



# 2022 SUSTAINABILITY AND CLIMATE ACTION PLAN

## DRAFT Goals and Key Actions

September 12, 2022

*Acting Now for a Resilient Future*



## Introduction

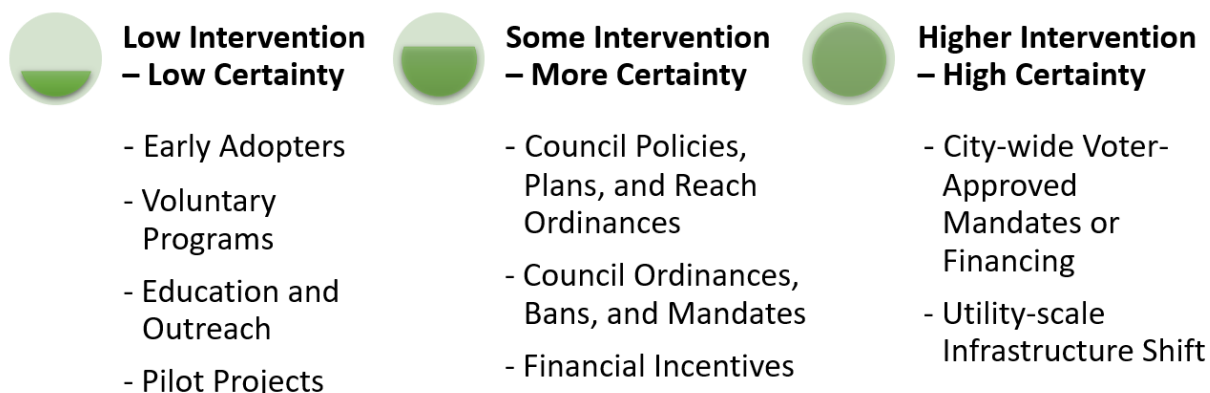
A Climate Action Plan, or CAP, is a comprehensive roadmap that lays out the specific activities that an agency will undertake to reduce greenhouse gas (GHG) emissions. In Palo Alto, we have a Sustainability and Climate Action Plan (S/CAP) because we include sustainability areas that don't necessarily have a direct impact on GHG reductions, but have critically important sustainability, public health and safety, regional, resource conservation, and equity benefits that contribute to overall climate action. The proposed S/CAP Goals and Key Actions in this document will form the basis of the full S/CAP Report.

The City's consultant, AECOM, performed an impact analysis that estimated the potential GHG reduction potential of the proposed actions, estimated costs, and additional sustainability co-benefits, as well as the outcomes needed to meet the "80 x 30" goal to reduce GHGs 80% below 1990 levels by 2030. This document outlines proposed S/CAP Goals and Key Actions in eight areas: Climate Action, Energy, Electric Vehicles, Mobility, Water, Climate Adaptation and Sea Level Rise, Natural Environment, and Zero Waste. The Key Actions do not capture the breadth and depth of the sustainability and climate action programs and projects across the City. Rather, they are the Key Actions that we are prioritizing, based on the outcomes needed and sustainability co-benefits that were identified in the impact analysis to achieve the "80 x 30" goal. There are additional Supplemental Actions that are being implemented and developed that contribute towards the City's climate and sustainability goals but are not highlighted here. Many of the Supplemental Actions are included in the Climate Change – Protection and Adaptation Work Plan and will be included in future Work Plans.

Each of the proposed Key Actions falls along a Spectrum of Tools for Achieving Climate Goals, as shown in Figure 1. The Spectrum ranges from market driven solutions that require low intervention but also low certainty of achievement, such as voluntary programs, to government driven solutions that require higher intervention but yield high certainty of achievement, such as city-wide voter-approved mandates.

Figure 1: Spectrum of Tools for Achieving Climate Goals

## Spectrum of Tools for Achieving Climate Goals



Market driven solutions

Government driven solutions

## **Strategies to Get Us There**

The Goals and Key Actions proposed in this document will work together towards achieving Palo Alto's goal to reduce GHG's 80 percent by 2030, relative to a 1990 baseline. The proposed S/CAP Goals and Key Actions are meant to be a high-level road map to achieving the community's 80 x 30 goal. More details and specifics will be provided in the S/CAP Workplan.

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# SUSTAINABILITY AND CLIMATE ACTION PLAN GOALS

## CLIMATE ACTION

### Reduce GHG emissions 80% below 1990 levels by 2030



- ➔ Reduce GHG emissions from the direct use of natural gas in Palo Alto's building sector by at least 60% below 1990 levels (116,400 MT CO<sub>2</sub>e reduction)
- ➔ Modernize the electric grid to support increased electric demand and to accommodate state-of-the-art technology



- ➔ Reduce transportation related GHG emissions at least 65% below 1990 levels (215,696 MT CO<sub>2</sub>e reduction)
- ➔ Develop a public and private charging network to support EV adoption



- ➔ Reduce total vehicle miles traveled 12% by 2030, compared to a 2019 baseline, by reducing commute vehicle miles traveled 20%, visitor vehicles miles traveled 10%, and resident vehicle miles traveled 6%
- ➔ Increase the mode share for active transportation (walking, biking) and transit from 19% to 40% of local work trips by 2030



- ➔ Reduce Palo Alto's potable water consumption 30% compared to a 1990 baseline (subject to refinement based on forthcoming California water efficiency standards expected in 2024)
- ➔ Develop a water supply portfolio which is resilient to droughts, changes in climate, and water demand and regulations, that supports our urban canopy



- ➔ Develop and adopt a multi-year Sea Level Rise Adaptation Plan including a sea level rise vulnerability assessment and adaptation plan.
- ➔ Minimize wildland fire hazards by ensuring adequate provisions for vegetation management, emergency access and communications, inter-agency firefighting, and standards for design and development within wildland areas.



- ➔ Restore and enhance resilience and biodiversity of our natural environment throughout the City
- ➔ Increase tree canopy to 40% city-wide coverage by 2030
- ➔ By 2030, achieve a 10% increase in land area that uses green stormwater infrastructure to treat urban water runoff, compared to a 2020 baseline



- ➔ Divert 95% of waste from landfills by 2030, leading to zero waste
- ➔ Implement short- and medium-term initiatives identified in the *2018 Zero Waste Plan*

# Climate Action



The seven areas of the S/CAP (Energy, Electric Vehicles, Mobility, Water, Climate Adaptation and Sea Level Rise, Natural Environment, and Zero Waste) are all equally important. However, three areas – Energy, Electric Vehicles, and Mobility – have the highest potential for the largest greenhouse gas (GHG) emissions reductions. Each of these three areas has Goals and Key Actions that are specific to each area, but the overarching 80 x 30 goal and several Key Actions encompass all three.

## GOAL

- ➔ Reduce GHG emissions 80% below 1990 levels by 2030

## KEY ACTIONS

### Community assistance

- C1. Enable any resident to receive guidance on reducing their building and transportation emissions via phone consultations, interactive web applications, or communications platforms.
- C2. Work with major employers, including Stanford entities, to develop custom emissions reduction plans that address commute, building, and other emissions on an employer-by-employer basis.

### Staff Analysis

- C3. Complete study to identify any additional Energy, EV, or Mobility key actions needed to achieve 80% reduction in greenhouse gas emissions from 1990 levels by 2030, such as electrification of additional multifamily or commercial end uses, greater electrification of vehicles, or other emissions reduction actions not already identified in this Plan.
- C4. Complete a technical and legal study of the staffing and other resources needed to operate programs, services, and related City processes at a high enough capacity to accommodate all necessary emissions reduction activities through 2030.
- C5. Complete a technical and legal study of funding alternatives, such as a carbon tax, parcel taxes, or other community funding mechanisms.
- C6. Complete an affordability study to identify vulnerable populations and businesses who may need help with electrification and the scale of subsidy needed. Develop a Council-approved affordability policy to guide incentive and program funding design.
- C7. Complete a study of carbon neutrality options, including the potential contribution of expansion of the Palo Alto urban canopy in achieving carbon neutrality goals.

### Staff and Council action

- C8. Present options for Council consideration to accelerate EV, Mobility, and Energy emissions reduction activities identified in this Plan through mandates or price signals, such as building emissions performance standards, carbon pricing, on-sale or replace-on-burnout ordinances, parking rules in public and private spaces, and withdrawal of gas by a date certain.

## KEY PERFORMANCE INDICATORS

- GHG reductions
- Community awareness
- Participation in Climate Pledge

# Energy



Building efficiency and electrification are key to achieving Palo Alto's - and California's – greenhouse gas (GHG) reduction goals. Overcoming building electrification barriers at both the local and regional level will be necessary to increase market adoption in existing buildings. Electrification and building energy efficiency are important strategies to meeting the City's aggressive GHG reduction goal. It is critical to modernize the City's electric grid to accommodate the technologies that will enable this transformation.

In California, buildings account for 70 percent of total electricity use<sup>1</sup> and 20 percent of total GHG emissions<sup>2</sup>. In 2020, buildings in the residential and commercial/industrial sectors accounted for 34.9 percent of total emissions in Palo Alto, with 17.9 percent from residential, 13.9 percent from commercial, and 3.1 percent from industrial.

In order to reach Palo Alto's 2030 emissions reduction target, natural gas consumption will need to decline significantly through a combination of energy efficiency and electrification. Energy efficiency is simply using less energy to perform the same task; for example, replacing a low-efficiency gas furnace with a high-efficiency gas furnace. Electrification is the practice of replacing equipment in buildings that is powered by natural gas, including gas furnaces and gas water heaters, with electric equipment, such as air source heat pumps and heat pump water heaters.

## GOALS

- ➔ Reduce GHG emissions from the direct use of natural gas in Palo Alto's building sector by at least 60% below 1990 levels (116,400 MT CO<sub>2</sub>e reduction)
- ➔ Modernize the electric grid to support increased electric demand and to accommodate state-of-the-art technology

## KEY ACTIONS

### Reduce greenhouse gas emissions in appliances and equipment

- E1.** Reduce all or nearly all greenhouse gas emissions in single-family appliances and equipment, including water heating, space heating, cooking, clothes drying, and other appliances that use natural gas.
- E2.** Reduce greenhouse gas emissions in non-residential equipment, including mixed-fuel rooftop packaged HVAC units, cooking equipment, and small nonresidential gas appliances.

### Reduce natural gas use in buildings

- E3.** Partner with major facility owners to reduce gas use in major facilities by at least 20%.
- E4.** Reduce natural gas use at City facilities.

### Make it affordable

- E5.** Support income-qualified residents and vulnerable businesses with electrification efforts while ensuring affordability of on-going utility bills.

<sup>1</sup> California Energy Commission. (2018). Energy Consumption Database Management System. Retrieved from <http://www.ecdms.energy.ca.gov/elecbyutil.aspx>

<sup>2</sup> California Air Resources Board. (2019) California Greenhouse Gas Emissions for 2000 to 2017. Retrieved from [https://ww3.arb.ca.gov/cc/inventory/pubs/reports/2000\\_2017/ghg\\_inventory\\_trends\\_00-17.pdf](https://ww3.arb.ca.gov/cc/inventory/pubs/reports/2000_2017/ghg_inventory_trends_00-17.pdf)

- E6. Develop electric rate options for electrified homes, EV charging, and solar + storage microgrid customers.

#### **Paving the road to electrification**

- E7. Use codes and ordinances - such as the energy reach code, green building ordinance, zoning code, or other mandates - to facilitate electrification in both existing buildings and new-construction projects where feasible.
- E8. Develop and implement an electric grid modernization plan to increase capacity and resilience.
- E9. Seek additional electrification opportunities in commercial and multi-family buildings to contribute as much as possible towards achieving an additional 8% city-wide emissions reduction below 1990 levels.

#### **KEY PERFORMANCE INDICATORS**

- GHG emissions from natural gas use in buildings (single-family, multifamily, nonresidential)
- Percentage of single-family households with no gas connections
- Percentage of gas use reduction in major facilities and City facilities

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## Transportation

In California, more than 50 percent of total GHG emissions stem from transportation. The primary driver of emissions is from cars and trucks. In Palo Alto, 61.9 percent of emissions come from transportation, with 56.4 percent from on-road vehicles.

Reducing transportation emissions requires addressing three areas: 1) reducing the carbon intensity of fuels, 2) increasing vehicle efficiency, and 3) reducing vehicle miles travelled (VMT). Each area is significant, layered, and complex. And while delving into details is not appropriate for this document, we acknowledge the importance of this sector by creating two transportation-related action areas: electric vehicles and mobility. The electric vehicle (EV) and mobility plans work in synch to jointly reduce GHG emissions and VMT.

### Transportation trends

As of 2019, electric vehicles made up 7.8 percent of total new car sales in California.<sup>3</sup> In Palo Alto, electric vehicles made up 29 percent of total new car sales in 2017<sup>4</sup> – the highest rate in the US – with electric vehicles comprising 10 percent of total registered vehicles in 2020. In September 2020, Governor Newsom issued an Executive Order directing the state to require that, by 2035, all new cars and passenger trucks sold in California be zero-emission vehicles. And in January 2021, General Motors announced it would phase out petroleum-powered cars and trucks and sell only vehicles that have zero tailpipe emissions by 2035.

While these are all positive trends towards reducing transportation-related emissions, addressing the third component, reducing VMT, is considerably more difficult. Californians have driven more and more miles per year over the past five decades, whether for necessity or convenience.

If we all chose to power half of our shorter vehicle trips with our feet instead of petroleum, we would save about \$575 million in fuel costs and about 2 million metric tons of CO<sub>2</sub> emissions per year. That's the equivalent of taking approximately 400,000 cars off the road annually.<sup>5</sup>

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<sup>3</sup> California Air Resources Board. (2019). Sales of electric cars breaking records in California. Retrieved from <https://ww2.arb.ca.gov/news/sales-electric-cars-breaking-records-california>

<sup>4</sup> International Council on Clean Transportation. (2018) California's continued electric vehicle market development. Retrieved from <https://theicct.org/sites/default/files/publications/CA-cityEV-Briefing-20180507.pdf>

<sup>5</sup> United States Environmental Protection Agency. (n.d.). Green Vehicle Guide. <https://www.epa.gov/greenvehicles/what-if-we-kept-our-cars-parked-trips-less-one-mile>



# Electric Vehicles



More than half of Palo Alto's emissions come from transportation, making adoption of Electric Vehicles (EVs) a crucial component to reaching our carbon reduction goals. Compared to fossil fuel vehicles, EVs are cheaper to drive, have lower maintenance costs, and produce no emissions. Driving and charging an EV in Palo Alto especially makes sense given the City's carbon neutral electricity supply and low electric retail rates. Greenhouse gas (GHG) emissions are a function of two factors: the carbon intensity (GHG/VMT) of fuels, addressed here, and Vehicle Miles Traveled (VMT), addressed in the next section. The EV and Mobility plans work in synch to jointly reduce GHG emissions and Vehicle Miles Traveled.

In order to reach Palo Alto's 2030 emissions reduction target, strategies to reduce the carbon intensity of fuels will need to be implemented.

## GOALS

- ➔ Reduce transportation related GHG emissions at least 65% below 1990 levels (215,696 MT CO<sub>2</sub>e reduction)
- ➔ Develop a public and private charging network to support EV adoption

## KEY ACTIONS

### Education, awareness, and collaboration

- EV1.** Raise awareness of financial and emission savings of alternative transportation modes, micromobility (such as e-bikes and e-scooters), EVs, the economics of these transportation modes compared to gasoline vehicles, and available incentives.
- EV2.** Collaborate with regional partners, other agencies, and local nonprofit partners to promote EV adoption regionally to reduce commuter and visitor emissions.
- EV3.** Partner with employers and business districts to promote commuter EV adoption and EV charging access as well as alternative commute promotion.
- EV4.** Facilitate the adoption of EVs, e-bikes and other light EVs.
- EV5.** When offering programs to facilitate EV adoption, EV charger installation, or building electrification, promote alternative transportation modes and infrastructure to support adoption (such as bicycle or micromobility infrastructure) as well where feasible.

### Expand EV infrastructure

- EV6.** Expand access to on-site EV charging for multi-family residents.
- EV7.** Improve access to EV charging for income-qualified residents.
- EV8.** Evaluate mandates or other mechanisms to ensure EV charging capacity is available to support EV growth.

### Electrify fleet vehicles

- EV9.** Convert all Palo Alto municipal vehicles to EVs when feasible and when the replacement is operationally acceptable.
- EV10.** Support state policy efforts to electrify fleet vehicles, including delivery trucks

## KEY PERFORMANCE INDICATORS

- GHG emissions from vehicle travel
- Percentage of registered EV vehicles in Palo Alto

- Percentage of new vehicle sales that are EVs
- Percentage of multifamily residents with access to overnight EV charging
- Gasoline sales in Palo Alto

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# Mobility



Road transportation represents the largest percentage of Palo Alto’s existing carbon footprint – and a congestion headache. Greenhouse gas (GHG) emissions are a function of two factors: Vehicle Miles Traveled (VMT), addressed here, and the carbon intensity (GHG/VMT) of fuels, addressed in the previous section. Reducing GHG/VMT is largely driven by Federal Standards, state policy, and vehicle offerings (including fuel efficiency and EVs). However, VMT reduction and EV adoption can be influenced by local programs and policies, including roadway engineering, land use, and zoning, since these elements affect travel mode choice.

In order to reach Palo Alto’s 2030 emissions reduction target, strategies to reduce VMT will need to be implemented.

## GOALS

- ➔ Reduce total vehicle miles traveled 12% by 2030, compared to a 2019 baseline, by reducing commute vehicle miles traveled 20%, visitor vehicles miles traveled 10%, and resident vehicle miles traveled 6%
- ➔ Increase the mode share for active transportation (walking, biking) and transit from 19% to 40% of local work trips by 2030

## KEY ACTIONS

### Promote alternatives to single occupancy car trips

- M1.** Implement transportation and land use infrastructure investments, programs, policies, and incentives to increase the mode share for active transportation (walking, biking) and transit for local work trips.
- M2.** Expand the availability of transit and shared mobility services from 61% of residents to 100% of all residents, including a bike/scooter shared micro-mobility service to provide last-mile connections, an on-demand shuttle / transit service pilot, and Neighborhood Mobility Hubs.
- M3.** Update and implement the Bicycle and Pedestrian Transportation Plan to expand bicycle and pedestrian infrastructure and establish a Vision Zero data collection and analysis program to target safety improvements.
- M4.** Improve Transportation Demand Management for employees and residents, including adopting a TDM Ordinance, allocating funding to scale up TDM programming, establishing a Safe Routes for Older Adults/Aging in Place program, and continuing the Safe Routes to School program.

### Change the way we think about parking cars

- M5.** Implement smart parking infrastructure in public garages and proposals for Council to price parking in business districts, including implementing an optional Healthy Climate Fee, ideally on gas vehicles, to partially offset GHG emissions from driving to support alternative modes in Palo Alto.

### Learn how we can grow without increasing GHG emissions

- M6.** Conduct a land use and transportation study to identify scenarios, changes, services, and programs that would reduce greenhouse gas emissions and accommodate projected housing growth without increasing transportation sector emissions. Include mobility equity needs analysis.

- M7.** Continue to implement the City's Housing Element of the Comprehensive Plan to improve jobs - housing balance and reduce vehicle miles traveled (VMT).
- M8.** Improve transit and traffic flow through programs to install transit signal priority equipment, implement traffic signal equipment improvements, and improve transit times.

**Leverage current tools to foster mobility-related GHG reductions**

- M9.** Utilize development regulations and standards to continue creating a housing density and land use mix that supports transit and non-SOV (Single Occupancy Vehicle) transportation modes.
- M10.** Utilize pricing, fees, and other program and policy tools to encourage reductions in GHGs and VMT.

**KEY PERFORMANCE INDICATORS**

- Total VMT
- Commute mode share for all modes
- Commute Benefits participation by City employees
- Transit ridership, the proportion of residents within a quarter-mile walkshed of frequent transit, and the proportion of residents covered by on-demand transit services (data may not be available every year)
- Number and proportion of residents within a 10-minute walk of retail land uses (data may not be available every year)
- Number of businesses participating in TDM programs (when regional TDM Program data becomes available)

# Water



Water is a limited resource in California, and its availability will be further impacted by climate change and new environmental regulations. Both potable water supplies and hydroelectric needs could be challenged by long-term shifts in California’s precipitation regime. With shifting climate patterns, and significant long-term water supply uncertainty, it would be prudent to reduce water consumption while exploring ways to capture and store water, as well as to increase the availability and use of recycled water.

Water reuse will increase in importance as California’s population expands and climate change and new environmental regulations pose uncertainties in imported water supply availability. Whether a water supply shortage exists or not, “Making Water Conservation a California Way of Life” is a concept embraced by the City.

In 2020, wastewater accounted for 0.4 percent of Palo Alto’s GHG emissions. While the Goals and Key Actions for water don’t explicitly address GHG reduction, energy and water use are linked. Energy is needed to transport and to treat water, treat wastewater, and heat domestic hot water in homes and businesses across California. Approximately 20 percent of California’s electricity and approximately 30 percent of natural gas used by homes and businesses across the state is dedicated to pumping, treating, and heating water.

## GOALS

- ➔ Reduce Palo Alto’s potable water consumption 30% compared to a 1990 baseline (subject to refinement based on forthcoming California water efficiency standards expected in 2024<sup>6</sup>)
- ➔ Develop a water supply portfolio which is resilient to droughts, changes in climate, and water demand and regulations, that supports our urban canopy

## KEY ACTIONS

- W1.** Maximize cost-effective water conservation and efficiency through incentives, outreach/education, and other programs.
- W2.** Design and build a salt removal facility for the Regional Water Quality Control Plant.
- W3.** Develop and implement projects that result from a "One Water" Portfolio for Palo Alto<sup>7</sup>, including but not limited to: stormwater, recycled water, on-site reuse, conservation, groundwater.
- W4.** Develop a tool for dynamic water planning in the future.

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<sup>6</sup> The California Water Action Plan, first released in 2014 and updated in 2016, is a roadmap to water resilience and reliability. Ten principles define California’s Water Action Plan, including “Make Conservation a California Way of Life.” Executive Order (B-37-16) instructed State agencies to help Californians adopt permanent changes to use water more wisely. In 2018 the legislature enacted SB 606 and AB 1668 that provide new requirements for water conservation and drought. Resulting new regulations will establish water budgets for urban water suppliers based upon state adopted water use efficiency standards for residential indoor and outdoor water use, outdoor irrigation of landscape areas, water loss, and local service area characteristics.

<sup>7</sup> A “One Water” approach envisions managing all water in an integrated, inclusive, and sustainable manner that is more resilient to the impacts of climate change. The One Water approach recognizes that water must be managed in ways that respect and respond to the natural flows of watersheds and the natural ecosystem, geology, and hydrology of an area. projects and programs focus on achieving multiple benefits—economic, environmental, and social.

## KEY PERFORMANCE INDICATORS

- Estimated indoor per capita residential water consumption
- Estimated outdoor residential water consumption for irrigation
- Water consumption of commercial customers with irrigation meters
- Amount of recycled water used in Palo Alto
- Volume of stormwater that is captured and reused

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# Climate Adaptation and Sea Level Rise



Climate adaptation refers to the actions taken to improve a community's resilience when confronted with the impacts of climate change. Actions that reduce the net amount of GHG emissions are emissions reductions or climate mitigation. Climate adaptation planning is most effective at the local level. Effective adaptation planning and management entails dealing with uncertainty. It is a long-term process that should allow immediate action when necessary and adjust to changing conditions and new knowledge.

One focus of climate adaptation is sea level rise. The State of California anticipates that relative sea level rise projections stemming from GHG emissions and related climate change pose significant economic, environmental and social risks to communities along the San Francisco Bay Shoreline, including the City of Palo Alto. Sea level rise in San Francisco Bay is anticipated to range between three feet to more than ten feet by 2100 with rising tides likely thereafter. In Palo Alto, many City services and infrastructure that are essential to the City's public health, safety, and economy are located within areas that are predicted to be inundated by Bay water if adaptation measures are not implemented.

Another focus of climate adaptation is preparation for and protection from wildfires. Climate change is expected to increase the frequency, intensity, and duration of wildfire events, especially here in California. On the West Coast, it is projected that an average 1 °C temperature increase could increase the median burned area per year as much as 600 percent in some forests.<sup>8</sup> GHG emissions from wildfires are not currently included in community GHG inventories. From 2000 – 2019, wildfire-related GHG emissions in California averaged approximately 14 million metric tons (MMT) of CO<sub>2</sub>. The California Air Resources Board (CARB) projects that CA wildfire emissions in 2020 were about 112 MMT CO<sub>2</sub>.<sup>9</sup>

While this document focuses primarily on sea level rise and secondarily on wildfire protection, the City is pursuing many other climate protection and adaptation strategies. The City is also working on addressing extreme weather and natural disasters such as floods.

## GOALS

- ➔ Develop and adopt a multi-year Sea Level Rise Adaptation Plan including a sea level rise vulnerability assessment and adaptation plan
- ➔ Minimize wildland fire hazards by ensuring adequate provisions for vegetation management, emergency access and communications, inter-agency firefighting, and standards for design and development within wildland areas.

## KEY ACTIONS

### Minimize the impacts of sea level rise

- S1.** Complete a Sea Level Rise Vulnerability Assessment to identify risks and hazards to the Palo Alto Baylands, City infrastructure, and residential and business property, considering high tide, 100-year coastal storm event scenarios and rising shallow groundwater impacts.

<sup>8</sup> US Department of Agriculture. (2012). Effects of Climatic Variability and Change on Forest Ecosystems: A Comprehensive Science Synthesis for the U.S. Forest Sector. [https://www.fs.fed.us/pnw/pubs/pnw\\_gtr870/pnw\\_gtr870.pdf](https://www.fs.fed.us/pnw/pubs/pnw_gtr870/pnw_gtr870.pdf)

<sup>9</sup> California Air Resources Board (2020). Greenhouse Gas Emissions of Contemporary Wildfire, Prescribed Fire, and Forest Management Activities. [https://ww3.arb.ca.gov/cc/inventory/pubs/ca\\_ghg\\_wildfire\\_forestmanagement.pdf](https://ww3.arb.ca.gov/cc/inventory/pubs/ca_ghg_wildfire_forestmanagement.pdf)

- S2. Develop and implement a Sea Level Rise Adaptation Plan with goals to 1) Preserve and Expand Habitat, and 2) Protect City and Community Assets, and Private Property.
- S3. Determine levee alignment and begin design process for a levee project that protects the Palo Alto community from sea level rise, and incorporates other related priorities including habitat restoration, recreation, transportation, City facilities, and community properties.
- S4. Complete bridge improvements and identify protection strategies from significant flood events

#### **Minimize the impacts of wildland fire hazards**

- S5. Implement the Foothills Fire Management Plan to balance conservation of natural resources with reduction of fire hazards especially in open space areas.
- S6. Minimize fire hazards by maintaining low density zoning in wildland fire hazard areas and enforcing building codes for fire resistant construction.
- S7. Work collaboratively with other jurisdictions and agencies to reduce wildfire hazards in and around Palo Alto, with an emphasis on effective vegetation management and mutual aid agreements.
- S8. Implement of CAL FIRE recommended programs in educating and involving the local community to diminish potential loss caused by wildfire and identify prevention measures to reduce those risks.

#### **KEY PERFORMANCE INDICATORS**

- Percent of vulnerable locations protected from 3 feet of sea level rise
- Percent of properties protected from San Francisquito Creek flooding
- Progress towards sea level rise levee alignments
- Implementation of Foothills Fire Management Plan mitigation measures



# Natural Environment



Sustainability is not only about mitigation, adaptation, and resilience, but also regeneration – identifying opportunities for renewal, restoration, carbon sequestration, and growth of our natural environment. Palo Alto will continue to build and restore the natural environment and its ecosystem services and bio-capacity that supports it, including soils, tree canopy, biodiversity, and other components. Enhancing and maintaining Green Stormwater Infrastructure will use natural areas and systems to provide habitat, flood protection, stormwater management, cleaner air, cleaner water, and human health enhancement.

Many actions that address climate vulnerability and risk also reverse emissions of greenhouse gases (GHGs) into the atmosphere. Shade trees absorb, or sequester, carbon dioxide from the atmosphere. Studies show that a young tree sapling can sequester anywhere from 1.0 to 1.3 pounds of carbon each year, while a 50-year-old tree can sequester over 100 pounds annually.<sup>10</sup> Restoration of wetlands can both sequester carbon and be implemented in a way that may protect shoreline communities and habitats from sea-level rise and storm surge. Healthy soils on farmland also play an important role in absorbing carbon.

Actions to sequester carbon in trees, soils, and vegetation can increase biodiversity of plants and animals and minimize stormwater runoff by mitigating impacts from impervious surfaces and providing opportunities to capture and use rain while also treating runoff pollutants. Biodiversity is critical to the health of City parks and other open spaces. Natural area conservation and retrofit of impervious areas protect natural resources and environmental features that sequester carbon, reduce stormwater runoff, promote infiltration, prevent soil erosion, and increase ecosystem biodiversity.

## GOALS

- Restore and enhance resilience and biodiversity of our natural environment throughout the City
- Increase tree canopy to 40% city-wide coverage by 2030
- By 2030, achieve a 10% increase in land area that uses green stormwater infrastructure to treat urban water runoff, compared to a 2020 baseline<sup>11</sup>

## KEY ACTIONS

### Maintain and protect tree canopy

- N1.** Develop programs to plant trees to increase tree canopy – that will be integrated with traditional tree planting programs and Green Stormwater Infrastructure programs – and provide carbon sequestration, improve water quality, capture stormwater when feasible, and reduce the urban heat island effect.
- N2.** Ensure No Net Tree Canopy Loss for all projects.
- N3.** Continue to review the use of pesticides in all parks and open space preserves to identify opportunities to further reduce and eliminate the use of pesticides.

<sup>10</sup> U.S. Department of Energy Energy Information Administration. (1998). Method for Calculating Carbon Sequestration by Trees in Urban and Suburban Settings. <https://www3.epa.gov/climatechange/Downloads/method-calculating-carbon-sequestration-trees-urban-and-suburban-settings.pdf>

<sup>11</sup> Green Stormwater Infrastructure (GSI) goals will be finalized once additional quantification work is conducted over the next two years to provide accurate, realistic and publicly vetted metrics.

- N4.** Enhance pollinator habitat by including native plants and pollinator-friendly plant landscaping with all park improvement projects when feasible.
- N5.** Establish a baseline and Key Performance Indicator for carbon storage of tree canopy in the public right-of-way and City-owned property.

#### **Restore and enhance biodiversity**

- N6.** Evaluate and modify plant palette selection in project plans to maximize biodiversity and soil health to adapt to the changing climate and incorporate buffers for existing natural ecosystems.
- N7.** Coordinate implementation of the Urban Forest Master Plan, Parks Master Plan, and other city-wide planning efforts through interdepartmental collaboration.
- N8.** Expand the requirements of the Water Efficient Landscape Ordinance (WELO) to increase native and drought-tolerant species composition.
- N9.** Phase out gas-powered lawn and garden equipment, in compliance with California's AB 1346.

#### **Reduce pollutants entering the Bay**

- N10.** Establish policies and ordinance changes as needed to support the Green Stormwater Infrastructure Plan.
- N11.** Incorporate Green Stormwater Infrastructure in future municipal projects, including public right-of-way.

#### **KEY PERFORMANCE INDICATORS**

- City-wide Tree Canopy coverage
- Native species on City property and in new landscape projects (to measure biodiversity)
- Land area that uses green stormwater infrastructure to treat urban water runoff

# Zero Waste



Zero Waste is a holistic approach to managing materials in a closed loop system (circular economy), where all discarded materials are designed to become resources. Reducing waste is an important strategy for both greenhouse gas (GHG) emissions reductions and overall sustainability. Approximately 42% of GHG emissions in the U.S. are associated with the flow of materials through the economy, from extraction or harvest of materials and food, production and transport of goods, provision of services, reuse of materials, recycling, composting, and disposal.

Palo Alto's current diversion rate is 84%. Diversion includes all waste prevention, reuse, recycling, and composting activities that divert materials from landfills. Getting to the 95% diversion goal will require refinement and enforcement of existing programs, the addition of new policies and programs, fostering producer and consumer responsibility and building community collaboration on waste prevention.

In 2020, solid waste accounted for 1.7 percent of Palo Alto's GHG emissions, which can be reduced through key actions that reduce waste, conserve resources, and prevent pollution.

## GOALS

- ➔ Divert 95% of waste from landfills by 2030, leading to zero waste
- ➔ Implement short- and medium-term initiatives identified in the *2018 Zero Waste Plan*

## KEY ACTIONS

### Education and outreach

- ZW1.** Encourage food waste<sup>12</sup> prevention and require edible food recovery for human consumption from commercial food generators.
- ZW2.** Promote residential food waste reduction.
- ZW3.** Champion waste prevention, reduction, reusables, and the sharing economy (e.g., promote adoption of a "Zero Waste lifestyle", stimulate value of reuse, repair, and access to sharing goods over ownership).
- ZW4.** Provide waste prevention technical assistance to the commercial sector.

### Collaborate on and expand policies

- ZW5.** Prioritize domestic processing of recyclable materials and collaborate with stakeholders on legislation to spur domestic recycling and require traceability of materials processing.
- ZW6.** Eliminate single-use disposable containers by expanding the Disposable Foodware Ordinance.
- ZW7.** Expand the Deconstruction and Construction Materials Management Ordinance.
- ZW8.** Implement Reach Code standard for low carbon construction materials.

## KEY PERFORMANCE INDICATORS

- Diversion rate
- Number of *Zero Waste Plan*<sup>13</sup> initiatives implemented

<sup>12</sup> "Food waste" refers to edible food that is not eaten, goes bad and is thrown away. It does not include food scraps such as banana peels, apple cores, and bones – they should be composted.

<sup>13</sup> [www.cityofpaloalto.org/zwplan](http://www.cityofpaloalto.org/zwplan)