode options and choosing efficient land use development options. The remaining VMT will then be decarbonized by increasing the adoption of zero-emission vehicles. When combined with renewable and zero-carbon electricity, electric vehicles eliminate GHG emissions from fossil fuel combustion and transition to a zero-emission operational footprint. Additionally, the strategy targets off-road equipment and vehicles for decarbonization. Based on this strategy, the Playbook Update's transportation decarbonization and sustainable land use strategy consists of the following Plays presented in Table 15. The table also indicates which Plays are quantitative and which Plays are supportive. The following subsections detail the substantial evidence and calculation methodologies of the quantitative Plays and the role of the supportive Plays.

Table 15 Strategy 3: Decarbonizing Transportation & Sustainable Land Use 2030 GHG Emission Reduction Summary

Play ID	Play	2030 Play Target	2030 GHG Emission Reductions (MT CO_2e)
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	20% reduction in vehicle miles per person	66,162
Play 3.2	Increase transportation options and support shared mobility		
Play 3.3	Increase zero-emission vehicles	42% of all vehicles on road are zero-emission vehicles	98,079
Play 3.4	Decarbonize off-road vehicles and equipment	30% of all vehicles and equipment off road are zero-emission	15,753
Total			**179,994**

Play 3.1 and Play 3.2: Increase opportunities for and encourage development of mixed-use sites to reduce vehicle miles per person and increase transportation options and support shared mobility.

Plays 3.1 and 3.2 aim to reduce, on average, VMT per person by 20 percent by 2030 to reduce GHG emissions from transportation. The primary Moves that enable this target include:

- **Move 3.A** which commits the City to identify areas that are most appropriate for parking strategies that discourage vehicle use, such as pricing, time limits, and supply reduction.
- **Move 3.B** which enhances the City's Transportation Demand Management (TDM) program implementation and monitoring to facilitate further reductions in single-occupant automobile trips, citywide.
- **Move 3.C** which directs the City to work with regional service providers to implement high quality transit service and a robust set of first- and last-mile strategies in over two-thirds of the cross-City corridors.
- **Move 3.D** which commits the City to update and implement the Active Transportation Plan to achieve a connected, safe, and active network.
- **Move 3.I** which directs the City to establish and implement a plan to convert vehicle roadways to bicycle and pedestrian space to increase opportunities for active transportation in the community.
- **Move 3.J** which commits the City to require employers with 1,000 employees and more to develop and implement Transportation Demand Management (TDM) programs with subsidies for employees to bike, walk, or carpool.
- **Move 3.K** which commits the City to establish tracking metrics to evaluate the effectiveness of the above Moves' impact on VMT, establish a monitoring schedule to report progress, and revise the above Moves accordingly based on a VMT progress report.

These Moves are among the suite of measures provided by the California Air Pollution Control Officers Association (CAPCOA) to reduce VMT and the associated GHG emissions.[39] Together, the Moves target increase in neighborhood connectivity, active transportation, and public transit use among Sunnyvale's residents, employees, and visitors as well as encourage use of alternative mobility options over single-occupancy vehicles using land use design and parking management strategies.

Sunnyvale requires new developments and redevelopments of high-industrial, office developments, and multi-family residences to implement TDM programs through the municipal code.[40] TDM programs are defined as the incorporation of a variety of incentives or disincentives, services, and actions that influence the reduction of automobile trips, such as promoting work related transit use, ridesharing, walking and bicycling to work, and flexible work schedules (i.e., work from home) as well as offering services such as employee-sponsored vanpool, subsidized transit passes, implementing employee parking cash-out programs or pricing workplace parking. Move 3.B commits the City to enhancing the monitoring and implementation of this mandatory ordinance thereby improving its effectiveness. Move 3.J builds on this program by directing the City to expand

[39] California Air Pollution Control Officers Association (CAPCOA). Handbook for Analyzing Greenhouse Gas Emission Reductions, Assessing Climate Vulnerabilities, and Advancing Health and Equity (2021). Accessed at: https://www.caleemod.com/documents/handbook/full_handbook.pdf.

[40] Sunnyvale Municipal Code Chapters 19.45 and 10.60 (https://ecode360.com/42731260)

the requirement to existing employers in the City with 1,000 or more employees.[41, 42] This requirement will cover about 60 percent of employees in the City,[43] increasing the coverage of the TDM program and impacting the VMT by these employees. While the City will develop specific reduction targets for VMT in the program, a multiyear study on the implementation of a mandatory commute trip reduction program at Genentech's South San Francisco campuses demonstrated a 26 percent reduction in employee commute vehicle miles traveled and associated GHG emissions.[44] In addition to redevelopment of Sunnyvale land-use to a transit-oriented, mixed-use housing near job centers, TDM program development, such as the adopted Moffett Park Specific Plan,[45] further promotes the transition out of single occupancy vehicles for employee commuting. According to census data, since 2019, vehicle commuting in Sunnyvale has decreased by approximately 16 percent while work from home has increased from 4 to 25 percent.[46] With TDM program enforcement, City land use redevelopment, and continued work from home behaviors, employee commute VMT has the potential to be reduced by up to 32 percent by 2030. Based on Bureau of Transportation Statistics, approximately 20 percent of all annual passenger miles traveled are for commuting to and from work.[47] As such, the Moves reducing employee commute VMT has the potential to reduce total passenger VMT by approximately 7 percent.[48]

In terms of public transit, the City recognizes that its jurisdiction is limited to the boundaries of Sunnyvale; however, a public transit network that effectively reduces VMT is regional in nature and crosses city boundaries. For this reason, Move 3.C directs the City to work with regional service providers to increase the coverage and improve the quality of public transit in Sunnyvale. Before COVID-19, the City of San Francisco led the State with 26 percent public transportation mode share in 2017. Although the transit mode share has decreased in recent years due to COVID-19 and work from home trends, the City of San Francisco still reports a mass transit mode share of over 10 percent.[49] Key strategies employed by cities looking to increase public transportation mode share include significant expansions of public transportation service lines, designated streets or lanes for

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41 Division of Transportation and Traffic, City of Sunnyvale. Transportation Demand Management (TDM) Program Guidelines (Rev 10/2016). Accessed at: https://www.sunnyvale.ca.gov/home/showpublisheddocument/2862/637822670459570000.

42 City of Sunnyvale. Transportation Demand Management, Chapter 19.45 of Municipal Code. Accessed at: https://library.qcode.us/lib/sunnyvale_ca/pub/municipal_code/item/title_19-article_4-chapter_19_45.

43 In March 2023, Sunnyvale had 13 employers with 1,000 or more employees, accounting for a total of 57,514 employees. This employee count represents about 60 percent of the jobs forecasted for 2023 in Sunnyvale's GHG Forecast.

City of Sunnyvale. 25 Largest Employers – March 2023. Accessed at: https://www.sunnyvale.ca.gov/business-and-development/economic-development/community-and-business-profiles.

44 California Air Pollution Control Officers Association. Handbook for Analyzing Greenhouse Gas Emission Reductions, Assessing Climate Vulnerabilities, and Advancing Health and Equity (2021).

45 Moffett Park Specific Plan was adopted in July 2023 and lays out a plan to redevelop the northern portion of the city, where Sunnyvale's largest employment centers lie, into a climate smart community that is fully interconnected with bicycle, pedestrian and transit routes, encompassed mixed-use housing an, job centers and other amenities to reduce daily travel distance for residents. Accessed at: https://www.moffettparksp.com/

46 https://data.census.gov/table/ACSST5Y2022.S0801?q=Sunnyvale%20city,%20California&t=Commuting&tid=ACSST5Y2019.S0801

47 https://www.bts.gov/content/average-annual-pmt-vmt-person-trips-and-trip-length-trip-purpose

48 VMT reduction related to TDM measures was quantified by taking into account commuter VMT reduction based on census data work from home trends, assuming work from home trends would be supported by employers, and using CAPCOA T-5 methodology that quantified VMT reduction for the implementation of a mandatory commute trip reduction program that is monitored and includes penalties for non-compliance. See reference 44 for calculation details.

49 https://sfgov.org/scorecards/transportation/non-private-auto-mode-share

bus lines to decrease headways, implementation of taxes to support transit, and reduced parking availability. Studies which incorporated factors such as elasticity of transit demand and average mode shift factors have estimated that doubling transit coverage (e.g., areas serviced or hours) in a city can reduce VMT—and associated GHG emissions—up to 4.6 percent.[50] Studies have also shown that increasing the frequency of transit service (up to 300 percent) can produce a maximum reduction in VMT—and associated GHG emissions—of 11.3 percent.[51] With the focus of Move 3.C on approximately two-thirds of the cross-City corridors and the level of redevelopment planned in the City to create a more connected and reliable network of transit (e.g., Moffett Park Transit Oriented Development Zoning Districts), it is reasonable to estimate that Sunnyvale can expect a 4 percent reduction in passenger VMT in the City.[52] This estimate is considered conservative to account for the census observed reduction in public transit use in the City from 7 percent transit use in 2019 to 4 percent in 2022, that is largely attributed to COVID-19 impacts.[53] While conservatively excluded from the quantification of GHG emissions reduction herein, Moves 3.E and 3.F, which include the evaluation of micro-transit programs and shuttle services in redeveloped areas, like Peery Park, have also been shown to increase transit mode share if they become a permanent program by increasing access and convenience of regional or cross-City transit.[54]

The City will also improve opportunities for active transportation through Move 3.D. Sunnyvale developed and adopted an Active Transportation Plan in 2020, which commits Sunnyvale to increase the miles of bikeways in the City from about 90 miles to about 160 miles to support the overall goal to increase bicycle mode share from 1.5 percent to 5 percent by 2030.[55] This Move commits the City to updating this plan with additional bikeway expansions, as needed, and implementing it by 2030. Expansions of and investments in active transportation infrastructure such as those directed by this Move have demonstrated reductions in VMT and associated GHG emissions.[56] Specifically, urban cities that make a strong commitment to bicycle travel can see up to an 11 percent reduction in VMT and associated GHG emissions. [57] Similar reductions can be reasonably expected because in 2017, about 16 percent of vehicle trips made nationally were one mile or less—a distance easily travelled by foot or bicycle.[58] An improved, safer, and expanded pedestrian and bike network is the most effective and direct approach for shifting those shorter

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[50] California Air Pollution Control Officers Association. Handbook for Analyzing Greenhouse Gas Emission Reductions, Assessing Climate Vulnerabilities, and Advancing Health and Equity (2021).

[51] Ibid.

[52] VMT reduction related to transit measures was quantified using CAPCOA T-24, T-25, and T-26 methodology that quantified VMT reduction for the extension of transit network coverage or hours, increase in transit service frequency, and implementation of transit-supportive roadway treatments, respectively. See reference 37 for calculation details.

[53] https://data.census.gov/table/ACSST5Y2022.S0801?q=Sunnyvale%20city,%20California&t=Commuting&tid=ACSST5Y2019.S0801

[54] McQueen, M., G. Abou-Zeid, J. MacArthur, and K. Clifton. 2020. Transportation Transformation: Is Micromobility Making a Macro Impact on Sustainability? Journal of Planning Literature. November. Available: https://doi.org/10.1177/0885412220972696.

[55] City of Sunnyvale. Sunnyvale Active Transportation Plan (2020). Accessed at: https://www.sunnyvale.ca.gov/home/showpublisheddocument/2844/637822670426570000.

[56] Glazener, Andrew and Khreis, Haneen. Transforming our Cities: Best Practices Towards Clean Air and Active Transportation (2019). Accessed at: https://link.springer.com/article/10.1007/s40572-019-0228-1

[57] Jacob Mason et al., Institute for Transportation & Development Policy and the University of California, Davis. A Global High Shift Cycling Scenario (2015). Accessed at: https://itdpdotorg.wpengine.com/wp-content/uploads/2015/11/A-Global-High-Shift-Cycling-Scenario_Nov-2015.pdf

[58] National Household Travel Survey. Population Vehicle Trips Statistics (2021). Accessed at: https://nhts.ornl.gov/vehicle-trips

vehicle trips to walking, and studies show that distance to destinations is one of the strongest predictors of walking as a mode choice. Move 3.I will also support this expansion in active transportation infrastructure by establishing and implementing a plan to convert vehicle roadways to bicycle and pedestrian spaces. This Move will effectively create new bikeways in areas the community already frequents on foot and by bicycle. Sunnyvale has demonstrated commitment to this Move by permanently closing part of their downtown core—South Murphy Ave—to vehicular traffic in 2023.[59] Further, planned redevelopment in Sunnyvale, including Moffett Park, focuses on building the district to be mixed-use, connected with complete streets and safe bike and pedestrian routes that are within 15-minutes or less to key amenities and job centers.

Mode shift potential associated with Move 3.D and Move 3.I was evaluated by comparing other cities with similar buildouts (bike network mileage versus city land square footage). Results from significant investment in bicycle infrastructure in California suggest that bicycle mode share can be increased on par with leading bicycle cities in the State. The City of Davis leads the State with a 20 percent bicycle mode share[60] and 9.2 miles of bike lane per square mile of the City.[61] The City of Berkely has a 9.7 percent bicycle mode [62] with approximately 4.8 miles of bike land per square mile of the City.[63] Sunnyvale's current bicycle mode share is 1.5 percent according to Census data[64] and has 4 miles of bike lane per square mile of the City.[65] With the City adding an additional 70 miles of bike lane through implementation of the Active Transportation Plan, there would be approximately 7.7 miles of bike lane per square mile of City. Based on other similar cities, this increase in bicycle lane miles per square mile of City and planned infrastructure projects within the City has the potential to result in a bicycle mode share of up to 10 percent. Based on information obtained from the Active Transportation Plan on the planned projects, infrastructure improvements, and connectivity improvements and using the CAPCOA methodology for VMT reduction, it was estimated that approximately 4 percent of passenger VMT could be reduced with implementation of Move 3.D and Move 3.I.[66]

To further reduce VMT with this Play, other defensible strategies were considered such as implementing a fee to drive downtown, implementing parking fees for existing City parking,

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[59] Gelhaus, Anne. Sunnyvale Council Votes to Make this Downtown Street a Pedestrian Mall (2023). Accessed at: https://www.mercurynews.com/2023/02/12/sunnyvale-council-votes-to-make-downtown-street-a-pedestrian-mall/?utm_source=ground.news&utm_medium=referral.

[60] https://www.theguardian.com/cities/2015/aug/03/davis-california-the-american-city-which-fell-in-love-with-the-bicycle

[61] https://www.cityofdavis.org/city-hall/public-works-engineering-and-transportation/bike-pedestrian-program/davis-bike-and-pedestrian-infrastructure#:~:text=4%20miles%20of%20buffered%20bike,and%20twenty%2Done%20underpass%20crossings.

[62] City of Berkeley. May 2017. City of Berkeley Bicycle Plan. Accessed at: https://www.cityofberkeley.info/uploadedFiles/Public_Works/Level_3_-_Transportation/Berkeley-Bicycle-Plan-2017-Executive%20Summary.pdf

[63] https://www.visitberkeley.com/media-press/press-kit/fact-sheet/

[64] 5-year estimate of bicycle mode share in 2022 according to census data obtained from: https://data.census.gov/table/ACSST5Y2022.S0801?q=Sunnyvale%20city,%20California&t=Commuting&tid=ACSST5Y2019.S0801 1

[65] City of Sunnyvale includes 22 square miles of land obtained from: https://data.census.gov/profile/Sunnyvale_city,_California?g=160XX00US0677000

[66] VMT reduction potential was quantified following CAPCOA methodology for T-16 Improve Street Connectivity, T-17 Provide Pedestrian Network Improvement, T-18A Construct or Improve Bike Facility, and T-18B Construct or Improve Bike Boulevard. See reference 37 for calculation details.

implementing a parklet program to reduce parking availability in the City, and unbundling residential and non-residential parking costs from property costs. The strategies are encompassed by Move 3.B and are strategies that the Moffett Park Specific Plan intends to implement in the Moffett Park redevelopment to improve mobility, limit congestion, support growth, and right size the parking supply.[67] Studies have shown that pricing on-street parking, particularly in areas with available alternatives to driving, VMT—and associated GHG emissions can be reduced by up to 30 percent depending on the parking price increase and percent of total community VMT impacted.[68] With an increase in priced parking by 150 percent, assuming that 25 percent of total passenger VMT in the Sunnyvale is occurring in areas that priced parking occurs and that 35 percent of parking in such areas is on-street, Move 3.B is estimated to reduce VMT up to approximately 5 percent (See Table 16Table 1 for calculations details).

Studies have also shown that unbundling a project's parking costs from property costs can reduce VMT – and associated GHG emissions – in the study area by up to 15.7 percent depending on the annual parking cost per space compared with the average vehicle cost.[69] As part of the Moffett Park Specific Plan, adopted in July of 2023, policies that unbundle both multi-family residential and non-residential parking from the property cost will be implemented.[70] Given that Moffett Park is projected to add 20,000 new mixed-use homes, this would house approximately 16 percent of forecasted population that can drive and thereby impacting approximately 16 percent of the forecasted VMT in the City. Assuming that the annual parking fee would be $600, unbundling parking fees from the property cost just in Moffett Park has the potential to reduce total passenger VMT by approximately 3 percent. Combined, Move 3.B and other parking strategy implementation is estimated to reduce passenger VMT by approximately 4.5 percent.[71]

Together, these Moves work to develop more connected and transit-oriented neighborhoods near job centers and amenities, to improve active transportation and transit opportunities in Sunnyvale, and target employers to incentivize mode shift to reduce VMT and the associated GHG emissions. Moves that focus on parking pricing and management are designed to reduce VMT in the community through disincentivizing driving when other alternative means of transport are available. These Moves combined are estimated to reduce VMT in Sunnyvale by approximately 20 percent based on the reductions shown in the cited studies on mandatory TDM programs, public transit coverage and frequency improvements, active transportation infrastructure build-out, and parking management. This percentage is also made under the conservative assumption that each Move would be implemented one after another with diminishing returns rather than have an aggregated effect on total vehicle miles traveled. To confirm these Moves work together to reduce VMT by 20 percent, the City will follow Move 3.K to establish tracking metrics as well as a monitoring and

[67] City of Sunnyvale. Moffett Park Specific Plan. July 2023. Accessed February 2024 at: https://www.moffettparksp.com/

[68] Pierce, G., and D. Shoup. 2013. Getting the Prices Right: An Evaluation of Pricing Parking by Demand in San Francisco. Journal of the American Planning Association 79(1)67–81. May. Available: https://www.tandfonline.com/doi/pdf/10.1080/01944363.2013.787307?needAccess=true

[69] CAPCOA. Handbook for Analyzing Greenhouse Gas Emission Reductions, Assessing Climate Vulnerabilities, and Advancing Health and Equity (2021). Accessed at: https://www.caleemod.com/documents/handbook/full_handbook.pdf.

[70] City of Sunnyvale. Moffett Park Specific Plan. July 2023. Accessed February 2024 at: https://www.moffettparksp.com/

[71] VMT reduction related to parking pricing was quantified using CAPCOA T-23 Implement Market Price Public Parking and VMT reduction from unbundling parking costs from property costs was quantified using CAPCOA T-15 Unbundle Residential Parking Costs from Property Cost. See reference 37 for calculation details.

reporting schedule to monitor the Moves' effect on VMT and revise the Moves as necessary to meet the targeted level of VMT reduction.

Table 16 shows the parameters and data sources that support the GHG emission reductions associated with reducing VMT and Table 17 shows the calculations as outlined in Equations 6 through 6.2.

Vehicle Miles Traveled Reduction Equations

Equation 6 $CO_2e\ Reduction_y = (VMT\ Reduced_y * CO_2e\ EF)$

Equation 6.1 $VMT\ Reduced_{c,y} = VMT_y * VMT\ Share_{t,y} * VMT\ Reduction_{t,c,y}$

Table 16 Vehicle Miles Traveled Reduction Parameters and Data Sources

Variable	Definition	Value	Unit	Data Source
Equation 6				
CO_2e *Reduction*	VMT GHG emission reductions	See calculation table	MT CO_2e	Calculated
CO_2e *EF*	CO_2e weighted emission factor	See calculation table	MT CO_2e/ passenger VMT	Adjusted Forecast
VMT Reduced$_y$	VMT reduced	See calculation able	miles	Calculated
c	Measure category	TDM, transit improvements, active transportation, and parking management	N/A	N/A
t	VMT trip type	Work related or All other VMT	N/A	N/A
y	Year	2030	N/A	N/A
Equation 6.1				
VMT_y	Forecasted Passenger VMT	See calculation table	miles	Based on forecasted VMT and EMFAC2021 vehicle share where in 2030, 93.5% of total VMT is from passenger vehicles.[72]
VMT Reduction$_{t,c,y}$	TDM – Work-related VMT	6.8%	percentage	Estimated based on the reductions shown in studies on mandatory TDM programs targeting commuters and , public transit coverage and frequency improvements, active transportation infrastructure build-out, and parking management targeting all passenger trip types.[44, 50, 57] CAPCOA methodology used to quantify reductions based on specific measure types.[44,48,52,66,71]
	Transit Improvements - All other VMT	3.9%		
	Active Transportation – All other VMT	4.3%		
	Parking Management – All other VMT	4.5%		
VMT Share$_{t,y}$	Share of VMT by trip type	See calculation table	percentage	Estimated based on Bureau of Transportation Statistics on distribution of annual VMT by trip type.[47]

[72] California Air Resources Board (CARB). 2021 EMission FACtor (EMFAC) Model. Version 1.0.2. Accessed at: https://arb.ca.gov/emfac/.

Table 17 VMT Reduction GHG Emission Reduction Calculations

Definition	Definition	Units	Sector	2030
Equation 6.1				
VMT_y	Forecasted Passenger VMT	miles	Passenger vehicles	1,053,170,888
$VMT\ Share_{t,y}$	Share of VMT by trip type	percentage	Work Related (Commuter)	20%
			All other non-work related	80%
$VMT\ Reduced_{c,y}$	VMT reduced by Move type	miles	TDM	71,914,274
			Transit Improvements	41,189,389
			Active Transportation	44,986,680
			Parking Management	47,282,473
Equation 6				
$CO_2e\ EF_f$	CO_2e emission factor	MT CO_2e/VMT	Passenger Vehicles	0.0003222
CO_2e Reduction	**VMT GHG emission reductions**	**MT CO_2e**	**Passenger Vehicles**	**66,162**

Play 3.3: Increase zero-emission vehicles.

Play 3.3 aims for Sunnyvale to increase zero-emission vehicle adoption to 42 percent by 2030. While the State is anticipated to reach a 26 percent zero-emission vehicle adoption rate by 2030,[73] Sunnyvale plans to exceed this goal through ample public and private investments in electric vehicle charging infrastructure.

The primary Move that enables this target is **Move 3.N** which directs Sunnyvale to develop a Community Electric Vehicle Readiness and Infrastructure Plan to install the number publicly accessible chargers needed to support Sunnyvale's zero-emission vehicle adoption target. This Move enables zero-emission vehicle adoption because studies have consistently found that limited charging infrastructure is one to the primary barriers to electric vehicle adoption.[74, 75] Publicly accessible electric vehicle chargers make owning an electric vehicle convenient for all drivers—including those who cannot charge at home or drive daily distances longer than their electric vehicle battery range. To this point, it is expected that 20 percent of electric vehicle charging nationally will occur at publicly accessible chargers in 2030.[76] The U.S. Department of Energy's Electric Vehicle Infrastructure Projection Tool outputs for the San Jose-Sunnyvale-Santa Clara Metropolitan Area with inputs that reflect Sunnyvale's 2030 zero-emission vehicle targets was used to estimate the number of publicly accessible chargers needed in Sunnyvale in 2030 to support a 42 percent adoption rate.[77]

Table 18 shows the parameters and data sources used to calculate the publicly accessible electric vehicle chargers needed in 2030 with this tool and Table 19 shows the calculations as outlined in Equations 7 through 7.2.

Publicly Accessible Electric Vehicle Chargers Equation

Equation 7 $EV\ Chargers_y = Region\ EV\ Chargers_y * (EVs_y / (Region\ EVs_y) - Existing\ EV\ Chargers_{by}$

Equation 7.1 $EVs_y = Population_y * (Vehicles_{by} / Population_{by}) * ZEV\ Adoption_y$

Equation 7.2 $Region\ EVs_y = Region\ Vehicles_y * ZEV\ Adoption_y$

[73] Based on the zero-emission vehicle goals for passenger vehicles established by Executive Order N-79-20, eight million zero-emission vehicles are anticipated statewide by 2030. Sunnyvale calculated that these eight million zero-emission vehicles represent 26 percent of the total passenger vehicles expected statewide by 2030 (based on statewide passenger car and light-duty truck counts in 2016 and population estimates for 2016 and 2030).

Crisostomo, Noel et al. Assembly Bill 2127 Electric Vehicle Charging Infrastructure Assessment: Analyzing Charging Needs to Support Zero-Emission Vehicles in 2030. Accessed at: Calmatters.org/environment/2023/03/california-electric-cars-demographics/?utm_id=91724&sfmc_id=4863450.

[74] Kumar, Rajeev Ranjan and Kumar Alok. Adoption of Electric Vehicle: A Literature Review and Prospects for Sustainability (2020). Accessed at: https://www.sciencedirect.com/science/article/abs/pii/S095965261934781X.

[75] Winjobi, Olumide and Kelly, Jarod. Used Plug-in Electric Vehicles as a Means of Transportation Equity in Low-Income Households (2021). Accessed at: https://www.osti.gov/biblio/1658592.

[76] Kampshoff, Philipp et al. Building the Electric-Vehicle Charging Infrastructure America Needs (2022). Accessed at: https://www.mckinsey.com/industries/public-sector/our-insights/building-the-electric-vehicle-charging-infrastructure-america-needs.

[77] U.S. Department of Energy. Electric Vehicle Infrastructure Projection Tool (EVI-Pro) Lite. Accessed at: https://afdc.energy.gov/evi-pro-lite.

Table 18 Publicly Accessible Electric Vehicle Charger Parameters and Data Sources

Variable	Definition	Value	Unit	Data Source
Equation 7				
EV Chargers$_y$	New publicly accessible electric vehicle chargers needed in Sunnyvale	See calculation table	chargers	Calculated
Region EV Chargers$_y$	Regional electric vehicle chargers needed	32,331	electric vehicles	Estimated using the Electric Vehicle Infrastructure Projection Tool public charger outputs for the San Jose-Sunnyvale-Santa Clara Metropolitan Area with the *Region EVs$_y$* value as the input.[78]
EVs$_y$	Electric vehicles targeted in Sunnyvale	See calculation table	electric vehicles	Calculated
Region EVs$_y$	Regional electric vehicles targeted	See calculation table	electric vehicles	Calculated
Existing EV Chargers$_{by}$	Existing publicly accessible electric vehicle chargers in Sunnyvale	208	chargers	PlugShare[79]
y	Year	2030	year	N/A
by	Baseline year	2019	year	N/A
Equation 7.1				
Population$_y$	Forecasted population in Sunnyvale	See calculation table	people	Inventory
Vehicles$_{by}$	Vehicles in baseline year in Sunnyvale	115,970	vehicles	California Department of Motor Vehicles[80]
Population$_{by}$	Population in baseline year in Sunnyvale	154,252	people	Inventory
ZEV Adoption$_y$	Zero-emission vehicle adoption target	See calculation table	percentage	Targeted zero-emission vehicle adoption for Play.
Equation 7.2				
Region Vehicles$_y$	Regional vehicles	1,580,600	vehicles	Electric Vehicle Infrastructure Projection Tool value for the San Jose-Sunnyvale-Santa Clara Metropolitan Area.[81]

[78] U.S. Department of Energy. Electric Vehicle Infrastructure Projection Tool (EVI-Pro) Lite.

[79] PlugShare. EV Charging in Sunnyvale, CA.

[80] California Department of Motor Vehicles. Fuel Type by County as of 1/1/2020. Accessed at: https://www.dmv.ca.gov/portal/uploads/2020/09/MotorVehicleFuelTypes_City_01012020.pdf.

[81] U.S. Department of Energy. Electric Vehicle Infrastructure Projection Tool (EVI-Pro) Lite.

Table 19 Publicly Accessible Electric Vehicle Charger Parameters and Data Sources

Definition	Definition	Units	2030
Equation 7.2			
ZEV Adoption$_y$	Zero-emission vehicle adoption target	percentage	42%
Region EVs$_y$	Regional electric vehicles targeted	electric vehicles	663,852
Equation 7.1			
Population$_y$	Forecasted population in Sunnyvale	people	231,502
EVs$_y$	Electric vehicles targeted in Sunnyvale	electric vehicles	73,100
Equation 7			
EV Chargers$_y$	New publicly accessible electric vehicle chargers needed in Sunnyvale	chargers	3,353

Sunnyvale will install these 3,353 publicly accessible electric vehicle chargers by 2030 by committing to a Community Electric Vehicle Readiness and Infrastructure Plan. The plan will set a list of prioritized locations for new chargers and a detailed funding plan that establishes an approach to working directly with private properties and private investments to install the publicly accessible chargers needed to support a 42 percent zero-emission vehicle adoption in Sunnyvale by 2030.

These zero-emission vehicles will also be supported by private electric vehicle chargers in new developments and existing buildings. **Move 3.O** directs the City to work with SVCE to expand their incentive program for electric vehicle chargers. This local action along with new federal and State funding will help cover the upfront costs to purchasing an electric vehicle and installing the equipment or infrastructure upgrades needed to charge an electric vehicle at home as high costs are one of the barriers to electric vehicle adoption for low-income households.[82] Sunnyvale's residential and commercial reach codes adopted in 2021, will also expand private electric vehicle charging as they require electric vehicle ready circuits (i.e., outlets) in all new single- and multi-family residential building along with electric vehicle capable conduits and electric vehicle charger stations (i.e., Level 2 and DC Fast charging) in certain commercial buildings.[83, 84] These reach codes along with the SVCE incentives will help ease the barriers residents of multi-family buildings face to electric vehicle adoption as these residents are unlikely to have access to home charging.[85, 86] These actions will enable Sunnyvale to install as many privately owned electric vehicle chargers in existing buildings and new developments as practical to support a 42 percent zero-emission vehicle adoption by 2030.

Table 20 shows the parameters and data sources that support GHG emission reductions from the zero-emission vehicle adoption and Table 21 shows the calculations as outlined in Equations 8 through 8.2.

[82] Gaillard, Isa. Ingredients for Equitable Electrification: Analyzing Equity in Statewide Electric Vehicle Rebate Programs (2022). Accessed at: https://greenlining.org/wp-content/uploads/2022/10/Greenlining-Ingredients-Equitable-Transportation-WebFINAL.pdf.

[83] City of Sunnyvale. Single-Family, Duplex, and Townhome Reach Codes (Rev 1/2023).

[84] City of Sunnyvale. Nonresidential and Multifamily Reach Codes (2021).

[85] DeShazo, J.R. et a. Overcoming Barriers to Electric Vehicle Charging in Multi-Unit Dwellings: A Westside Cities Case Study (2021). Accessed at: https://www.energy.ca.gov/publications/2021/overcoming-barriers-electric-vehicle-charging-multi-unit-dwellings-westside.

[86] Hsu, Chih-Wei and Fingerman, Kevin. Public Electric Vehicle Charger Access Disparities Across Race and Income in California (2021). Accessed at: https://www.sciencedirect.com/science/article/pii/S0967070X20309021.

Zero-emission Vehcile Adoption Equations

Equation 8 $CO_2e\ Reduction_{VMT,y}=(VMT\ Reduced_{ICE,y}*EF_{VMT,y})-(Elec\ Converted_y*EF_{elec,y})$

Equation 8.1 $VMT\ Reduced_{ICE,y}=VMT_y*(ZEV\ Adoption_y-ZEV\ Adoption\ Baseline_y)$

Equation 8.2 $Elec\ Converted_y=VMT\ Reduced_{ICE,y}*EPM_{ZEV\ VMT,y}$

Table 20 Zero-emission Vehicle Adoption Parameters and Data Sources

Variable	Definition	Value	Unit	Data Source
Equation 8				
$CO_2e\ Reduction_{VMT,y}$	VMT GHG emission reductions	See calculation table	MT CO_2e	Calculated
$VMT\ Reduced_{ICE,y}$	Internal combustion engine VMT reduced	See calculation table	miles	Calculated
$EF_{VMT,y}$	Forecasted VMT emission factor	See calculation table	MT CO_2e/mile	Forecast
$Elec\ Converted_y$	Electricity from zero-emission vehicle conversion	See calculation table	kWh	Calculated
$EF_{elec,y}$	Forecasted residential electricity emission factor[87]	See calculation table	MT CO_2e/kWh	Forecast
y	Year	2030	N/A	N/A
Equation 8.1				
VMT_y	Forecasted total VMT after VMT reductions (Play 3.1 and Play 3.2)	See calculation table	miles/gallon	Forecast and Plays 3.1 and 3.2
$ZEV\ Adoption_y$	Zero-emission vehicle adoption target	42%	percentage	Target that is enabled by 3,353 new publicly accessible chargers.
$ZEV\ Adoption\ Baseline_{by}$	Zero-emission vehicle adoption baseline	9%	percentage	Inventory
by	Baseline year	2019	Year	N/A
Equation 8.2				
$EPM_{ZEV\ VMT,y}$	Forecasted electricity usage per mile of zero-emission vehicles	See calculation table	kWh/mile	Forecast

[87] To remain conservative, it is assumed all zero-emission vehicles are charged at residents' homes (Sunnyvale's forecasted residential electricity emission factor is higher than the forecasted commercial electricity emission factor).

Table 21 Zero-emission Vehcile Adoption GHG Emission Reduction Calculations

Definition	Definition	Units	2030
Equation 8.1			
VMT_y	Forecasted total VMT after VMT reductions (Play 3.1 and Play 3.2)	miles	921,030,579
$ZEV\ Adoption_y$	Zero-emission vehicle adoption target	percentage	42%
$ZEV\ Adoption\ Baseline_{by}$	Zero-emission vehicle adoption baseline	percentage	9%
$VMT\ Reduced_{ICE,y}$	Internal combustion engine VMT reduced	miles	305,070,720
Equation 8.2			
$EPM_{ZEV\ VMT,y}$	Forecasted electricity usage per mile of zero-emission vehicles	kWh/mile	0.41
$Elec\ Converted_y$	Electricity from zero-emission vehicle conversion	kWh	124,383,003
Equation 8			
$EF_{VMT,y}$	Forecasted VMT emission factor	MT CO_2e/mile	0.00032
$EF_{elec,y}$	Forecasted electricity emission factor	MT CO_2e/kWh	0.0000016
$CO_2e\ Reduction_{VMT,y}$	**VMT GHG emission reductions**	**MT CO_2e**	**98,079**

Play 3.4: Decarbonize off-road vehicles and equipment.

Play 3.4 aims for Sunnyvale to decarbonize 30 percent of off-road vehicle and equipment use in the community by 2030. The Moves that enable this Play include **Move 3.P** which commits the City to establishing a phased ordinance by 2026 to ban local operation of gasoline and diesel-powered off-road vehicles and equipment by type.

The phased ordinance will first ban the operation of off-road vehicles and equipment with gasoline- and diesel-powered small off-road engines by 2028. As defined by the California Air Resources Board (CARB), small off-road engines (SORE) are those equipment types with rated power at or below 19 kilowatts (i.e., 25 horsepower). Typical off-road vehicle and equipment types that use these engines include lawn and garden equipment, portable generators, and pressure washers.[88] In 2028, gasoline and diesel used by these small off-road engines will compromise 18 percent of the off-road vehicle and equipment fuel used in Sunnyvale.[89] By banning the operation of gasoline- and diesel-powered small off-road engines, the ordinance will effectively reduce 18 percent of the community's off-road fuel usage.

The remaining 12 percent of off-road fuel will be reduced by 2030 by targeting other vehicles and equipment types through different phases of the ordinance. For example, the ordinance will ban the operation of gasoline- and diesel-powered lawn and garden equipment with engines greater than 25 horsepower, as well as these types of engines in light commercial vehicles and equipment and portable equipment or construction vehicles and equipment. The fuel use by engines greater than 25 horsepower in lawn and garden equipment accounts for 0.2 percent of total off-road fuel in Sunnyvale while those engines in light commercial account for four percent, those in portable equipment account for 14 percent, and those in construction account for 17 percent of total off-road fuel used in Sunnyvale.

Targeting a combination of these off-road vehicle and equipment types will reduce the remaining 12 percent of off-road fuel. Where equipment does not have market-ready electric alternatives available, the ordinance will still require decarbonization of targeted equipment through the use of renewable diesel. Renewable diesel is a drop-in renewable fuel produced from non-petroleum renewable sources—including vegetable oils and animal fats—and is readily available in California due to existing regulation requiring its use.[90] This requirement for renewable diesel will be a strong tool to increase compliance with the local ordinance by providing flexibility and can be counted towards the Move because the State requirements for renewable diesel were not included in Sunnyvale's adjusted forecast.

This ordinance aligns with the State's goals and regulations. The ordinance exceeds CARB's SORE regulations which ban the sale of off-road vehicles and equipment with gasoline- and diesel-powered small off-road engines starting in 2024 and bans the sale of gasoline- and diesel-powered portable generators starting in 2028. The ordinance does however align with Executive Order

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[88] California Air Resources Board. SORE Applicability Fact Sheet (2021). Accessed at: https://ww2.arb.ca.gov/resources/fact-sheets/sore-applicability-fact-sheet.

[89] Sunnyvale's small off-road fuel usage in 2028 was estimated by filtering CARB OFFROAD2021 model outputs (for Santa Clara County in 2028) for horsepower ratings greater than or less than 25 and attributing the resulting County-level annual fuel usage to Sunnyvale based on the attribution methodology used in the inventory and forecast. The results were divided by the total estimated off-road fuel usage in Sunnyvale in 2028 to estimate the share, or percentage, of fuel usage attributable to small off-road engines.

[90] California Air Resources Board. Fact Sheet: Renewable Diesel Fuel Requirements. Accessed at: https://ww2.arb.ca.gov/resources/fact-sheets/fact-sheet-renewable-diesel-fuel-requirements.

N-79-20's statewide goal to transition off-road vehicles and equipment operations to 100 percent zero-emission by 2035.

In addition to establishing the phases and revising the ordinance as necessary to achieve the Play's target, Sunnyvale will establish a communications and outreach program to support effective implementation of the ordinance throughout the community.

Table 22 shows the parameters and data sources that support off-road ordinance GHG emission reductions and Table 23 shows the calculations as outlined in Equations 9 through 9.1.

Off-road Decarbonization Equations

Equation 9 $$CO_2e\ Reduction_{Fuel,y} = Fuel\ Reduced_y * EF_{Fuel}$$

Equation 9.1 $$Fuel\ Reduced_y = (Fuel_{Gasoline,y} + Fuel_{Diesel,y} + Fuel_{Natural\ Gas,y}) * Fuel\ Reduction_y$$

Table 22 Off-road Decarbonization Parameters and Data Sources

Variable	Definition	Value	Unit	Data Source
Equation 9				
$CO_2e\ Reduction_{Fuel,y}$	Fuel GHG emission reductions	See calculation table	MT CO_2e	Calculated
$Fuel\ Reduced_y$	Fuel use reduced	See calculation table	gallons	Calculated
EF_{Fuel}	Weighted fuel emission factor	0.008438	MT CO_2e/gallon	Inventory
y	Year	2030	N/A	N/A
Equation 9.1				
$Fuel_{Gasoline,y}$	Forecasted gasoline use	See calculation table	gallon	Forecast
$Fuel_{Diesel,y}$	Forecasted diesel use	See calculation table	gallon	Forecast
$Fuel_{Natural\ Gas,y}$	Forecasted natural gas use	See calculation table	gallon	Forecast
$Fuel\ Reduction_y$	Fuel use reduction target	30%	percentage	Estimated based on the share of small off-road engines in Sunnyvale and direction of State goals (i.e., EO N-79-20).[89]

Table 23 Off-road Decarbonization GHG Emission Reduction Calculations

Definition	Definition	Units	2030
Equation 9.1			
$Fuel_{Gasoline,y}$	Forecasted gasoline use	gallons	2,075,523
$Fuel_{Diesel,y}$	Forecasted diesel use	gallons	2,413,519
$Fuel_{Natural\ Gas,y}$	Forecasted natural gas use	gallons	1,733,800
$Fuel\ Reduced_y$	Fuel use reduced	gallons	1,866,853
Equation 9			
$CO_2e\ Reduction_{Fuel,y}$	**Fuel GHG emission reductions**	**MT CO_2e**	**15,753**

5 Strategy 4: Managing Resources Sustainably

The City of Sunnyvale's strategy to manage resources sustainably focuses on optimizing the use of resources and enhancing the City's natural services to increase resilience in the community and reduce GHG emissions. The strategy aims to accomplish these goals by reducing and diverting solid waste, conserving and reusing water, enhancing natural ecosystems, and reducing the consumption of carbon-intensive consumer goods and food.

Most of these actions will increase community resilience and reduce personal carbon footprints rather than have a significant impact on GHG emissions in Sunnyvale. However, reducing and diverting solid waste will significantly reduce GHG emissions in Sunnyvale by reducing and diverting organic waste from the landfill. In the landfill, organic waste decays without access to light or oxygen and produces methane (CH_4) gas. Reducing the occurrence of this anaerobic decomposition serves as an important opportunity for Sunnyvale to reduce GHG emissions.

Based on this strategy, the Playbook Update's strategy to manage resources sustainably consists of the following Plays presented in Table 24. The table also indicates which Plays are quantitative and which Plays are supportive. The following subsections detail the substantial evidence and calculation methodologies of the quantitative Plays and the role of the supportive Plays.

Table 24 Strategy 4: Managing Resources Sustainably 2030 GHG Emission Reduction Summary

Play ID	Play	2030 Play Target	2030 GHG Emission Reductions (MT CO_2e)
Strategy 4: Managing Resources Sustainably			
Play 4.1	Achieve Zero Waste goals for solid waste.	Reduce landfilled garbage to 1 pound per person per day	45,258
Play 4.2	Ensure resilience of water supply.	TBD	Supportive
Play 4.3	Enhance natural carbon sequestration capacity.	N/A	Supportive
Play 4.4	Promote awareness of sustainable goods and services.	N/A	Supportive
Total			**45,258**

Notes: TBD = to be defined per State requirements; N/A = not applicable

Play 4.1: Achieve Zero Waste goals for solid waste.

Play 4.1 aims for Sunnyvale to reduce landfilled waste to one pound per person per day by 2030. As part of this target, the Play includes a series of Moves that put Sunnyvale on the path to meet Senate Bill (SB) 1383 requirements to recover 20 percent of disposed edible food for human consumption and reduce landfilled organic waste—and its associated GHG emissions—75 percent by 2025. The primary Moves that enable this target include:

- **Move 4.C** which directs the City to meet SB 1383 landfilled organic waste reduction requirements by continuing to provide organic collection service to single-family residents and multi-family residents and establishing organic collection service to the entire commercial sector.
- **Move 4.D** which directs Sunnyvale to expand the edible food recovery program to edible food generators beyond those required by SB 1383;[91] and
- **Move 4.E** which directs the City to continue implementing the waste diversion ordinance that requires all residents visitors, and businesses to place their discards in the appropriate container (i.e., recycle, compost, or garbage) and includes monitoring of contamination by waste hauler drivers.

In addition to these Moves, Sunnyvale is committed to updating their communitywide waste characterization study every ten years as part of their GHG inventory update process. These Moves and inventory process encompass the activities the California Department of Resources Recycling and Recovery (CalRecycle) requires jurisdictions to conduct to comply with SB 1383 requirements.[92] Continuing and completing these activities is thus expected to provide the levels of diversion, composting, and food donations needed to reduce Sunnyvale's landfilled organic waste 75 percent by 2025. This level of landfilled organic waste reduction is expected to directly reduce solid waste disposal GHG emissions 75 percent because nearly all GHG emissions from the natural decay of solid waste in landfills come from organic waste.[93]

Table 25 shows the parameters and data sources that support the landfilled organic waste reduction GHG emission reductions and Table 26 shows the calculations as outlined in Equation 10.

Landfilled Organic Waste Reduction Equations

Equation 10 $$CO_2e\ Reduction_{LOW,y} = CO_2e\ Emissions_{LOW,y} * LOW\ Reduction_y$$

[91] Sunnyvale has contracted with Joint Venture Silicon Valley (JVSV) to manage edible food recovery in the City. JVSV has contacted tier two commercial generators to begin donating edible food (ahead of the January 1, 2024 deadline). Concurrently, JVSV has begun identifying edible food generators beyond those required by SB 1383 to expand the edible food recovery program in Sunnyvale.

See the following resource for the definition of tier two commercial generators: California Department of Resources Recycling and Recovery (CalRecycle). Guidance for Jurisdictions: How to Identify SB 1383 Commercial Edible Food Generators. Accessed at: https://www2.calrecycle.ca.gov/Docs/Web/118917.

[92] CalRecycle. SB 1383 Jurisdiction Responsibilities. Accessed at: https://www2.calrecycle.ca.gov/Docs/Web/119160#:~:text=Beginning%20in%202022%2C%20SB%201383,is%20automatically%20provided%20the%20service.

[93] According to the Local Governments for Sustainability (ICLEI) U.S. Community Protocol for Accounting and Reporting of Greenhouse Gas Emissions, Appendix E – Solid Waste Emission Activities and Sources, GHG emissions are generated by non-biologic wastes only if they are combusted.

Table 25 Off-road Decarbonization Parameters and Data Sources

Variable	Definition	Value	Unit	Data Source
Equation 10				
$CO_2e\ Reduction_{LOW,y}$	Landfilled organic waste GHG emission reductions	See calculation table	MT CO_2e	Calculated
$CO_2e\ Emissions_{LOW,y}$	Landfilled organic waste GHG emissions	See calculation table	MT CO_2e	Forecast
$LOW\ Reduction_y$	Landfilled organic waste reduction percent	75	percentage	Estimated based on compliance with CalRecycle's required activities for SB 1383 compliance and GHG emission factors for solid waste.[92,93]
y	Year	2030	N/A	N/A

Table 26 Off-road Decarbonization GHG Emission Reduction Calculations

Definition	Definition	Units	2030
Equation 10			
$CO_2e\ Emissions_{LOW,y}$	Landfilled organic waste GHG emissions	MT CO_2e	60,344
$CO_2e\ Reduction_{LOW,y}$	**Fuel GHG emission reductions**	**MT CO_2e**	**45,258**

Play 4.2: Ensure resilience of water supply.

Play 4.2 aims to increase the resilience of water supply by reducing water consumption communitywide and increasing the reuse or recycling of water in the City. While both actions may provide GHG emission reductions, there is a high potential for double counting reductions as the electricity used to distribute water and treat wastewater is included in the City's electricity consumption and decarbonized through Plays to increase renewable and carbon-free electricity in the City (Strategy 1: Promote Clean Energy). This Play does, however, directly support the clean energy Plays by reducing the amount of energy used to distribute water and treat wastewater.

The Center for Water-Energy Efficiency has begun demonstrating the quantifiable value of water conservation towards GHG emission reduction goals in California. Specifically, the center found that during the Governor's Mandate (between June 2015 and May 2016), California saved 524,000 million gallons of water which translated to 1,830 gigawatt hours of electricity savings and 521,000 MT CO_2e of GHG emission reductions.[94] A study by the University of California, Los Angeles Field of Public Health also found that increasing the use of recycled water in California would have the greatest potential to reduce energy use and GHG emissions when compared to other water resilience options such as banning landscape irrigation.[95]

[94] Center for Water-Energy Efficiency, University of California, Davis. Impact of Water Conservation on Electricity Consumption and GHG Emissions. Accessed at: https://cwee.ucdavis.edu/research/waterconservation_energyghg/#:~:text=The%20study%20showed%20the%20state,tons%20of%20carbon%20dioxide%20equivalents.

[95] Sokolow, Sharona et al. Impacts of Urban Water Conservation Strategies on Energy, Greenhouse Gas Emissions, and Health. Accessed at: https://ajph.aphapublications.org/doi/full/10.2105/AJPH.2016.303053.

Play 4.3: Enhance natural carbon sequestration capacity.

Play 4.3 to aims to enhance Sunnyvale's capacity to sequester carbon through nature-based solutions. While this Play cannot be counted towards Sunnyvale's GHG emission reduction targets (due to the difference between reductions and sequestration and the potential for the Play to produce indirect GHG emission reductions), it is still critical for climate action in Sunnyvale. Through urban forest management, green stormwater infrastructure, and assessments of regional sequestration opportunities, this Play will lay the foundation for Sunnyvale to develop the natural capacity to sequester the GHG emissions remaining in 2045 once the long-term GHG emission reduction target is achieved (i.e., 85 percent reduction in GHG emissions from 1990 levels).

Play 4.4: Promote awareness of sustainable goods and services.

Play 4.4 aims to promote the awareness of sustainable goods and services in the community to reduce solid waste generation and reduce residents' and business' personal carbon footprints. While solid waste reduction can reduce GHG emissions in the community, there is a high potential for double counting reductions as solid waste reductions are quantified in Play 4.1. This Play does, however, directly supports the solid waste reduction Play by encouraging the use of reusable containers that can reduce the use of single-use plastic or compostable containers. The Play will also help reduce residents' and businesses' personal carbon footprints by encouraging the use of products with lower upstream GHG emissions. These potential GHG emission reductions cannot be counted towards the City's GHG emission reduction target because upstream GHG emissions from the consumption of products are excluded from Sunnyvale's GHG inventory, but they can be influenced by the City through creative policies.

6 Strategy 5: Empowering Our Community

The City of Sunnyvale's strategy to empower the community focuses on engaging the community in the Playbook Update process, educating the community on opportunities to reduce GHG emissions, and maintaining a transparent process to monitor and report progress on the City's targets. This strategy will support all other Plays by increasing participation in GHG emission reduction initiatives through education (e.g., building electrification, organic waste diversion, active transportation, and electric vehicles) and increasing accountability for the City to update the Playbook and produce new Game Plans based on results from annual GHG emission inventories.

Based on this strategy, the Playbook Update's strategy to empower the community consists of the following Plays presented in Table 27. The table indicates that all Plays are supportive. The Playbook Update provides further detail on purpose of this strategy and the supportive Plays.

Table 27 Strategy 5: Empowering Our Community 2030 GHG Emission Reduction Summary

Play ID	Play	2030 Play Target	2030 GHG Emission Reductions (MT CO_2e)
Strategy 5: Empowering Our Community			
Play 5.1	Enhance community awareness and engagement.	N/A	Supportive
Play 5.2	Track and share data and tools.	N/A	Supportive
Total			**0**

Notes: N/A = not applicable

7 Strategy 6: Adapting to a Changing Climate

The City of Sunnyvale's strategy to adapt to climate change impacts focuses on adjusting the community to climate impacts and increasing the community's ability to anticipate, prepare for, and recover from hazardous events strengthened and made more frequent by climate change. While this strategy will not result in direct GHG emission reductions, it will support the other Plays by building a strong, connected community that can implement them. Based on this strategy, the Playbook Update's strategy to adapt to climate change consists of the following Plays presented in Table 28. The table indicates that all Plays are supportive. The Playbook Update provides further detail on purpose of this strategy and the supportive Plays.

Table 28 Strategy 6: Adapting to a Changing Climate 2030 GHG Emission Reduction Summary

Play ID	Play	2030 Play Target	2030 GHG Emission Reductions (MT CO_2e)
Strategy 6: Adapting to a Changing Climate			
Play 6.1	Assess climate vulnerabilities for Sunnyvale.	N/A	Supportive
Play 6.2	Protect shoreline area from seal level rise and coastal flooding.	N/A	Supportive
Play 6.3	Strengthen community resiliency.	N/A	Supportive
Total			**0**

Notes: N/A = not applicable

Acknowledgements

City Council

Larry Klein, Mayor

Murali Srinivasan, Vice Mayor

Russ Melton, Councilmember

Alyssa Cisneros, Councilmember

Omar Din, Councilmember

Richard Mehlinger, Councilmember

Linda Sell, Councilmember

Community Partners

Bicycle and Pedestrian Advisory Commission

Planning Commission

Livable Sunnyvale

Sunnyvale Neighborhood Associations

Moffett Park Business Group

BPAC, S. Comm, Planning

Silicon Valley Youth Climate Action Group

Consultant Team

Rincon Consultants, Inc.

Community Members

Special thanks to more than 200 community members who engaged with us throughout this process, contributed ideas online, attended our community workshops and public meetings, and delved head-first into giving us feedback in developing this Playbook. Your contributions are and will remain invaluable to advancing Sunnyvale on the path to 85x45.

City Staff

Amber Blizinski, former Principal Planner

Angela Chan, Youth and Family Resources Manager

Chaunacey Dunklee, Supervising Librarian

Chip Taylor, Director of Public Works

Christina Raby, Environmental Engineering Coordinator

Connie Verceles, Assistant to the City Manager

Daniel Moskowitz, Public Safety Lieutenant

Deepti Jain, Environmental Programs Manager

Dennis Ng, Transportation and Traffic Manager

Dzanh Le, Public Safety Captain

George Schroeder, Principal Planner

Jennifer Garnett, Communications Officer

Jennifer Ng, Assistant Director of Public Works

Jim Stark, Superintendent of Parks and Golf

Joe De La Cruz, Water Operations Manager

Kent Steffens, City Manager

Lillian Tsang, Principal Transportation Engineer/Planner

Madeline Khair, Environmental Programs Manager

Mansour Nasser, Water and Sewer Systems Division Manager

Mary Jeyaprakash, Senior Planner

Melody Tovar, Regulatory Programs Division Manager

Michelle King, former Principal Planner

Michelle Perera, Director of Library and Recreation

Nathan Scribner, Assistant City Engineer

Phan S. Ngo, Director of Public Safety

Ramana Chinnakotla, Director of Environmental Services

Rebecca Moon, City Attorney

Roya Samani, Environmental Programs Specialist

Rohan Wikramanayake, Water Pollution Control Plant Division Manager

Shaunn Mendrin, Planning Officer

Shikha Gupta, Solid Waste Programs Division Manager

Suzanne Park, Chief Building Official

Tim Kirby, Director of Finance

Tina Murphy, Director of Human Resources

Trudi Ryan, Director of Community Development

City of Sunnyvale
456 West Olive Avenue, Sunnyvale, CA 94086
green@sunnyvale.ca.gov
408-730-7717