

**Report Type: Action Items** 

Meeting Date: 4/17/2017

Summary Title: Earth Day Report 2017 (EDR17)

Title: Annual Earth Day and Sustainability and Climate Action Plan (S/CAP) Update

From: City Manager

# Lead Department: City Manager

# Recommendation

Accept this Report. This was originally an informational report, but has been converted to an Action Item to allow Council to bring up questions related to information in this report as part of the Action Item on the Strategic Implementation Plan (SIP) of the S/CAP on tonight's agenda. It is recommended both items be taken up simultaneously.

# **Executive Summary**

This report includes:

- Summary/Overview
- Background
- Discussion/Summary of 2016 initiatives and results, including:
  - Progress towards development and adoption of the Sustainability and Climate Action Plan (S/CAP)
  - Green House Gas (GHG) Emissions from City Operations, City and Community Activities, and from City of Palo Alto Utilities
  - Water Consumption and Considerations
  - o Highlights and Accomplishments from City Departments
- Future Vision and Challenges

Palo Alto has long been a leader in sustainability and climate action, and has made substantial progress in meeting its climate goals and forwarding its substantial sustainability commitments. Much of that progress is summarized in this report.

The draft Sustainability and Climate Action Plan (S/CAP) Framework, which Council adopted November 28 2016, set an ambitious goal for GHG reductions and provided the foundation for a comprehensive S/CAP including goals, policies, and implementation actions. The final S/CAP is envisioned as a roadmap for how the City will continue its environmental stewardship, and will

include a Sustainability Implementation Plan (SIP), which will lay out the initial steps the City will need to take in 2017-2020 to both progress toward our established goals, and to build the organizational capacity and flexible platforms that will enable us to respond effectively to the changes that we will no doubt encounter on the road to 2030.

Progress this year has included (partial list; additional detail below and in Attachment D):

- Adopted the 2030 S/CAP goal of reducing GHG emissions by 80% below 1990 levels by 2030, and adopted a draft S/CAP framework consisting of goals, guidelines and principles
- Began work on a Sustainability Implementation Plan (SIP) for 2017-2020
- Worked to align the draft S/CAP framework and the evolving SIP into the ongoing Comprehensive Plan Update
- Adopted the Green Building Ordinance and Energy Reach Code
- Dramatic reductions in per capita water use
- Continued electric vehicle (EV) development (including grant funding for additional chargers in City facilities and development of pricing policy, Ride and Drive and other outreach events, fleet electrification policy and strategy)
- Award of \$1.085 million Federal grant to support mobility alternatives
- Engaged 43 households in pilot Cool Block program
- Collaborated with other cities on ZNE workshop, sustainability finance tool kit, sustainable purchasing tool kit
- Joined multi-city sustainability initiatives, including Compact of Mayors and Mayors National Climate Action Agenda

The challenges the City faces (in addition to the uncertain Federal policy environment) include:

- Matching City processes to the pace of technology, climate and policy change
- Continuing to encourage water conservation even as the urgency Palo Altans feel toward conservation is alleviated as Palo Alto exits near-term drought conditions.
- Monitoring the changes to the electric industry as it is affected by increasing solar penetration, electric vehicle adoption, controllable electric loads, and other factors and determining what changes the utility may need to make to adapt.
- Potential changes in relevant federal, state and regional policy
- Consistent assessment and efficiency enhancement of City buildings and fleet
- Managing S/CAP implementation,
- Understanding and reducing "Scope 3" emissions<sup>1</sup>
- Developing, consolidating and using sustainability performance dashboards.
- Nurturing a culture of agility, experimentation and emergence in City government
- Addressing adaptation and resilience choices in the face of seal level rise and other dimensions of climate change

<sup>&</sup>lt;sup>1</sup> "Scope 3 emissions" are indirect emissions, such as those engendered by purchased goods and services, production of purchased goods, emissions from the use of sold products, business travel, employee commuting, transportation and distribution of electricity, and waste disposal.

• Financing the future/Investing in sustainability and climate action

(These challenges are discussed in more detail below.)

## Background

Demonstrating its leadership in climate and sustainability, Palo Alto adopted one of the first municipal climate action plans in the U.S. in 2007, delivering carbon neutral electricity, and partnering with our community to develop a vision for an innovative, carbon neutral city of the future—and quickly exceeded the 20% reduction goals set by Council in the 2007 Climate Protection Plan. In 2013, Council established the Office of Sustainability in the City Manager's Office, to work with other City departments to bring a sharper strategic focus, better inter-departmental synergy and greater momentum to the City's sustainability and climate initiatives.

On April 18, 2016, Council unanimously approved the primary goal of the S/CAP - <u>achieving an</u> <u>80% reduction in Greenhouse Gases (GHGs) below 1990 levels by 2030</u><sup>2</sup> - 20 years ahead of the State of California 80x50 target. Since that time, the City has: adopted an advanced Green Building Ordinance and Energy Reach Code; continued analyzing electrification options, explored Zero Net Energy buildings and districts; adopted the S/CAP Framework including Goals, Strategies, Guidelines, Design Principles and Decision Criteria; approved a Carbon Neutral Natural Gas Plan; begun aligning the S/CAP and the Comprehensive Plan Update; and drafted a Sustainability Implementation Plan for 2017-2020.

On November 28, 2016, Council adopted the <u>S/CAP Framework</u><sup>3</sup>, including its Guiding Principles, Decision Criteria, Design Principles, and key Goals and Strategies, as the road map for development of S/CAP Implementation Plans.

On December 5, 2016, Council unanimously approved Palo Alto's "<u>Carbon Neutral Natural Gas</u> <u>Plan</u>"<sup>4</sup>, making City of Palo Alto Utilities (CPAU) one of the first carbon neutral utilities for both electricity and natural gas in the US. This move will also help mitigate one of Palo Alto's largest remaining sources of greenhouse gas emissions.

As shown in Figure 3, Palo Alto reduced greenhouse gas (GHG) emissions an estimated 37% since 1990<sup>5</sup> in 2016 — a remarkable achievement in 26 years, with most of it accomplished in

<sup>&</sup>lt;sup>2</sup> <u>http://www.cityofpaloalto.org/civicax/filebank/documents/51856</u>

<sup>&</sup>lt;sup>3</sup> http://www.cityofpaloalto.org/civicax/filebank/documents/54865

<sup>&</sup>lt;sup>4</sup> <u>https://www.cityofpaloalto.org/civicax/filebank/documents/55728</u>

<sup>&</sup>lt;sup>5</sup> Palo Alto emissions in the 1990 baseline year are estimated at 765,920 MT CO2e, a restatement of prior estimates of 780,119 MT CO2e due to changes in "Lifecycle Emissions from Annual Total Waste placed in Landfills" and "Landfilling Recyclable Material" emissions, which have been updated based on the most recent EPA Waste Reduction Model (WARM) methodology. Most emissions noted in this report as called "estimates," since only utility consumption (electricity, natural gas and water) are measured. Transportation emissions are modeled every few years; solid waste related emissions are calculated using established EPA protocols. Solid waste related emissions were not included in the CompPlan DEIR. Staff has been unable to obtain "confidence intervals" for the

the ten years since 2005—largely a result of the leadership of Palo Alto Utilities and the City Council's 2013 commitment to carbon neutral electricity. Palo Alto's largest remaining sources of greenhouse gas emissions are road transportation (approximately 66%) followed by natural gas use (approximately 29%).

To achieve an 80% reduction target by 2030, Palo Alto will need to meet a target "GHG reduction budget" of about 224,600 MT CO2e<sup>6</sup> (See Figure 1 below). The 2016 S/CAP analysis projects that 117,900 MT CO2e, or more than half of the needed additional reductions, can come from mobility related measures, 97,200 MT CO2e, or just under half from efficiency and fuel switching measures (largely in buildings), and 9,500 MT CO2e, or 4% from continuation and extension of Palo Alto's zero waste initiatives.



Figure 1. Overview of Palo Alto GHG Reduction Target relative to Business-as-Usual (MT CO2e)

## Discussion

The national political environment has of course shifted since the last Earth Day Report. We have a new administration in the White House, a new EPA Administrator, and a lot of uncertainty around the status of existing environmental legislation, climate funding, and whether the United States will follow the historic Paris Climate Agreement - the first international treaty to mitigate global warming.

transportation emissions modelling, so these estimates should be considered to have a confidence interval of *at least* +/-5%.

<sup>&</sup>lt;sup>6</sup> MT CO2e = metric tons of CO2 equivalent

The State of California – a leader in environmental advocacy for the past 50 years, beginning with setting appliance and vehicle emissions standards in the 1960s – has responded to this uncertainty by pledging to work directly with other nations and states to defend and strengthen climate change policies. And cities around the world—including the 150-member Urban Sustainability Directors Network, the 75-member Mayors National Climate Agenda, the Compact of Mayors, and the Carbon Neutral Cities Alliance—remain in the forefront of sustainability and climate action.

Despite uncertainty around climate policy on the federal level, California continues to lead on climate and energy through strong government leadership, accelerated investment in clean energy, and advancement of a low-carbon economy. Key State climate change strategies include: increasing renewable electricity production to 50%, reducing petroleum use by 50% in vehicles, doubling energy efficiency savings at existing buildings, reducing GHG emissions from natural and working lands, reducing short-lived climate pollutants, and safeguarding California from the worst impacts of climate change. Cities across the US, including Palo Alto, have responded by joining together in the U.S. Mayors' National Climate Action Agenda (MNCAA), and committing to ambitious targets to reduce greenhouse gas emissions, setting climate action, regularly reporting on progress, sharing lessons, and holding each other accountable. Even before the Presidential Election, cities around the globe started working together to combat climate change through organizations like Compact of Mayors and C40.

To continue our forward progress, the City of Palo Alto will need to continue its leadership in advancing sustainability commitments. This will require continued cooperation across City departments and diverse community stakeholders, and possibly even the addition of dedicated staff to help Palo Alto achieve its sustainability goals.

# **Climate Action**

The City launched its Sustainability and Climate Action Plan (S/CAP) initiative in August 2014 to chart a path to a more sustainable future, find ways to improve our quality of life, grow prosperity, and create a thriving and resilient community – all while dramatically reducing our carbon footprint. The S/CAP builds on Palo Alto's historic leadership – and our successes exceeding the goals of our 2007 climate plan – to create an ambitious plan that also considers broader issues of sustainability, such as land use and biological resources.

On April 18, 2016<sup>7</sup>, Council adopted the S/CAP's "80x30" GHG reduction goal, "supported the draft S/CAP framework," and directed staff to return for further discussion of the S/CAP Guidelines as Design Principles, unanimously adopting those in turn November 28, 2016<sup>8</sup>.

Staff used the draft proposed S/CAP actions as the starting point for a near-term Sustainability Implementation Plan (SIP). Staff formed inter-departmental teams to develop a 2017 – 2020 Sustainability Implementation Plan to cover key S/CAP sections: Mobility, Efficiency and

<sup>&</sup>lt;sup>7</sup> http://www.cityofpaloalto.org/civicax/filebank/documents/52025

<sup>&</sup>lt;sup>8</sup> http://www.cityofpaloalto.org/civicax/filebank/documents/55242

Electrification, Water Management, Zero Waste & Circular Economy, Municipal Operations, Climate Adaptation & Resilience, Regeneration & Natural Environment, and Financing Strategies. Other S/CAP sections - Community Behavior, Culture, and Innovation; and Utility of the Future - will be developed in future work phases.

The Office of Sustainability led other departments in development of the 2017 – 2020 Sustainability Implementation Plan (SIP, being presented to Council as an action item tonight), delineating key initial actions towards fulfilling the S/CAP's 2030 goals, and building organizational capacity to carry out key strategies and actions which will enable Palo Alto to reduce GHG emissions 50% by 2020.

A more complete summary of the Sustainability and Climate Action Plan can be found in Attachment A: Summary of 2016 Sustainability and Climate Action Plan

# **GHG Emissions from City Operations**

Overall the performance of City Operations is mixed for 2016, with large declines in emissions from power generation facilities, street lights and traffic signals, and wastewater facilities; little change in emissions from vehicle fleet, and water delivery facilities, and continued increases in emissions from buildings & other facilities and solid waste facilities (Figure 2).

# Figure 2: City Operations GHG Emissions: 2005 and 2013-2016 (Hydro and PAG-adjusted)

Total Emissions Reduced from 42,000 MT in 2005 to 23,300 MT in 2016



Source: City of Palo Alto Utilities

More detailed analysis can be found in Attachment B: City Municipal Operations Emissions

## GHG Emissions from City and Community Activities

Combined City Municipal Operations and Palo Alto community emissions continue to decline. In 2016, overall City and Palo Alto GHG emissions were reduced an estimated 37% from 1990 levels, slightly less than 2% beyond 2015 reductions. As shown in Figure 3 below, estimated City and community transportation related emissions declined an additional 4% from 2015 reductions, due to both a decrease in Vehicle Miles Travelled and changes in fleet composition. Natural gas emissions increased slightly from 2015, by approximately 1 %, due in part to a colder fall and winter in 2016 than in 2015, which was warmer than average.

# Figure 3: Palo Alto Municipal Operations and Community GHG Emissions<sup>9</sup>

<sup>&</sup>lt;sup>9</sup> Total Emissions are weather adjusted, with biogenic emissions excluded. Net Brown Power (fossil fuel-based) electricity emissions taper down and are not present starting in 2013 because the CPAU began purchasing Renewable Energy Credits (RECs) to offset all the GHG emissions for this power source.



Source: City of Palo Alto Utilities

As illustrated in Figure 4 below, Palo Alto's largest single source of greenhouse gas emissions is transportation into, around, and through the City (approximately 66%), followed by natural gas use (approximately 29%).

While City Fleet Services reports a steady reduction in fuel consumption and emissions over the past years, the vast majority of transportation emissions are from residents, workers, and people to and from and doing business in Palo Alto. The City can't control the cars, but it can influence the driving environment. The S/CAP is exploring multiple strategies to help people shift from using single occupancy vehicles (which dominate the commute and around town traffic flows) to a comprehensive suite of attractive mobility options. OOS is working with its partners in the Planning Department, Development Services, Fleet Services, regional business and agencies and the community to envision, explore and assess a broad spectrum of approaches for transforming mobility within the City—supported by a \$1.085m "Mobility on Demand" grant from the US Department of Transportation for regional pilots of mobility alternatives.



Figure 4: 2016 Palo Alto Community-wide GHG Emissions<sup>10</sup> Sectors

In 2016, Palo Alto's Cool Block program – a pilot program of the Cool City Challenge –brought together 43 households within 12 neighborhood blocks who worked together on 1208 actions that eliminated 611,066 pounds of  $CO_2$  emissions-- an average 7.1 tons of  $CO_2$  per household.

The City of Palo Alto adopted a Zero Waste policy in 2005. Since then, Palo Alto has dramatically reduced the amount of material going into landfills. Palo Alto now has a waste diversion rate of 80 percent, up from a 63 percent diversion rate in 2005 (Figure 5).

# Figure 5: Annual Diversion Rate, 1995-2014

Source: City of Palo Alto Utilities

<sup>&</sup>lt;sup>10</sup> Total Emissions are weather adjusted, with biogenic emissions excluded



A breakdown of actual emissions numbers can be found in Attachment C: Palo Alto Community and City Municipal Operations GHG Emission

## GHG Emissions from City of Palo Alto Utilities

Palo Alto's biggest source of leverage to increase resource efficiency and reduce carbon impacts resides with its largest municipal business entity: City of Palo Alto Utilities (CPAU).

The City's electricity supply has been carbon neutral since 2013, when Council approved a Carbon Neutral Electric Resource Plan, committing Palo Alto to pursuing only carbon-neutral electric resources and effectively eliminating all GHG emissions from the City's electric portfolio (Figure 6). The 2016 Solar group-buy discount program, Bay Area SunShares, resulted in 28 kW of new local solar. 94 CPAU customers installed net metered PV systems in 2016 for a total capacity of 541 kW (~0.1% of load). The City added 80 megawatts (MW) of clean, renewable energy to its carbon neutral electric resources portfolio in 2016, resulting in more than 150 MW of solar power commitments throughout California. By bringing these facilities online, solar energy will now supply about one-third of Palo Alto's total electricity needs on an annual basis. With the addition of renewable energy from these projects to other renewable resources including PA CLEAN, wind, small hydro, and landfill gas, the City is on track to reach a Renewable Portfolio Standard (RPS) of up to 60 percent in 2017. For comparison, in 2015 California adopted one of the most aggressive RPS policies in the country, requiring that all utilities in the state supply 50 percent of their retail electric sales from eligible renewable energy resources by the year 2030.





Source: City of Palo Alto Utilities

Council unanimously approved Palo Alto's "Carbon Neutral Natural Gas Plan" on December 5, 2016 meeting, one week after approving the S/CAP Framework. The Natural Gas Plan achieves carbon neutrality for the gas supply portfolio by 1) purchasing high-quality environmental offsets equivalent to our City and community natural gas emissions (~29% of our carbon footprint); 2) pursuing efficiency strategies to reduce natural gas use, and 3) seeking opportunities to fund *local* offsets that finance actual emissions reductions in Palo Alto and the surrounding region.

Overall residential per capita utility consumption of resources from CPAU has been steadily declining since FY 2007 (Figure 7), contributing to overall GHG emissions reductions; but energy and natural gas use ticked up last year - due in part to a colder fall and winter in 2016 than in 2015, which was warmer than average - while per capita water use continued to decline significantly.



Figure 7: Residential Per Capita Utility Consumption Declining

Source: City of Palo Alto Utilities

# Water Consumption and Considerations

The City of Palo Alto's Urban Water Management Plan (UWMP) was updated in May of 2016. The UWMP incudes an assessment of the reliability of the City's water sources, an analysis of water demand, identification of alternative water supply sources, a description of water conservation efforts, and a water shortage contingency plan.

Although the City has experienced several drought periods since 1975, the most recent drought has had a particularly profound effect on City and customer attitudes regarding water. The current state-mandated water use reductions resulted in large numbers of landscape conversion projects as well as a dramatic shift in customer behavior regarding water use. In addition, new construction in every sector is subject to increasingly stringent regulations regarding water-using appliances and fixtures.

Because many permanent water use changes including landscape conversion has occurred as a result of rebate programs and public outreach, and because staff detects a shift in the community's attitude regarding water use, the City's water consumption is forecast to remain relatively stable in the future, with slight increases due to a post-drought rebound and

continued increases in economic development and population. By 2025, it is predicted that the overall trend of decreasing per capita water use will resume.

In 2015 residential and multi-family water sales were responsible for 60% of total water consumption in the City. The business sectors including commercial and industrial customers consume 23%, while irrigation customers consumed 11%. Public and City facilities consume the remaining 6%. The relative share of water consumed has not changed significantly between customer types since 2010.

CPAU data shows that total residential water consumption declined 17% from FY 16 to FY 15, and has declined 40% since FY 07. Much of the decline since FY 07 has come in the last two fiscal years, largely as a result of the community's exceptional response to the current drought conditions. Total commercial, industrial research and City Facilities water consumption declined 11% from FY 16 to FY 15, and has declined 21% since FY 07.

# Highlights and Accomplishments from City Departments

Staff is implementing more than 150 sustainability programs across the city. This section provides a summary of key activities.

Administrative Services (ASD) and Public Works (PWD) – Green Purchasing: The City's awardwinning green purchasing program has "greened" several performance criteria for structural and landscaping pest control, custodial and office supplies, and computers. The City has reduced the use of single-use plastics (bottled water, plastic bags, plastic packaging), reduced the toxicity and amount of pesticides used, and virtually eliminated products that contain mercury and dioxins. The City incrementally embeds green purchasing into its procurement procedures by revising forms, contract specifications, and contract Terms and Conditions.

*City of Palo Alto Utilities (CPAU):* Many new programs were introduced in 2016. Council approved a carbon-neutral gas plan using environmental offsets. With customers focusing on the drought, water and gas savings were high. Electric savings were just below target. The City's Renewal Portfolio Standard was 26.0% in 2015, and 40.2% in 2016. Executed contracts will result in RPS of 59.9% in 2017, with the remaining supply coming from hydro resources. The 2016 Solar group-buy discount program, Bay Area SunShares, resulted in 28 kW of new local solar. 94 CPAU customers installed a net metered PV system in 2016 for a total capacity of 541 kW (~0.1% of load). In May 2016, CPAU launched a pilot program to promote heat-pump water heaters. Rebate program for EV chargers using LCFS funds was launched in January 2017. Electric vehicle count in Palo Alto is estimated at around 2,000 at the end of 2016.

**Community Services (CSD):** Community Services Department maintains over 4,000 acres of parkland. CSD reduced potable water use by approximately 25% through strategic reductions in irrigation in open space, parks, and golf courses. Posted signs at every park and preserve highlighting the City's conservation efforts in order to lead by example. Partnered with environmental organizations and volunteers to improve habitat by removing 18,591 pounds

invasive weeds and planting a total of 10,216 native plants – 8,519 native plants were planted in the Baylands Nature Preserve and 1,697 native plants were planted in Pearson Arastradero Preserve.

**Development Services (DSD):** Developed and gained approval on two sustainability ordinances related to green building, the green building ordinance and the energy reach code ordinance, both going into effect January 1, 2017. The new Energy Ordinance will focus on energy efficiency with solar power as a method for compliance. Presented an update on the Electrification Study in March 2017 in accordance with the Electrification Study work plan, which studied barriers and opportunities in the pursuit of electrification.

*Library (PACL):* Library buildings include information about energy use and conservation, model new thinking regarding public building design, and sustain materials collections that aid customer education about all aspects of sustainability and the environment. PACL continues to host events and provide programs to all ages that passively or purposefully provide examples to demonstrate some aspect of sustainable practices. For example, nearly all crafts programs incorporate reuse of materials. Installed Bike Repair stations at Mitchell Park and Rinconada Libraries.

*Office of Emergency Services (OES):* Evaluating (cost-effective and practical) means to expand the use of renewables to reduce the risk of power disruption for certain facilities. OES retained an outside expert to evaluate the existing photovoltaic (PV) grid-tied panel system and propose a design to add a battery back-up capability, so that certain locations and systems at Cubberley would remain operational even in a grid-down scenario. OES designed, developed, and now operates several vehicles and units of portable equipment, such as the Mobile Emergency Operations Center (MEOC). In addition to these energy assurance efforts, OES leads a number of other community resilience efforts, including the Emergency Services Volunteer (ESV) program that encompasses CERT, Neighborhood Watch, and other programs (www.cityofpaloalto.org/emergencyvolunteers), support of Stanford University and affiliates (such as Stanford Hospital), regional public safety planning efforts, regional training programs, coordination with private sector entities for emergency response and recovery, technology development for public safety, grant management, and other all hazards activities.

*Office of Sustainability (OOS):* Held a community summit on January 24, 2016 that brought together more than 500 engaged and committed citizens who worked on the challenges of water, energy, and transportation; their ideas fed into the Sustainability and Climate Action Plan (S/CAP), described above, which has since been approved by Council. Developed a Financial Scan & Toolkit categorizing 44 "other than General Fund" options for financing City sustainability initiatives, and conducted two workshops. Won a \$1 million federal grant for a demonstration project to reduce single-occupant vehicle driving from 75 percent to 50 percent in the Bay area using commuter trip reduction software, a multimodal trip planning app and workplace parking rebates. Led the City in joining the U.S. Mayors' National Climate Action Agenda (MNCAA), which authored two letters to President Obama and two letters to President

Trump. Built sustainability considerations, commitments and capacity into City operations through actions such as creating an Electric Vehicle Supply Equipment (EVSE) Task Force, developing an Electric Vehicle (EV) Charging Pricing Policy, reporting GHG emissions to Climate Registry (TCR) and the Carbon Disclosure Project (CDP), and initiating a Sustainability purchasing audit. Hired two two half-time, limited term employees.

**Planning and Community Environment (PCE)**: Aligning the Comprehensive Plan for Palo Alto Update with the adopted Sustainability/Climate Action Plan and evolving implementation plans to the extent feasible, completing the analysis of Scenarios 5 & 6 for inclusion in the Comprehensive Plan Update Environmental Impact Report (EIR), assessing a more balanced approach to jobs and housing developing strategies to increase trip frequency and ridership of the expanded free shuttle service, supported activities of the new Transportation Management Association to reduce Single Occupancy Vehicle trips to/from downtown.

**Public Works – Engineering & Public Services:** Through various Capital Improvement Projects, Public Works is working to use energy more efficiently and reduce water usage through actions such as including drought-tolerant landscaping and trees and more efficient irrigation systems in park renovations and utilizing efficient LED lighting, more efficient HVAC systems, cool roofing materials, and water saving fixtures in building projects. Utility Track Software has been acquired and installed in Facilities Management in order to benchmark and compare with similar buildings in the state and the nation, and identify and prioritize opportunities for improvement.

*Public Works – Fleet:* The City has been steadily decreasing its unleaded fuel and diesel consumption, decreasing its fuel consumption by more than 17,000 gallons and its diesel consumption by almost 35,000 gallons from 2006 to 2016. These reductions contributed to the Fleet reducing GHG emissions 28.7% from a 2005 baseline year, which includes a 5% reduction from 2015. In addition, the City's overall propane consumption is down due in part to modernization steps taken in Fleet.

**Public Works – Watershed Protection**: Regional Water Quality Control Plant (RWQCP) GHG emissions decreased by more than 60% since 1990. RWQCP total recycled water usage remained relatively constant from 2015 to 2016 with a 1% decrease from 220 million gallons in 2015 to 218 million gallons in 2016. In 2016, 85 active recycled water permits were reviewed and approved for use; this is a 40% increase from 2015 when 61 recycled water permits were active. The City of Palo Alto not only met the Bay Area Municipal Regional Permit 60% trash reduction guideline, but also met the 70% trash reduction requirement one year ahead of schedule by reducing trash 84% by July 2016.

**Public Works – Zero Waste & Landfill:** The City now has a waste diversion rate of 80 percent, up from a 63 percent diversion rate in 2005. In April 2016, the City began implementing the first phase of the Recycling and Composting Ordinance that required all large businesses and institutions, food service establishments, and multifamily complexes to subscribe to compost

services. The City anticipates that this ordinance will dramatically increase the amount of food scraps composted and kept from the landfill. The City has partnered with GoBox to provide an easy to use "to go" container for downtown Palo Alto lunchtime eaters. The City has also partnered with Rethink Disposables to provide technical support to local restaurants on how they can save money and reduce their environmental footprint by switching from disposable food service ware to reusables. The landfill closure work was completed in November 2015. The overall the trend in City of Palo Alto landfill GHG emissions is downward. Fluctuations in GHG emissions are likely the result of closure activities.

Expanded departmental reports, including goals, activities and challenges, can be found in Attachment D.

The City continues to gain acknowledgement for its leadership. Some of the awards won in the last year include<sup>11</sup>:

Date	Organization Giving Award or Recognition	Person/Program Receiving Award or Recognition	Title and Description of Award or Recognition
2016	California Energy Efficiency Industry Council	Development Services Department	Energy Champion Award - recognizes key businesses and policy leaders in California who have shown excellence in advancing energy efficiency
2016	League of American Bicyclists	City of Palo Alto	The City was awarded gold level status as a Bicycle Friendly Community.
2016	Moody's	City of Palo Alto Water Enterprise	Moody's upgraded the City's Water Enterprise bond rating from Aa2 to Aa1, a rare event for water operations.
2016	Solar Electric Power Association	CPAU Solar Programs	Top Ten list of utilities that integrated the most solar into the grid. #3 on the Watts-per-Customer list for 2015.
2016	Arbor Day Foundation	City of Palo Alto Utilities	Tree Line USA Utility - In recognition of quality tree care, annual worker training, tree planting, and public education

<sup>&</sup>lt;sup>11</sup> <u>http://www.cityofpaloalto.org/gov/depts/utl/about/awards.asp</u> & http://www.cityofpaloalto.org/services/sustainability/sustainability\_news.asp

## **Future Vision and Challenges**

There is challenging work ahead. The completed Sustainability and Climate Action Plan (S/CAP), including the implementation plan currently in development, will provide a roadmap for how the City will continue its environmental stewardship and exceed state goals for GHG emission reductions. The Sustainability Implementation Plan will lay out the initial steps the City will need to take in 2017-2020 to both progress toward our established goals—and to build the organizational capacity and flexible platforms that will enable us to respond effectively to the changes that we will no doubt encounter on the road to 2030— will help Palo Alto continue its forward progress.

Planning in the face of uncertainty is not a familiar practice for the City—nor for any City—but the traditional practice of extrapolating from past trends will not be sufficient in a world of rapid and sometimes exponential change. The City is addressing that challenge with 2030 goals and strategies that are high level, directional and aspirational. We understand the major moves that will need to be made over the next 14 years, and the specific moves that will need to be made in the next four, and recognize that much of the mid- and long-term plan will emerge as we orient, experiment and learn, and update the plan as we go.

In order to do that effectively, staff and community will need to take an agile, experimental approach—taking and testing small steps, which in turn are steered by the SCAP Guidelines, Principles and Decision Criteria; learning from those initial explorations and experiments; and embedding our learnings into City policies, programs, practices and management systems. And we will need to find ways to not let "what we already know" stand in the way of "what we might be able to learn."

Some of the specific challenges the City faces (in addition to the uncertain Federal policy environment) include:

- Matching City processes to the pace of change
  - As climate change accelerates, and in technology capabilities, price and performance continue to accelerate, existing processes may make it difficult for the City to make timely decision. (For example, when SCAP when finally approved with be two years old, based on three year old analyses.)
- Continuing to encourage water conservation even as the urgency Palo Altans feel toward conservation is alleviated as Palo Alto exits drought conditions.
  - Over the long term, climate change will likely result in an ever-increasing need for conservation. California may face a "multi-decadal mega-drought"<sup>12</sup> in the future, raising potential challenges for both water supply and hydroelectric power supply.
- Monitoring the changes to the electric industry as it is affected by increasing solar penetration, electric vehicle adoption, controllable electric loads, and other factors and determining what changes the utility may need to make to adapt.

<sup>&</sup>lt;sup>12</sup> See, for example, https://uanews.arizona.edu/story/southwest-may-face-megadrought-in-this-century-ua-researchers-find

- The rapidly declining price of renewables, the rapid growth of distributed energy resources (DER) and storage, and the potential evolution of utility industry business models present strategic challenges and opportunities for CPAU. Previously framed as the Utility of the Future chapter of the S/CAP, this will be addressed in the upcoming CPAU Strategic Plan.
- Potential changes in relevant federal, state and regional policy
  - Development Services, for example, faces continuous change in the area of state, local, and federal policy, and the changing policies don't always align with the specific needs of Palo Alto.
- Consistent assessment and efficiency enhancement of City buildings and fleet
  - While the City has made substantial progress in these realms, City facilities have not been subject to regular efficiency assessments, and Fleet has found it challenging to implement the City Manager's "EVs first" policy, due to fleet utilization patterns.
- Managing S/CAP implementation
  - Staffing constraints in departments and OOS will put a premium on better coordination and more effective [performance tracking and information sharing.
- Understanding and reducing Scope 3 emissions<sup>13</sup> (e.g. from purchases of computers, furniture, cheeseburgers, etc.).
  - While not part of climate reporting protocols, Scope 3 emissions can be a significant part of a community's GHG emissions<sup>14,</sup> and will only be shifted through cultural and behavioral changes, not policy and regulation. Some Scope 3 emissions, such as employee commuting and waste disposal, are already being addressed by the S/CAP and the 2017 2020 Sustainability Implementation Plan. But there are many other Scope 3 emissions—especially the emissions "embedded" in City and community purchases—that need further examination. The next phase of the City's climate and sustainability planning will need to take this into account.
- Developing, consolidating and using sustainability performance dashboards.
  - The City has at least five sustainability dashboard projects in various degrees of active use. We have the opportunity to consolidate these platforms, and use them more actively to support better decision making and more timely staff and community understanding.
- Nurturing a culture of agility, experimentation and emergence in City government
  - The City's planning cycles and inclusive deliberative processes have the benefit

<sup>&</sup>lt;sup>13</sup> The most widely-used international accounting tool, the GHG Protocol, categorizes GHG emissions into three groups or "scopes". Scope 1 covers all direct GHG emissions, such as fuel combustion. Scope 2 covers indirect GHG emissions from consumption of purchased electricity, heat or steam. Scope 3 covers other indirect emissions, such as those engendered by purchased goods and services, production of purchased goods, emissions from the use of sold products, business travel, employee commuting, transportation and distribution of electricity, and waste disposal.

<sup>&</sup>lt;sup>14</sup> <u>Greenhouse Gas Protocol Corporate Value Chain (Scope 3) Accounting and Reporting Standard:</u> <u>http://www.ghgprotocol.org/standards/scope-3-standard</u>

of inclusiveness but a pace that sometimes means missed opportunities, and a welcome rigor that sometimes encourages over-specification in projects that are intrinsically "emergent." S/CAP and the SIPs offer an opportunity to test more agile approaches to decision making and project management that could support faster learning cycles while preserving accountability.

- Addressing adaptation and resilience choices in the face of sea level rise and other dimensions of climate change
  - These "big and slow" issues present both opportunities and tough questions. For example, what is the comparative economic and resilience value of investing in a second point connection to the power grid vs. expanding local electrical power generation?
- Financing strategies.
  - The S/CAP analysis estimates that meeting Palo Alto's 2030 S/CAP goals will require a public investment of \$10 million (leveraging private investment of \$760 million), estimated to generate an attractive Net Present Value<sup>15</sup> (NPV) of \$400 million. Nonetheless, however attractive the rate of return, the funds must come from somewhere, and the City's financing capacity is finite and faces competing needs. The Sustainability Finance Toolkit<sup>16</sup>, developed by the City in collaboration with the USDN, evaluates more than 40 financing mechanisms—including carbon pricing, finds and taxes—that could complement General Fund and Enterprise Fund resources in support of Palo Alto's sustainability and climate goals.

## Attachments

Attachment A: Summary of 2016 Sustainability and Climate Action Plan Attachment B: City Municipal Operations Emissions Attachment C: Palo Alto Community and City Municipal Operations GHG Emission Attachment D: Highlights of Sustainability Initiatives by City Municipal Operations Attachment E: Sustainability Policy and Organizational Structure

# Timeline, Resource Impact, Policy Implications, Environmental Review (If Applicable) Attachments:

- Attachment A: Summary of Sustainability and Climate Action Plan
- Attachment B: City Municipal Operations Emissions
- Attachment C: Palo Alto Community and City Municipal Operations GHG Emission
- Attachment D: Highlights of Sustainability Initiatives by City Municipal Operations
- Attachment E: Sustainability Policy and Organizational Structure

<sup>&</sup>lt;sup>15</sup> Net Present Value, defined as the present value of the future net cash flows from an investment project, evaluates the relative worthiness of an investment.

<sup>&</sup>lt;sup>16</sup> <u>http://usdn.org/public/page/32/Government-Operations</u>

## Attachment A: Summary of 2016 Sustainability and Climate Action Plan

#### Summary Description of the 2016 Sustainability and Climate Action Plan

On April 18, 2016 the Palo Alto City Council unanimously approved the primary goal of the S/CAP - achieving an 80% reduction in Greenhouse Gases (GHGs) below 1990 levels by 2030<sup>1</sup>.

On November 28, 2016, Council adopted the Sustainability and Climate Action Plan (S/CAP) Framework, including its Guiding Principles, Decision Criteria, Design Principles, and key Goals and Strategies, as the road map for development of subsequent S/CAP Implementation Plans<sup>2</sup>.

As of the end of 2016 Palo Alto reduced GHG emissions an estimated 38% since 1990<sup>3</sup>. (See Figure 1) Palo Alto's largest remaining sources of greenhouse gas emissions are road transportation (approximately 66%) followed by natural gas use (approximately 29%). Figure 2 illustrates the current sources breakdown more clearly. Figure 3 provides another view of the relative size of Palo Alto's emissions sources.

Over the next 13 years, a variety of external drivers, including Federal and state policy (such as building efficiency and vehicle efficiency standards) and demographic changes, are expected to reduce Palo Alto emissions to an estimated 45% below 1990 emissions by  $2030^4$ —in line with the State of California's recently approved 2030 reduction target of 40%. Initiatives that the City has already approved or set in motion (such as existing City of Palo Alto Utilities (CPAU) efficiency incentive programs, Palo Alto's existing Green Building Ordinance and Reach Code, and the Bicycle and Pedestrian Plan), will bring emissions down to an estimated 52% of 1990 levels by 2030. These trajectories are shown in Figure 3.

The additional GHG reduction between those already "in-the-pipeline" reductions and the 80% reduction target for 2030 is about 224,600 metric tons (MT) CO2e<sup>5</sup>, and is Palo Alto's target "GHG reduction budget." The S/CAP projects that 117,900 MT CO2e, or more than half of the needed additional reductions, can come from mobility related measures, 97,200 MT CO2e, or just under half from efficiency and fuel switching measures (largely in buildings), and 9,500 MT CO2e, or 4% from continuation and extension of Palo Alto's zero waste initiatives. These emission reduction budgets are shown in Figure 4.

<sup>&</sup>lt;sup>1</sup> Staff Report 6754: Sustainability/Climate Action Plan and Annual Earth Day Report,

http://www.cityofpaloalto.org/civicax/filebank/documents/51856

<sup>&</sup>lt;sup>2</sup> Staff Report 7304: Discuss and Approve S/CAP Framework, Principles & Guidelines,

http://www.cityofpaloalto.org/civicax/filebank/documents/54865

<sup>&</sup>lt;sup>3</sup> Palo Alto emissions in the 1990 baseline year are estimated at 780,119 MT CO2e, a restatement of prior estimates based on revised analyses using updated emissions models. Most emissions noted in this report as called "estimates," since only utility consumption (electricity, natural gas and water) are actually measured. Transportation emissions are modeled every few years; solid waste related emissions are calculated using established EPA protocols, and lag by one year. Solid waste related emissions were not included in the CompPlan DEIR.

<sup>&</sup>lt;sup>4</sup> Based on the "business as usual" analysis conducted for the CompPlan DEIR.

<sup>&</sup>lt;sup>5</sup> MT CO2e = metric tons of CO2 equivalent



Figure 1. Palo Alto Community-wide GHG Emissions<sup>6</sup> (MT CO2e)<sup>7</sup>

Source: City of Palo Alto Utilities

<sup>&</sup>lt;sup>6</sup> Total Emissions are weather adjusted, with biogenic emissions excluded

<sup>&</sup>lt;sup>7</sup> Net Brown Power (fossil fuel-based) electricity emissions taper down and are not present starting in 2013 because CPAU began purchasing Renewable Energy Credits (RECs) to offset all the GHG emissions for this power source, and replacing brown power with increasing purchases of renewable energy.



Figure 2. 2016 Palo Alto Community-wide GHG Emissions<sup>8</sup> Sectors

Source: City of Palo Alto Utilities



**Figure 3. Overview of Palo Alto GHG Reduction Target relative to Business-as-Usual (MT CO2e)** 

The S/CAP focuses on pathways to a low-carbon future, and initiatives addressing mobility, energy, city operations, water, green infrastructure, adaptation and regeneration as part of a holistic framework for sustainability. Specifically, it contains Goals and Strategies for reducing

<sup>&</sup>lt;sup>8</sup> Total Emissions are weather adjusted, with biogenic emissions excluded

Palo Alto's GHG emissions from the current level of 38% below 1990 levels to 80% below 1990 levels by 2030 ("80x30"), 20 years ahead of the State of California 80x50 target. This represents a GHG reduction "budget" of approximated 224,600 MT CO2e (as shown in Figure 4 below).



Figure 4: 80x30 GHG Reduction Budget (MT CO2e)

The S/CAP is organized around ten sustainability chapters, including some without direct quantifiable impacts on greenhouse gas emissions, but which are central to a holistic approach for sustainability in Palo Alto that protects and enhances our natural resources for generations to come. The Goals and Strategies for GHG reduction are summarized below:

- Mobility:
  - *Make it more convenient not to drive* by developing responsive, multimodal, service-focused transportation services
  - Shift subsidies from free parking to support non-SOV travel
  - o Encourage land use patterns that reduce both congestion and climate impacts.
  - Support policy changes that **promote EV charging infrastructure** in public and private development and that encourage EV use by residents and commuters
- Building Energy Efficiency & Electrification:
  - *Pursue large gains in energy, and materials efficiency* in buildings and operations
  - Pursue the adoption of an Energy Reach Code that drives energy efficiency through our building codes
  - o Emphasize *integrative design* and *streamlined policy* approaches
  - Explore *building stock upgrades* to Zero Net Energy or Net Positive through design, efficiency, renewables and bundled services packages

- **Encourage all-electric** new construction (if technically and legally feasible, cost effective and directed by City Council)
- *Rapidly upgrade existing building stock* resource efficiency (residential and commercial)
- Support a systematic *shift from natural gas to all-electric systems<sup>9</sup> and/or renewable natural gas* (if technically and legally feasible, cost-effective and directed by City Council)
- Zero Waste and the Circular Economy
  - o Divert 95% of Waste from Landfills by 2030, and ultimately achieve Zero waste
  - *Minimize Energy and Pollution* from waste collection, transportation and processing
- Water Management:
  - o Reduce Water Use
  - Utilize *the right water* quality for the right use
  - Ensure *sufficient water* quality and quantity
  - Protect the Bay, other Surface Waters, and Groundwater
  - Lead in Sustainable Water Management
- Sea Level Rise Response:
  - o **Plan** for the Coming Changes in our Climate and Environment
  - Protect the City from Climate Change-Induced Hazards
  - *Adapt* to Current and Projected Environmental Conditions
  - *Empower* the Local Community and Foster Regional Collaboration
- Municipal Operations Leading the Way
  - Create Energy and Water *Efficient City Buildings*
  - Minimize *City Fleet* Emissions and Maximize its Efficiency
  - "Default to Green" purchasing for products and services
  - o *Embed sustainability* in city procurement, operations and management
  - *Set targets and tracking performance metrics* for City sustainability performance
  - "Walk the talk" by ensuring the City goes first on any sustainability actions requested or required of the community
- Natural Environment Protection:
  - o Renew, Restore, and Enhance resilience of our natural environment
  - Align Planning for Management of our Natural Environment with the S/CAP and other key City Plans
  - o Maximize Carbon Sequestration and Storage in the Natural Environment
- Utility of the Future:
  - Adapt CPAU offerings and business model to potentially disruptive challenges facing the utility industry, including distributed generation & storage, and "grid defection"
  - *Explore micro-grids, nano-grids* and other resilience strategies

<sup>&</sup>lt;sup>9</sup> See analysis of electrification strategies, Staff Report 5971, August 2015

- Community Behavior and Culture Change
  - Challenge community to *consider the impact on future generations* of choices in lifestyle, purchases and investment.
  - Engage and support community through *neighborhood initiatives*, interactive tools, etc.
- Information systems:
  - *Advance "smart city" platforms* for transportation, utilities, buildings, operations, finance, etc.
  - Provide *transparent reporting and open data* to track performance, build knowledge and fuel innovation
- Financing Strategies:
  - *Finance cost-effective initiative* through multi-channel, non-general fund, local and external investment in support of these goals, to the extent permitted by existing legal and regulatory framework applicable to the City.

Council approved (November 28, 2016) a set of guiding principles, design principles and decision criteria to guide decision-making. In both evaluating the S/CAP, and in developing and evaluating future programs guided by it, the City is guided by the guiding principles and design principles below. In selecting specific programs and policies to pursue, and in allocating public resources to support them, the City will be guided by the decision criteria below:

#### **Guiding Principles**

The Vision Statement for the 1998 Comprehensive Plan Governance Element declares that: "Palo Alto will maintain a positive civic image and be a leader in the regional, state, and national policy discussions affecting the community. The City will work with neighboring communities to address common concerns and pursue common interests. The public will be actively and effectively involved in City affairs, both at the Citywide and neighborhood levels."<sup>10</sup>

S/CAP builds on that vision with these guiding principles as a basis for effective and sustainable decision-making:

- Consider "sustainability" in its broadest dimensions, including quality of life, the natural environment and resilience, not just climate change and greenhouse gas emissions reductions.
- Address the sustainability issues most important to the community and select most cost-effective programs and policies—recognizing that this will entail moral and political, as well as economic, decision factors.
- Seek to improve quality of life as well as environmental quality, economic health and social equity.
- Foster a prosperous, robust and inclusive economy.
- Build resilience—both physical and cultural—throughout the community.

<sup>&</sup>lt;sup>10</sup> http://www.paloaltocompplan.org/plan-contents/governance-element/

- Include diverse perspectives from all community stakeholders, residents, and businesses.
- Recognize Palo Alto's role as a leader and linkages with regional, national and global community.

#### **Design Principles**

- Focus on what's feasible—recognizing that technology and costs are shifting rapidly.
- Prioritize actions that are in the City's control recognizing that we can urge others to join us, but leading by example is most effective
- Be specific about the actions and costs to achieve near-term goals, while accepting that longer-term goals can be more aspirational
- Use ambient resources: Maximize the efficient capture and use of the energy and water that fall on Palo Alto.
- Full cost accounting: Use total (life cycle) cost of ownership and consideration of externalities to guide financial decisions, while focusing on emission reductions that achievable at a point in time (i.e. not on life cycle emissions).
- Align incentives: Ensure that subsidies, if any, and other investment of public resources encourage what we want and discourage what we don't want.
- Flexible platforms: Take practical near term steps that expand rather than restrict capacity for future actions and pivots.

#### **Decision Criteria**

- Greenhouse gas impact
- Quality of life impact
- Mitigation cost
- Return on investment (ROI)
- Ecosystem health
- Resilience
- Impact on future generations

Council directed Staff to create a Sustainability Implementation Plan (SIP) specifying actions needed to build City capacity to achieve the "80x30" GHG reduction goal. Staff used proposed S/CAP actions to construct a near-term SIP. Staff formed inter-departmental teams to develop a 2017 – 2020 Sustainability Implementation Plan to cover key S/CAP sections: Mobility, Efficiency and Electrification, Water Management, Zero Waste & Circular Economy, Municipal Operations, Climate Adaptation & Resilience, Regeneration & Natural Environment, and Financing Strategies. Other S/CAP sections - Community Behavior, Culture, and Innovation; and Utility of the Future - will be developed in future work phases.

# Attachment B: GHG Emissions of City Municipal Operations: Comparison Data

City municipal operations related emissions drivers and associated emissions are shown below.

## Table B1: City Operations GHG Emission in 2005 and 2013-2016 (in MT of CO<sub>2</sub> equivalent)

- Biogenic and Anthropogenic, not normalized for hydro conditions or PAG purchases -

	2005				2013			2014		2015		2016			
	Scope 1	Biogenic	Scope 2	Scope 1	Biogenic	Scope 2									
Buildings and Other Facilities	8,723	0	1,819	5,365	0	0	8,177	0	0	8,053	0	0	9,767	0	0
Streetlights and Traffic Signals	0	0	689	0	0	0	0	0	0	0	0	0	0	0	0
Water Delivery Facilities	2	0	67	91	0	0	41	0	0	54	0	0	79	0	0
Wastewater Facilities	8,504	16,689	2,546	5,024	11,183	0	4,913	10,861	0	5,840	11,054	0	5 <i>,</i> 892	17,462	0
Vehicle Fleet	2,835	1	0	2,399	0	0	2,523	0	0	2,373	0	0	1,903	0	0
Power Generation Facilities	0	0	8,570	0	0	0	23	0	0	333	0	0	468	0	0
Solid Waste Facilities	6,846	2,994	29	6,642	2,919	0	8,470	6,436	0	8,014	5,941	0	10,160	6,120	0
Other Processes & Fugitive Emissions	3	0	0	4	0	0	4	0	0	6	0	0	4	0	0
TOTAL	26,912	19,684	13,720	19,525	14,102	0	24,151	17,297	0	24,673	16,995	0	28,273	23,582	0

Scope 1 and Scope 2 emissions are non-biogenic emissions that are caused by human activity. Biogenic emissions are assumed to be net carbon neutral and not reported under GHG emission reporting protocols. Scope 2 emissions from electricity were eliminated starting in 2013 by the purchase of Renewable Energy Credits (RECs) under the Carbon Neutral Plan. Table B2 below shows the transformation of the data in Table B1 above by excluding biogenic emissions, and shows a 30.4% reduction in Scope 1 and Scope 2 emissions from the 2005 baseline.

GHG Emissions comparison (Scope 1 & 2)	2005	2013	2014	2015	2016
Water Delivery Facilities	69	91	41	54	79
Wastewater Facilities	11,049	5,024	4,913	5,840	5,892
Vehicle Fleet	2,835	2,399	2,523	2,373	1,903
Streetlights & Traffic Signals	689	0	0	0	0
Solid Waste Facilities	6,876	6,642	8,470	8,014	10,160
Power Generation Facilities	8,570	0	23	333	468
Buildings & Other Facilities	10,542	5,365	8,177	8,053	9,767
TOTAL	40,629	19,521	24,147	24,667	28,269
Percentage reduction from 2005 baseline		52.0%	40.6%	39.3%	30.4%

Table B2: City Operations GHG Emission in 2005 and 2013-2016 (in MT of  $CO_2$  equivalent)

Excludes Biogenic, not normalized for hydro conditions or PAG purchases

Table B2 does not include the effects of the purchase of PaloAltoGreen resources and the normalization of the vagaries of hydroelectric supply conditions. Table B3 below *does* adjust for these two effects and shows a 44.2% reduction in emissions from the 2005 baseline year.

Table B3: City Operations GHG Emission in 2005 and 2013-	2016 (in MT of CO <sub>2</sub> equivalent)
Excludes Biogenic, normalized for hydro conditions a	and PAG purchases

GHG Emissions comparison (Scope 1 & 2)	2005	2013	2014	2015	2016
Water Delivery Facilities	74	91	41	54	78
Wastewater Facilities	11,269	5,024	4,616	4,225	2,914
Vehicle Fleet	2,835	2,399	2,346	2,373	1,903
Streetlights & Traffic Signals	748	0	0	0	0
Solid Waste Facilities	6,878	6,642	8,470	8,014	10,160
Power Generation Facilities	9,308	0	23	173	54
Buildings & Other Facilities	10,698	5,365	8,175	7,060	8,216
TOTAL	41,811	19,521	23,670	21,899	23,326
Percentage reduction from 2005 baseline		53.3%	43.4%	47.6%	44.2%

Figure 1 below graphically illustrates Table B3 and is a reproduction of Figure 1 from the body of the report.



Figure 1: City Operations GHG Emissions: 2005 and 2013-2016 (Hydro and PAG-adjusted) Total Emissions Reduced from 42,000 MT in 2005 to 23,300 MT in 2016

The primary drivers for GHG emission reduction performance are:

- Building and Other Facilities Due to enactment of the Carbon Neutral Plan in March 2013, all electricity consumed by the City in 2013 had zero carbon emissions. The City began purchasing carbon offsets through the PaloAltoGreen Gas (PAGG) program in July 2015, which reduced emissions from natural gas consumption relative to 2014. Increased natural gas usage (even with PAGG offsets) increased emissions in 2016.
- Power Generation Facilities This category accounts for transmission and distribution system losses. The City divested its ownership of the COTP transmission line in 2009, resulting in a lower loss allocation to the City. Distribution loss-related emissions also were eliminated in 2013 due to carbon neutral electric supplies.
- Solid Waste Facilities Closure and capping of the landfill, resulting in less methane production and leakage in CY 2012. Higher collection and improved monitoring,

combustion of biogenic landfill gas through flaring, and uncaptured methane leakage have resulted in increased emissions since 2014.

- Streetlights and Traffic Signals No emissions are reported due to conversions to highly efficient LED streetlights (note, only metered fixtures are shown) and carbon neutral electricity supply.
- Vehicle Fleet Fleet Services saw a slight reduction in consumption of CNG fuels in 2016.
- Wastewater Facilities 74% emissions reduction from 2005 baseline reflects use of landfill gas for incinerator, optimized use of gas from incinerator tuning, and use of carbon neutral electricity. The 31% decrease from 2015 was due to purchasing PaloAltoGreen Gas (PAGG) for use in the incinerator.
- Water Delivery Facilities There has been fluctuating energy use for water pumping, with a decrease in activity for 2014 and 2015.

## Attachment C: Palo Alto Community & City Municipal Operations GHG Emission: Restated reduction of 35% since 2005, 37% since 1990

	1990*	***	2005 2013		2014		2015		2016		1		
	Consumption Quantity	Emissions (MT of CO2e)	Consumption Quantity	Emissions (MT of CO2e)	Consumption Quantity	Emissions (MT of CO2e)	Consumption Quantity	Emissions (MT of CO2e)	Consumption Quantity	Emissions (MT of CO2e)	Consumption Quantity	Emissions (MT of CO2e)	Notes
Scope 1 Emissions			_		-								
Natural Gas Use (therms)	36,589,986	194,000	31,374,970	166,350	30,336,076	160,842	26,103,713	138,402	25,491,698	135,153	25,846,328	137,141	1
Natural Gas Distribution Leakage		4,718		4,718		4,718		4,781		4,781		4,781	2
Palo Alto Landfill Fugitive Emissions		24,325		9,900		5,110		9,427		8,617		6,527	3
Palo Alto Landfill Gas Flaring (biogenic)		11,993		2,994		2,919		6,436		5,941		5,463	3
Wastewater Process Emissions		8,504		8,504		5,024		4,616		4,080		2,914	4
City of Palo Alto Vehicle Fleet		2,835		2,835		2,399		2,523		2,373		1,903	5
Scope 2 Emissions Actua	al				-								
Total Electric Load (MWh)			996,091		986,241		978,561		963,254		945,744		
Hydro Supply (MWh)*****			548,760		406,570		266,026		256,570		406,975		
Renewables Supply (MWh)			49,980		188,086		172,139		235,491		361,290		
Brown Power Supply (MWh)		186,000	397,352	158,427	391,585	0	540,370	0	471,193	0	177,479	0	6a
Palo Alto Green Purchases (MWh)			30,601	-12,201		N/A		N/A		N/A		N/A	7
Scope 2 Emissions Weat	her Adjusted***	:											
Total Electric Load			996,091		986,241		978,561		963,254		945,744		
Hydro Supply (MWh)			514,073		514,073		514,073		531,538		536,768		
Renewables Supply (MWh)			49,980		188,086		172,139		235,491		361,290		
Brown Power Supply (MWh)		186,000	432,038	172,257	284,082	113,266	292,324	116,552	196,226	78,237	47,686	19,013	6b
Palo Alto Green Purchases (MWh)			30,601	-12,201	0	0	0	0		0			7
Scope 3 Emissions													
Commute into, from, and within City		329,005		369,035		317,321		326,773		326,923		314,004	8
Lifecycle Emissions From Annual Total Waste Placed in Landfills		2,883	9,900	2,883	5,110	1,931	9,427	1,919	8,617	1,986	6,527	1,850	9
Landfilling Recyclable Material		13,650		13,650		8,934		8,892		9,910		<i>9,905</i>	9
Total Emissions (weather adjusted, biogenic excluded)		765,920		737,931		506,279		497,333		493,823		479,025	
					Emission Reduction (since 2005)	31%	Emission Reduction (since 2005)	33%	Emission Reduction (since 2005)	33%	Emission Reduction (since 2005)	35%	
					Emission Reduction (since 1990)	34%	Emission Reduction (since 1990)	35%	Emission Reduction (since 1990)	35.53%	Emission Reduction (since 1990)	37.46%	

## Notes:

1	Total Community supply of natural gas use/delivery. Adjusted for purchases of carbon offsets through PaloAltoGreen Gas program.
2	Leakage from the natural gas distribution system- modeled result, unchanged over the period.
3	Now using 40CFR Part HH methodology, per AB32. Estimates provided in prior estimates have been revised to reflect current methodology.
4	Represents N2O emissions from biological treatment process and release of Nitrogen.
5	City of Palo Alto Vehicle Fleet emissions are Scope 1 emissions. For more accuracy in reporting, they are separated out from the Scope 3 "Commute into,
	from, and within City" emissions.
6	a. Represents actual quantity of brown power related emission @ 879 lbs/MWh in 2005 and 2012; not applicable beyond 2012 due to Carbon Neutral
	electric supply.
	b. Weather normalized (for hydroelectric generation) quantity of brown power. No GHG impact in 2016.
7	Emissions saved due to purchase of PaloAltoGreen (PAG) related Renewable Energy Credits (RECs). PAG related RECs not included in 2013 – 2015 due to
	Carbon Neutral Plan, and not included in 2016 due to Carbon Neutral electric supply.
8	Road travel estimates are based on emissions modeling, not on actual measurements. The 2016 estimate is from Placeworks On-Road Transportation
	Greenhouse Gas Emissions Inventory Technical Memorandum from February 28, 2017. Study results from Fehr and Peer (03/19/2013) using Valley
	Transportation Authority regional transportation model based Vehicular Miles Travelled (VMT) and vehicular profiles - does not account for Palo Alto
	specific parameters related to greater penetration of alternate fuel vehicles, bicycle use, etc. 2012 - 2013 estimates were from a subsequent 2016 Fehr
	and Peer analysis.
9	Based on most recent EPA WARM methodology, based on characteristics and tons of material landfilled; prior year emissions have been updated using
	new WARM methodology. Landfilled amount in 2016 down 34% compared to 2005.
*	Municipal emissions related to electricity and natural gas consumption included within utility load numbers; fleet vehicle emissions also assumed to be
	included in community wide commute related emissions estimates made by consultant.
**	Table excludes biogenic emissions related to: Landfill gas flaring and WQCP sludge incineration.
	Normalized to account for the vagaries of weather on hydroelectric supplies. No GHG impact starting in 2013 due to Carbon Neutral Plan. Because of the
***	timing of the Earth Day Report, the meter data from renewable power counterparties is not prepared yet, so invoice data is used for some months. The
	2015 estimates have been with updated with the most accurate data.
****	1990 emissions data, where unavailable, were assumed to be equal to 2005 values.
****	The hydro supply number changed for 2015 because the percentage received of Western Area Power Administration (WAPA) base resource hydro power
	changed on Jan 1, 2015, and was not accurately reflected in last year's Earth Day Report Attachment C.

## Attachment D: Highlights of Sustainability Initiatives by City Municipal Operations

**Department Name**: Administrative Services Department (ASD) and Public Works (PWD) - Green Purchasing

**Background:** PWD and CMO initiated development of the City's Green Purchasing Policy following adoption of the 2007 Climate Protection Plan and the City's 2008 <u>Environmentally</u> <u>Preferable Purchasing (EPP) Policy<sup>1</sup></u>. PWD coordinates with ASD and other City departments to incorporate green purchasing priorities into contract language and purchasing operations as resources and program priorities allow. In past Earth Day reports, Green Purchasing was listed as an ASD objective. In 2017, this has been revised to clarify that PWD leads this effort, although ASD partners with PWD and incorporates its own green purchasing objectives into City operations when it can. Green Purchasing program development has not been budgeted for in either ASD or PWD; as a result, staffing constraints limit Staff's ability to robustly implement green purchasing policies or objectives that are not otherwise required by specific City policies or regulations that do have budgeted resources.

**Strategy:** In 2015, the City Manager established a "default to green" strategy that makes the greener product the norm rather than the exception:

- Prioritize products and services to green based on City policies, regulatory drivers and "low hanging fruit";
- Incorporate green purchasing into the City's policies and purchasing procedures.

#### Goals:

- Goal 1: The City's "default to green" procurement policy is the standard for aligning Purchasing procedures with the City's environmental policies, regulatory requirements and Council directives;
- Goal 2: The City purchases goods and services that value product performance, human health, and environmental health as outlined in the <u>City's Green Purchasing Policy and</u> <u>subsequent guidelines<sup>2</sup></u>;
- Goal 3: The City provides dedicated staff and budget to implement green purchasing.

**Initiatives and Activities:** The City's award-winning green purchasing program has "greened" performance criteria for several purchase categories, including structural and landscaping pest control, custodial and office supplies, computers and the City fleet<sup>3</sup>. The City has reduced the use of single-use plastics (bottled water, plastic bags, plastic packaging), reduced the toxicity and amount of pesticides used, and virtually eliminated products that contain mercury and dioxins. The City incrementally embeds green purchasing into its procurement procedures by revising forms, contract specifications, and contract Terms and Conditions, and by training staff

<sup>&</sup>lt;sup>1</sup> http://www.cityofpaloalto.org/civicax/filebank/documents/32651

<sup>&</sup>lt;sup>2</sup> http://cityconnect/civica/filebank/blobdload.asp?BlobID=2287

<sup>&</sup>lt;sup>3</sup> Fleet procurement policies are discussed in more detail under Public Works– Fleet Division on page 37.

in the application of these procedures.

Sustainability Initiative	Objective	Outcome
Develop "default to green"	Continue to implement the	2016 projects:
options where appropriate	City's Green Purchasing	Implementation continued and
and align City procurement	<u>three year plan (2015-</u>	included:
with City environmental	<u>2017)<sup>4</sup>,</u> goals, objectives	<ul> <li>A new "managed print</li> </ul>
goals, policies, regulatory	and a timeline.	service" contract which will
requirements and Council		monitor paper use and
directives.		provide sophisticated
		scanning services to archive
		and retrieve files thereby
		reducing paper consumption.
		The City is targeting the use
		of 100% recycled content
		paper in copier machines that
		are provided for this service,
		but may need to use 30% due
		to manufacturer
		recommendations. This
		outcome will be finalized in
		2017.
		• The Purchasing Department is
		greening custodial products
		that are centrally distributed
		from its warehouse for staff
		use. This project will be
		completed in 2017.
		PWD–Watershed Protection
		revised the City's Single-use
		Plastic Policy to address
		plastic toam primary
		packaging (most commonly
		found in computer
		purchases). Manufacturers
		may only use packaging that
		can be recycled in Palo Alto's
		recycling program or must
		take back the packaging, or
		pay for the City's disposal

*Top Three Sustainability Initiatives in 2016* 

<sup>4</sup>\\staff.copa\files\Public\Green Purchasing\Palo Alto's Policy and Plan Development\2015 Reboot\2016 Revisied Green Purchasing Timeline for SCAP.xlsx

		<ul> <li>costs. This will be challenging to enforce, but staff has open discussion lines with vendors about packaging preferences.</li> <li>Updated procedures to better inform the community and enforce the City's policy which prohibits City purchases of bottled water and other designated single- use plastics.</li> </ul>
City Auditor review of the	Determine how well the	The Audit will conclude in 2017.
Green Purchasing policy	City's Green Purchasing	A City Council–Policy and
implementation	Policy is being enforced,	Services Committee meeting has
	and obstacles that must be	been scheduled for March 2017.
	addressed.	
Partner with regional green	• Learn, contribute, and	• The City worked with an
purchasing efforts.	leverage regional	Urban Sustainability Directors
	partnerships to improve	Network project to draft <u>The</u>
	the City's green	Buck Starts Here–Sustainable
	purchasing program;	<u>Procurement Playbook for</u>
		<u>CITIES</u> . (Primary funding for
	Leverage opportunities	the USDN incountion fund
	outside of Palo Alto	Additional funding was
	operations to further	novided by the Poy A Hust
	environmental	Foundation) Agoncy partners
	performance goals	included the cities of Pale
	related to green	Alto San Francisco, Chicago
	purchasing.	Washington D.C. and others
		RWOCD staff served the first
		vear of a three year term on
		the Advisory Committee for
		Electronic Product
		Environmental Assessment
		Tool (EPEAT) program <sup>6</sup> . Staff
		will explore opportunities to
		reduce plastic packaging in
		electronics.

<sup>&</sup>lt;sup>5</sup> https://www.usdn.org/uploads/cms/documents/rpn-usdn-sustainable-purchasing-playbook-101216 final.pdf?source=http%3a%2f%2fusdn.org%2fuploads%2fcms%2fdocuments%2frpn-usdn-sustainablepurchasing-playbook-101216\_final.pdf <sup>6</sup> http://www.epeat.net/

**Data:** New data will be available in 2017 related to the audit that is being performed by the City of Palo Alto Auditor's Office.

Sustainability Initiative	Objective	Anticipated Outcome(s)
Review recommendations of	Improve the City's Green	Funding for staff and required
City Auditor to best comply	Purchasing Program.	budget will likely be a
with the City's Green		fundamental discussion point,
Purchasing Policy		along with considering the
		recommendations for green
		purchasing projects and
		programs that are already in
		place.
PWD will continue	Discuss plastic packaging in	Staff will meet with Hewlett
participation in EPEAT	computer purchases.	Packard Environmental Affairs
Advisory Committee.		Director to discuss packaging
		concerns and options.

Top Two Sustainability Initiatives for 2017

## Challenges:

- The City's green purchasing initiative lacks dedicated budget and staff resources. In 2016, a large amount of staff time was devoted to the audit process which limited implementation of the Green Purchasing Workplan objectives during 2016.
- Public Works is considered the lead for green purchasing implementations. A better model is required where all departments are held accountable in complying with green purchasing policy with better wired—and funded—leadership from both Administrative Services and Public Works.
- Current reporting systems, both from vendors and internal, don't provide sufficient information to evaluate and manage the initiative.

# # #

#### **Supplemental Materials:**

Please see attached:

- <u>2015-2017 Green Purchasing Workplan<sup>7</sup></u>
- Green Purchasing Policy<sup>8</sup>
- <u>USDN Playbook<sup>9</sup></u>

<sup>&</sup>lt;sup>7</sup> \\staff.copa\files\Public\Green Purchasing\Palo Alto's Policy and Plan Development\2015 Reboot\2016 Revisied

<sup>&</sup>lt;sup>8</sup> http://cityconnect/civica/filebank/blobdload.asp?BlobID=2287

<sup>&</sup>lt;sup>9</sup> https://www.usdn.org/uploads/cms/documents/rpn-usdn-sustainable-purchasing-playbook-

<sup>&</sup>lt;u>101216\_final.pdf?source=http%3a%2f%2fusdn.org%2fuploads%2fcms%2fdocuments%2frpn-usdn-sustainable-purchasing-playbook-101216\_final.pdf</u>
# **Department**: City of Palo Alto Utilities (CPAU)

**Background:** The mission of CPAU is to earn a high level of customer satisfaction by providing cost competitive, safe, reliable and environmentally sustainable utility services.

#### Strategy:

- Continue to implement cost effective energy efficiency and water conservation programs
- Continue to implement customer behavioral programs to encourage conservation and efficiency
- Implement Local Solar Plan with objective of providing 4% of the community's electrical energy needs from local solar resources by 2023
- Maintain the City's 100% carbon neutral electric supply
- Facilitate adoption of electric vehicles (EVs) in Palo Alto by providing time of use (TOU) electric rate option to residential customers and by optimally utilizing Low Carbon Fuel Standard (LCFS) revenue for the benefit of EV owners in Palo Alto
- Implement pilot programs to encourage electrification of natural gas appliances, specifically for water heating and space heating, in both existing and new buildings
- Implement the green gas program to annually procure certified carbon offsets (local offsets where possible) in quantities equal to total emissions related to natural gas use in Palo Alto.
- Seek and test emerging technologies that have the potential to enable CPAU to provide more effective utility services
- Consistent with cost of service requirements, provide customer rates that encourage efficiency/conservation, greater EV adoption and electrification of natural gas appliance

#### Goals:

- Reduce electric energy use by at least 5.7% between 2018 and 2027<sup>10</sup> (no GHG impact since electric supply portfolio is carbon neutral)
- Reduce natural gas use by at least 5.1% between 2018 and 2027 (7,800 metric tons per year of GHG reduction by 2027)
- Reduce water use to 135 gallons per capita per day by 2040 (40% by 2040 from 2015 levels).
- Generate at least 4% of electrical energy from local solar by 2023<sup>11</sup> (no GHG impact)
- Continue to procure long-term renewable electric supplies to maintain carbon neutral electric supplies (no GHG impact since electric supply portfolio carbon neutral)
- Implement and manage the green gas program to offset the emissions related to natural gas combustion in Palo Alto.

For the updated 10-year gas energy efficiency goals, see:

<sup>&</sup>lt;sup>10</sup> For the updated 10-year electric energy efficiency goals, see:

http://www.cityofpaloalto.org/civicax/filebank/documents/56087

https://www.cityofpaloalto.org/civicax/filebank/documents/56113

<sup>&</sup>lt;sup>11</sup> For Local Solar Plan, see: <u>https://www.cityofpaloalto.org/civicax/filebank/documents/39981</u>

# Initiatives and Activities:

Sustainability	Objective	Outcome
Initiative		
Electricity and	Promote resource efficiency	Many new programs were introduced
Natural Gas	to commercial and residential	this year, including the Home Efficiency
Efficiency and	customers for cost savings,	Genie audit and residential online
Conservation	lowered consumption, and	utility. With customers focusing on the
Programs	avoided greenhouse gas	drought, water and gas savings were
	emissions.	high. Electric savings were just below
		target.
Renewable Portfolio	Increase renewable energy in	The City's RPS was 26.0% in 2015, and
Standard (RPS)	CPAU's electric portfolio	40.2% in 2016. Executed contracts will
eligible electric		result in RPS of 59.9% in 2017, with the
supplies		remaining supply coming from hydro
		resources.
Local Solar Program	Increase local solar	The 2016 Solar group-buy discount
	generation from 0.7% of total	program, Bay Area SunShares, resulted
	load to 4.0% by 2023.	in 28 kW of new local solar. 94 CPAU
		customers installed net metered PV
		systems in 2016 for a total capacity of
		541 kW (°0.1% of load).
PaloAltoGreen Gas	Design a program to reduce	Council approved a carbon-neutral gas
	and utility	plan using carbon onsets.
Drought Response	gas utility. Meet the State's mandated	Potable water use was reduced 3/%
Diought Response	drought-related water	over the compliance period
	savings goals (see figure D-5	
	for actual reductions) The	
	compliance period is from	
	June 1, 2015 through October	
	31. 2016.	
Long-term potable	Reduce long-term water use	The 20% by 2020 target has already
water use reduction	in order to comply with the	been achieved and exceeded.
	State's 20% by 2020 per	
	capita water use reduction	
	requirement.	

# Top Sustainability Initiatives in 2016

Sustainability	Objective	Outcome
Electrification	Facilitate adoption of high efficiency electric heat pump appliances and electric vehicles	Pilot program to promote heat-pump water heaters launched in May 2016. Rebate program for EV chargers using LCFS funds was launched in January 2017. EV count in Palo Alto is estimated at around 2,000 at the end of 2016.

#### Table 1: Resource Efficiency and Local Renewable Energy Programs

	FY 2016	FY 2016	FY 2016
	Savings Goals	Savings Achieved	Savings Achieved
Resource	(% of load)	(% of load)	
Electricity	0.60%	0.58%	5,530 MWh
Gas	0.50%	1.07%	286,317 therms
Water	0.91%	1.96%	74,484 CCF
Customer-side		FY 2016	Cumulative
Renewable	Program Goal	Achievement	Achievement
Solar Electric (PV)	6,500 kW by 2017	1,098 kW	7,694 kW since 1999
Solar Water Heating	30 systems/year	1 system	59 systems since 2008

#### Data:

- See impact of energy efficiency programs on utility loads in Figures D-2 and D-3.
- See RPS increase since 2005 in Figure D-1.

# **Challenges:**

- Current building standards (Title 24) adopted by the California Energy Commission (CEC) discourage the adoption of electric water heating and space heating, despite the higher efficiency performance of heat pump appliances. CPAU is collaborating with other organizations that are also interested in building decarbonization to work with CEC to remove this bias.
- For existing homes, switching from natural gas using appliances (for space heating and water heating) to electric appliances requires a high upfront investment and is not cost effective at this time, especially if the home's electrical panel needs to be upgraded. For newer home construction, such conversions are marginally cost-effective.
- Future State water reduction requirements and regulations that will impact available water supply are unknown.
- Hydroelectric power as well as potable water supplies could be at risk in potentially disruptive climate change scenarios.
- Disruptive innovation in local PV generation, distributed energy storage (including rolling storage provided by growing EV fleets ) and net zero buildings may require **re-examination of CPAU business models.**

- Cost of service based retail rate making process required by State law may **limit the** options available to encourage electrification through retail rate structures, unless specifically approved by Palo Alto voters.
- While CPAU is delivering efficiency gains generally ahead of targets, greater progress will be needed to achieve California's 80% by 2050 GHG reduction goals, or Palo Alto's 2030 GHG goals. "Low hanging fruit" efficiency have been achieved, so deeper gains may require new approaches.
- If electrification of natural gas appliances achieves high market penetration in the coming decades, it will increase electricity demand and reduce natural gas loads/revenues.

###

# Supplemental Materials:



Figure D-1: Electricity Portfolio: 2005-2025 (Actuals and Projections)





# Figure D-3: Impact of Energy Efficiency on Gas Sales



<sup>&</sup>lt;sup>12</sup> There are no GHG reductions from electric energy efficiency after 2013 since electric supplies are carbon neutral.





# Figure D-5: Utility Departmental Efforts in Implementing Sustainability Projects (to be completed)

Staff estimates that approximately \$5.5 million in funding and seven FTE of staff effort is devoted by Utilities Resource Management Division towards administering and implementing environmental sustainability-related projects in a year. Staff expects to continue at similar levels of effort through 2020.



Department Name: Community Services Department - Open Space, Parks, and Golf

**Background:** Community Services Department maintains over 4,000 acres of parkland. The key sustainability issues are irrigation water management and habitat restoration. Habitat restoration, which includes removing invasive vegetation, planting native vegetation and adapting vegetation to climate change helps renew, restore, and enhance resilience of our natural environment, and maximizes carbon sequestration and storage in the natural environment.

# Goals:

- Reduce potable water use for irrigation in Open Space, Parks, and Golf by 25% (based on 2013 base year)
- Plant 10,000 native plants in Palo Alto Open Space areas and parks annually.

#### Initiatives and Activities:

Sustainability Initiative	Objective	Outcome(s)		
WATER MANAGEMENT-	Conserve potable water	Reduced potable water use by		
Reduce consumption & lead	through strategic reductions	approximately 25%. Posted signs		
by example	in irrigation in Open Space,	at every park and preserve		
	Parks, and Golf.	highlighting our conservation		
		efforts in order to lead by		
		example.		
<b>REGENERATION &amp; NATURAL</b>	Partner with environmental	18,591 pounds of invasive weeds		
ENVIRONMENT- Renew,	organizations and volunteers	removed, and 8,519 native		
restore, and enhance	to improve habitat by	plants planted in the Baylands		
environmental resilience	removing invasive weeds	Nature Preserve. 1,697 native		
	and planting native plants.	plants were planted in Pearson		
		Arastradero Preserve. <b>Total</b>		
		native plants planted: 10,216		

Top Sustainability Initiatives in 2016

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τυp	IIIIee	Sustaniubint	y minulatives	101 2017

Sustainability Initiative	Objective	Anticipated Outcome(s)
Water Management- Protect	Complete hydrology study for	Completed report with
creeks, bay, & groundwater	Buckeye Creek and develop	recommendations reviewed by
	recommendations to resolve	the Parks and Recreation
	erosion and flooding issues.	Commission and Council.
<b>REGENERATION &amp; NATURAL</b>	Partner with environmental	Plant 10,000 native plants. Start
ENVIRONMENT- Renew,	organizations and volunteers	creating pollinator pathways (as
restore, and enhance	to improve habitat by	described in Parks Master Plan)
environmental resilience	removing invasive weeds and	
	planting native plants.	

WATER MANAGEMENT-	Conserve potable water	Reduce potable water use by
Reduce consumption & lead	through strategic reductions	approximately 25%.
by example	in irrigation in Open Space,	
	Parks, and Golf.	

# **Challenges:**

Challenges for potable water reduction include:

- Ensure water reduction doesn't negatively impact tree health (CSD staff will work closely with Urban Forestry staff to ensure trees are monitored and are receiving the necessary amount of water.)
- Converting ornamental turf to low-water use landscaping can be expensive, and require increased water use to establish the new landscaping (CSD staff will partner with environmental groups to help offset the costs)

Challenge for the Buckeye Creek Hydrology Study:

• The cost to implement the recommendations from the Buckeye Creek Hydrology Study is likely to be significant. (CSD staff will research possibilities for outside funding sources.)

#### Department Name: Development Services

**Background:** Development Services is committed to the design and construction of highperformance green buildings that reduce the impact on natural resources and provide healthy environments for living and working.

**Strategy:** Development Services will continue to provide leadership in the area of green building programs and enforcement protocol. We will develop green building policy for new and existing building stock that lead the State in incorporating high performance, resource efficient buildings, net-zero energy and carbon neutral strategies, and encouraging deconstruction and recycling of construction waste. Our policies, programs, and incentives will promote energy, water, and resource efficiency across our community, resulting in occupant comfort, better indoor air quality, and better environmental quality.

**Goals:** Our calendar year goal is to improve annual water use reduction, annual energy use reduction, and metric tons of CO2 avoided by 10% over the FY 2015 data. Our target equals a total energy use reduction amount of 4.73M kBTu/year, 11.55M gallons/year of water, and 108.9 metric tons of CO2 (compared to 2015 performance data reported below). Also, we have a target to reduce energy use of buildings while promoting local generation to offset what is left to achieve Zero Net Energy consumption (or potential Zero Net Carbon emissions—a potential more relevant metric for Palo Alto) over the course of a year. We have published a green building survey to better track these building metrics related to building permit applications.

**Initiatives and Activities:** Delivered interdepartmental trainings enabling all development review staff and community to answer basic green building questions to the community. Initiated a monthly Staff Task Force with an appointed Green Building Liaison for each department. Continued providing public trainings quarterly for all Palo Alto stakeholders. Gained approval on two sustainability ordinances related to green building, including the green building ordinance and the energy reach code ordinance. Continued to meet with Green Building Advisory Group for future code cycles and to resolve issues from previous review cycles. Published a streamlined website promoting design clarity in green building policy and enforcement expectations.

Top Sustainability Initiatives in 2016

Sustainability Initiative	Objective	Outcome
New Green Building	Expand and update the	Adopted a new Green Building
Ordinance	existing green building	Ordinance, Effective January 1,
	ordinance with new criteria	2017. Implemented a
	that reflects current building	Landscape Permit in
	technology and drought	accordance with the MWELO.
	regulations	
New Energy Reach Code	Conduct a cost-effectiveness	Adopted a new Energy Reach
	study enabling the	Code, Effective January 1,
	requirement of enforcing a	2017.
	Zero Net Energy Readiness	
	Ordinance.	
Training and Outreach	Solicit input on future building	Successful outcomes include
	code amendments, enforce	improved code compliance
	existing codes, and support	and increased capacity from
	awareness and compliance	our community partners.
	with existing codes.	
Electric Vehicle and Photo	Develop process to move from	This function is being
Voltaic (PV) Installation	over-the-counter permitting	implemented as a part of
Permitting Streamlining	to on-the-web.	Accela Work Plan.
Study PV as Default for New	Explore feasibility of	The new Energy Ordinance will
Construction	developing "default to solar"	focus on energy efficiency
	codes and policy.	with solar power as a method
		for compliance.
Conduct Feasibility Study for	Completed Phase 1 of the	Present an update on the
Electrification	Electrification Study	Electrification Study in March
		2017 in accordance with the
		Electrification Study work
		plan. This determines when
		Phase 2 of the study will
		occur.

#### Data: Fiscal Year 2016

Performance						
Measure	FY 2011	FY 2012	FY 2013	FY 2014	FY 2015	FY 2016
Green Building -						
revenue \$	\$73,895	\$94,113	\$127,186	\$89,911	\$304,625	\$108,255
Green Building						
valuations with						
mandatory						
regulations \$	\$187,725,366	\$543,237,137	\$569,451,035	\$349,128,085	\$537,328,177	\$399,013,812
Green Building						
square feet with						
mandatory						
regulations	1,249,748	1,342,448	2,441,575	3,432,025	3,982,319	2,349,870
Energy savings						
(kBtu/yr) (sf)	3,399	1,701	1,922,532	3,141,510	3,958,192	3,677,853
Water reduction						
(gallons/yr)	2,119,485	4,976,775	5,580,485	7,730,840	31,285,192	8,200,989
CO2 emissions						
reduction (metric						
tons)	2,818	21	19,269	72,168	103,270	63,331

# Green Building<sup>13</sup>

#### Challenges:

- Development Services faces continuous change in the area of state, local, and federal policy—particularly policies that don't align with the specific needs of Palo Alto.
- California Energy Commission regulates how aggressive agencies can be in their pursuit above minimum code. To affect significant change and meet our GHG reduction goals, new legislation is needed. (Development Services is working with CPAU, CEC, and other parties to explore these changes.)
- Maintaining an educated community of city staff, local architects, and contractors is a concern that impacts our green building and energy policy.
- Development Services will be rolling out a comprehensive green building training protocol to address this challenge amongst staff and the community.
- Cost effectiveness analysis that accounts for environmental costs needs to be performed to support reach codes.

# # #

<sup>&</sup>lt;sup>13</sup> California requires applicable projects to meet the California Green Building Code Mandatory Provisions ("CALGreen Mandatory") found in Title 24, Part 11. The state has developed higher green building thresholds for those cities who are leaders in environmental sustainability and wish to elect higher standards. These thresholds are entitled " CALGreen Tier 1" and "CALGreen Tier 2". For non-residential projects, the City has adopted CALGreen Tier 1 for tenant improvements and renovations and CALGreen Tier 2 for new construction.

#### Supplemental Materials:



**ZNE** Roadmap



**Green Building Vision** 

#### Department Name: Library

**Background:** The Library (PACL) provides educational opportunities that provide the public with information and resources for reducing carbon footprint, waste and energy use, and for making improvements to home and habits that encourage a sustainable life.

**Strategy:** Library buildings include information about energy use and conservation, model new thinking regarding public building design, and sustain materials collections that aid customer education about all aspects of sustainability and the environment. For example:

- Mitchell Park Library: building design as an example of sustainable building practices; architect-developed system of "ecoglyphs" (symbols to lead to discovery of conservation/sustainable systems), and other educational signage to teach while observing/experiencing the environment; LEED<sup>™</sup> Platinum rating.
- Children's Library: heating/cooling guide on screen
- Rinconada Library: building improvements from renovation to HVAC system and incorporation of improved furnishings

**Initiatives and Activities:** PACL continues to host events and provide programs to all ages that passively or purposefully provide examples to demonstrate some aspect of sustainable practices. For example, nearly all crafts programs incorporate reuse of materials. The Library provided the following programs for 2016:

- January-March 2016: Silicon Valley Reads, "Chance of Rain: The Impact of Climate Change in Our Lives." Series of programs to tie in community read of *Memory of Water* by Emmi Itäranta and *Sherwood Nation* by Benjamin Parzybok. Programs included:
  - Creative Ecology with Artist Linda Gass
  - SVR 2016 Film Series: Screening of Water Detectives
  - Success with Low-Water Ornamentals: presented by Master Gardeners of Santa Clara County
  - o Silicon Valley Reads Author Visit: Emmi Itäranta
  - Water Cycle Storytime & Craft for kids
  - Brown Bag Book Club: Book group discussion of Memory of Water
  - RainDance: Using Recycled Water
- February-November 2016: Monthly Master Gardeners program
- April 2016: 'Welcome to America'' series topic on sustainability in Palo Alto
- July 2016: Bike Repair program
- August: Bike PALS (Palo Alto Library Service) launched using funds from the State Library and the Friends of the Palo Alto Library
- November 2016: Bike Repair stations were installed at MP and Rinconada Libraries.

Sustainability Initiative	Objective	Outcome(s)
Climate Change Book Club	Keep readers engaged and	Monthly program to begin on
	informed on the topic.	February 16 at MP Library
Sustainable Living Programs	Provide workshops for adults	Several programs planned for
	on canning, raising chickens	Spring 2017
	and home organization and	
	decluttering	
Bike PALS Service	Bring the Library out into the	Have events planned
	community to promote our	including visits to City events,
	services and reach new	schools, community fairs,
	customers	senior housing and local
		businesses

# Challenges:

The Library's books are still being shipped from other systems and within the Library's system, relying on vans that depend on fossil fuel. The Library, while using energy efficient equipment, nevertheless relies on automation which requires high energy usage. Additional open hours of service to the public also increase the hours of energy use.

# Department Name: Office of Emergency Services (OES)

**Background:** The Office of Emergency Services works with all City departments as well as the community to promote resilience to threats and risks of all types.

**Strategy:** The mission of the Office of Emergency Services is to prevent, prepare for and mitigate, respond to, and recover from all hazards. These hazards were recently codified in the Threat and Hazard Identification and Risk Assessment (THIRA) that was presented to City Council in September 2014 (www.cityofpaloalto.org/thira). The THIRA lists a number of hazards that could either directly (criminal sabotage or cyber-attack) or indirectly (storm that knocks out power) endanger critical utilities and fuel supplies. The FEMA THIRA best practice structure also encompasses the "technological or accidental" type of incident, such as occurred in February 2010 when a small aircraft collided with the City's connection to the power grid.

There are a number of City plans and related documents that bear on this topic. The Continuity of Operations Plan (COOP) (pending) will address means of keeping the City's government in operation in the event of disruption of City facilities, including utility-related scenarios. OES has also drafted an Energy Assurance Plan (EAP) with the *pro bono* assistance of consultant Arrietta Chakos.

Palo Alto is required to revise the existing Local Hazard Mitigation and Adaptation Plan (LHMAP, formerly LHMP), with State and FEMA approval, and Council adoption no later than 1 June 2017. The LHMAP process will interface with S/CAP and the City's Comprehensive Plan.

**Goals:** OES is working with the Chief Sustainability Officer, the Public Works Department, Utilities, and other staff to:

OES Sustainability Goals	Linkage to S/CAP Framework
Bolster resilience for key facilities	Supporting: Goals 5.1, 5.4
Develop systems (primarily vehicles and	Primary: Goal 5.2
communications) that are resilient and	Supporting: Goal: 5.4
adaptable to energy disruption, supply chain	
problems, and other emergencies	
Community engagement and public safety	Supporting: Goal 6.4, 9.1
education	
Explore strategies to leverage existing	Primary: Goals 6.2, 7.2
sustainability initiatives to realize emergency	Supporting: Goals 2.1, 2.3, 8.1
preparedness functions of mitigation,	
preparedness, response, and recovery	
	Primary: Directly Involved

Primary: Directly Involved Supporting: Indirectly Involved

# **Initiatives and Activities:**

# Critical Facilities:

OES is evaluating cost-effective and practical means to expand the use of renewables to reduce the risk of power disruption for certain facilities. For example, the Cubberley Community Center is an important resource in the event of a major earthquake or other disaster, since it 1) houses the Red Cross shelter, 2) is an identified site for medical care by the City's Medical Reserve Corps (MRC), 3) is a back-up location for certain City departments per the Continuity of Operations Plan (COOP), and 4) is the location of the City's Emergency Services Volunteers Division Operations Center (ESV DOC). OES retained an outside expert to evaluate the existing photovoltaic (PV) grid-tied panel system and propose a design to add a battery back-up capability, so that certain locations and systems at Cubberley would remain operational even in a grid-down scenario.

Future key facilities include the proposed new Public Safety Building (PSB). The PSB may incorporate microgrids, islanding, and other alternative energy elements to reduce dependence on 1) the power grid and 2) diesel fuel for generators, especially during prolonged incidents.

# Vehicles and Portable Renewable Generation:

OES has designed, developed, and now operates a number of vehicles and portable equipment, such as the Mobile Emergency Operations Center (MEOC). OES is investigating solar-battery generator trailers as a means to similarly improve energy resilience for those key assets. OES is even seeking to acquire an all-electric All-Terrain Vehicle (ATV) for rescue operations and routine use (could be the City's first-ever non-fossil-fueled public safety vehicle).

#### Survivable Communications Network:

As the City continues to explore the integration of Fiber into the community, OES supports expanding current systems to include a public safety Wi-Fi network powered by a PV backbone. Such a system would enhance emergency communications during a widespread disaster or temporary failure of the grid tied electrical system, and moreover could be shared with key community stakeholders who may be assisting our emergency response and recovery efforts (Emergency Services Volunteers, Business Neighborhoods, Faith Based Organizations, etc).

# Community Engagement and Public Safety Education:

In addition to these energy assurance efforts, OES leads a number of other community resilience efforts, including the Emergency Services Volunteer (ESV) program that encompasses CERT, Neighborhood Watch, and other programs

(www.cityofpaloalto.org/emergencyvolunteers), support of Stanford University and affiliates (such as Stanford Hospital), regional public safety planning efforts, regional training programs, coordination with private sector entities for emergency response and recovery, technology development for public safety, grant management, and other all hazards activities. OES believes that the development of local resources, including, for example, locally-grown farm-to-table food (Victory Gardens!), is not only good for the environment but will help us through a potential crisis.

# Leverage Environmental Initiatives and Maximize Value for Community Risk Reduction and Emergency Preparedness:

The City and others have made and plan to make substantial investments to reduce greenhouse gases, etc. OES seeks to assist by providing input from a public safety perspective to facilitate a more complete understanding of the consequences and potential risks of certain strategies and to maximize the full value of such investments.

The push to increase electric home appliances, for example, has a number of nuances. Those residences with gas appliances (stoves, hot water heaters<sup>14</sup>) can still use them even during a power outage. Increasing electric vehicles (EV) can create hazards (electrical problems when charging; risks to first responders dealing with EVs in accidents) that will need to be considered and addressed.

This is certainly not to say such strategies should not be explored, but rather that the full spectrum of pros and cons should be evaluated. In many cases, there could be creative work-arounds. For example, a resident could install a new electric water heater in parallel to the legacy gas water heater, idling the gas water heater unless/until electricity fails. (The value of a shower during a crisis should not be ignored, in other words.)

There may be some genuine opportunities for "big thinking" in terms of resilience. Palo Alto is unique in having its Utilities, dating back over a century to a time, originally, when the City also controlled electrical generation. Imagine the benefits to residents, businesses, and others were the City to again own (all or a large part) of its electrical generation capability locally, mitigating the risk of grid failures, future pricing and commodities uncertainty, and so forth.

Put another way, what is the comparative economic and resilience value of investing in a second point connection to the power grid vs. expanding local electrical power generation?

Sustainability Initiative	Objective	Anticipated	S/CAP Strategy
		Outcome(s)	
Electric ATV	Public Safety Electric	Prove feasibility of	5.2.1: Continue to
	Vehicle demo	certain EVs in Public	electrify City fleet
		Safety fleet	vehicles wherever
			possible
Portable Power Pod	Renewable Energy and	Reduce fuel supply risk	5.4.1: Infuse
	Battery Portable Set-		sustainability
	Up to Power MEOC		throughout City
	and other Key Systems		operations
Cubberley Solar	Provide Off-Grid	Improve viability of	5.1.2: Use city
Project	Resilience to Red	Cubberley in cases of	buildings as

# Top Three Sustainability Initiatives for 2017

<sup>&</sup>lt;sup>14</sup> Old-school tank hot water heaters have an additional advantage after an earthquake or other disaster where the water supply to a residence is impaired: It can be used as an emergency water source.

Cross Shelter	electrical grid	demonstration
	interruption / serve as	projects for
	a test case for such	advanced
	development at other	building
	essential facilities	Technologies

**Challenges:** The Office of Emergency Services should be viewed a source of expertise, creative ideas, and operational experience. Improved interdepartmental cooperation is needed to advance sustainable programs that also maximize resiliency and enhance public safety. This can only be done with a deliberate interconnect across City Operations.

###

#### Supplemental Materials:

Please refer to <u>www.cityofpaloalto.org/preparedness</u>

# Department Name: Office of Sustainability, City Manager's Office

**Background:** The Office of Sustainability (OOS), established in December 2013, works with other City departments to develop and implement a world class sustainability strategy for Palo Alto that improves quality of life, grows prosperity and builds resilience, while protecting and improving the living systems that sustain us — and leads Palo Alto to recognized as one of the greenest cities in America.

**Strategy:** In the Office of Sustainability's (OOS) third full year of operation, our priorities were to:

- Develop and adopt a world class sustainability and climate action plan (S/CAP), integrating the community's highest aspirations and the many initiatives across city departments into coordinated one plan;
- Further embed the City's sustainability commitments, programs and practices into City operations & Community actions, including management systems, procurement, finance and training.
- Develop innovative new strategies, particularly regarding mobility services and nongeneral fund options for financing the City's sustainability initiatives; expand community engagement; and
- Collaborate with other cities, non-profits, and foundations, to bring in resources, raise awareness and build our capacity to reduce emissions in the two most impactful sectors: transportation and buildings.
- Develop a city/community wide sustainability performance dashboard, to streamline and improve access to sustainability performance data through the year.
- Foster experimentation, alliances & big leaps, such as electrification, "mobility as a service," "Zero Net" and "Net Positive" Energy building initiatives and smart city.

**Initiatives and Activities:** OOS has coordinated and partnered with other City departments to advance the City's overall sustainability goals, including active participation in electrification, green building, smart city and transportation work streams. On January 24, 2016 OOS held a community summit that brought together more than 500 engaged and committed citizens who worked on the challenges of water, energy, and transportation; their ideas fed into the Sustainability and Climate Action Plan (S/CAP), which has since been approved by Council. Continuing work on the S/CAP, OOS led other departments in development of the 2017 – 2020 Sustainability Implementation Plan, delineating the next steps in fulfilling the S/CAP's 2030 goals, and building organizational capacity to carry out key strategies and actions which will enable Palo Alto to reduce GHG emissions 50% by 2020. OOS is also working with other City departments to incorporate sustainability commitments and programs into the Comprehensive Plan where appropriate and align with the S/CAP.

Responding to the uncertainty around climate policy on the federal level, OOS led the City in joining the Compact of Mayors and the U.S. Mayors' National Climate Action Agenda (MNCAA), which authored two letters to President Obama and two letters to President Trump.

OOS continued to engage and inform both City staff and Palo Alto residents about the City's sustainability efforts through the annual Earth Day Report, new employee orientation (NEO) briefings & Green Team meetings, updated Sustainability web pages, and a re-designed Sustainability e-Newsletter<sup>15</sup>.

In 2016, Palo Alto's Cool Block program – a pilot program of the Cool City Challenge –brought together 43 households within 12 neighborhood blocks who worked together on 1208 actions that eliminated 611,066 pounds of CO2 emissions-- an average 7.1 tons of CO2 per household

OOS led an initiative with Ann Arbor MI; Berkeley CA; Ithaca NY; Milwaukee WI; Oakland CA; Phoenix AZ; Vancouver BC, HIP Investor and the Urban Sustainability Directors Network to develop a Financial Scan & Toolkit<sup>16</sup> categorizing 44 "other than General Fund" options for financing City sustainability initiatives, and conducted two workshops. See summary graphic below.

In addition, OOS staff responded to multiple community requests for information about sustainability and City programs, and presented the City's sustainability work at multiple conferences and workshops.

Sustainability Initiative	Objective	Outcome(s)
Strategy	Adopt S/CAP	S/CAP 80x30 GHG goal adopted 8-0 in April 2016; S/CAP Framework, Principles & Guidelines adopted 9-0 November 2016
Embed	Build sustainability considerations, commitments and capacity into City operations	<ul> <li>EVSE Task Force (underway)</li> <li>EV Charging Pricing Policy (underway)</li> <li>Added initial sustainability questions to CIP application form</li> <li>Participated in development of USDN Sustainable Purchasing toolkit</li> <li>Supported development of the Green Building Ordinance and Energy Reach Code</li> </ul>

Top Three Sustainability Initiatives in 2016

<sup>&</sup>lt;sup>15</sup>http://www.cityofpaloalto.org/services/sustainability/sustainability\_newsletters\_and\_reports\_.asp

<sup>&</sup>lt;sup>16</sup> http://usdn.org/public/page/32/Government-Operations

		<ul> <li>Reported GHG emissions to Climate Registry (TCR) and the Carbon Disclosure Project (CDP)</li> <li>Sustainability Dashboard pilot (underway)</li> <li>Sustainability purchasing audit (underway)</li> <li>Compiled, updated and posted list of all City Sustainability policies</li> </ul>
Innovate	Build the regional mobility ecosystem to advance non- auto, "mobility as a service" capacity	<ul> <li>Participated in Mobility as a Service (MaaS) regional convenings</li> <li>Participated in monthly Managers Mobility Partnership meetings with City Managers of Mountain View, Palo Alto, Menlo Park and Redwood City, as well as Stanford leadership</li> <li>Won a \$1 million federal DOT grant for a demonstration project to reduce single-occupant vehicle driving from 75 percent to 50 percent in the Bay area using commute benefit programs, commuter trip reduction software, a multimodal trip planning app and workplace parking rebates</li> <li>Participated in national "shared used mobility" study and database of initiatives</li> <li>Conducted two EV ride and drive events, supported by \$53k CEC grant</li> </ul>

Sustainability Initiative	Objective	Anticipated Outcome(s)
Strategy and Planning	Implement the S/CAP	<ul> <li>Complete and adopt Sustainability Implementation Plans</li> <li>Support UTL Strategic Plan</li> </ul>
Operations	Embed Sustainability in City operations	<ul> <li>Work with ASD to develop internal carbon pricing strategy and protocols, and to improve effectiveness of City "environmentally preferable purchasing" EPP program</li> <li>Work with PWD to develop zero emissions fleet strategy and City facilities master plan</li> <li>Add 56 additional EV chargers at City facilities in 2016-2017 (dependent upon installation of solar canopies on four City garages)</li> <li>Work with HR, PCE/Transportation and the TMA to develop "commute alternative" pilots for City staff and community.</li> </ul>
Engagement	Deploy and use sustainability dashboards	<ul> <li>Deploy a sustainability dashboard to provide better reporting of sustainability data and increased transparency to drive stronger community engagement</li> <li>Add 15 more neighborhood blocks to the Cool Block Beta Project</li> </ul>

*Top Three Sustainability Initiatives for 2017* 

# Challenges:

• OOS is a very small office with a very large mission (in both absolute and comparative terms), and is challenged to fulfill that mission without permanent staff or stable

budget; in 2016, OOS's two half-time, limited term employees left for full time positions elsewhere, costing us several months of lost productivity as we recruited and onboarded new staff.

- OOS relies on coordination with other departments whose resources are also limited and not always available for collaborative activities; we're working to design more effective ways to coordinate sustainability activities across departments.
- Synchronizing the different times lines and processes of the S/CAP and CompPlan processes has been challenging.
- The emerging nature of OOS's work requires timely responsiveness (for example in relation to funding and collaboration opportunities and invitations to participate in multi-city platforms and positions) that the City is not always able to provide; as a result OOS has been unable to capture some funding opportunities.

#### Finance Scan and Toolkit Summary

#### FINANCING SUSTAINABLE CITIES: Spectrum of Financial Mechanisms and City Examples



# **Department Name**: Planning and Community Environment Department

**Background:** The Planning and Community Environment (PCE) Department is responsible for a range of planning and implementation actions aimed at preserving and enhancing the quality of life in Palo Alto, ensuring wise transportation investments, and facilitating land use and development decisions through consistent and transparent processes. The department is responsible for:

- Updating, maintaining, and overseeing compliance with the City's Comprehensive Plan
- Monitoring and enhancing the City's transportation infrastructure
- Implementing a variety of transportation programs aimed at reducing reliance on the private automobile and improving safety for all modes of travel
- Gathering and analyzing data in support of land-use and transportation policy
- Reviewing commercial and residential applications for planning entitlements for compliance with the City's zoning ordinance and applicable guidelines
- Reviewing projects for potential environmental impacts on the City and its residents
- Administration of the City's Community Development Block Grant (CDBG) programs
- Management and implementation of the City's Housing Programs
- Oversight and implementation of the City's Historic Preservation Ordinance
- Investigating and abating code violations

**Strategy:** Prepare an update to the Comprehensive Plan for Palo Alto with active community input, addressing issues related to land use and community design, transportation, climate change and sustainability, safety, noise, natural environment, community services and facilities, business and economics, governance, and housing. Following steps will be implementing programs to support the adopted goals and policies.

**Goals:** PCE's goals for the current year are:

- Incorporate the concept of sustainability into the Comprehensive Plan where appropriate and align with the stand-alone Sustainability/Climate Action Plan (S/CAP) that is being prepared concurrently.
- Complete the analysis of Scenarios 5 & 6 for inclusion in the Comprehensive Plan Update Environmental Impact Report (EIR), assessing a more balanced approach to jobs and housing (employed residents), consistent with the draft Sustainability/Climate Action Plan.
- Implement transportation programs to address traffic congestion and parking demand generated by single occupant vehicles including a paid parking study and implementation of parking management programs (e.g. RPP), creation and support of a Transportation Management Association (TMA), and development of strategies to enhance shuttle service.

# **Initiatives and Activities:**

Sustainability Initiative	Objective	Outcome(s)
Comprehensive Plan Update	Align the Comp Plan Update with the adopted draft S/CAP and evolving implementation plans to the extent feasible	Analysis of scenarios 5 & 6 for inclusion in the Comp Plan EIR that would improve the balance between jobs and housing (employed residents) consistent with the draft S/CAP
Expanded Free Shuttle Service	Identify ways to increase ridership by improving and/or expanding shuttle service in Palo Alto, as well as ways to reduce shuttle emissions	Strategies are being developed to increase trip frequency and ridership, and conduct community outreach (1 year planning phase delayed by VTA Next Network planning process).
Transportation Management Association support	Support activities of the new TMA to reduce SOV trips to/from downtown	Provide incentives to businesses, residents, and the regional community (3 year planning phase)

Top Three Sustainability Initiatives in 2016

**Data:** Please see Comp Plan DEIR <u>www.paloaltocompplan.org</u>.

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Sustainability Initiative	Objective	Anticipated Outcome(s)
Comprehensive Plan Update	Align the Comp Plan Update	Adoption of Comprehensive
	with the adopted S/CAP	Plan that supports
		implementation of S/CAP
		goals
Expanded Free Shuttle	Identify ways to increase	Identify preferred strategies
Service	ridership by improving and/or	to increase trip frequency and
	expanding shuttle service in	ridership, and reduce
	Palo Alto	emissions
Transportation Management	Support activities of the new	Identify a future, secure
Association support	TMA to reduce SOV trips	funding source and support
	to/from downtown	the maturation of the non-
		profit organization

# **Challenges:**

- PCE recognizes the importance of its sustainability-related initiatives, and has been challenged to hire the staff needed to implement these programs.
- In addition, the process for the S/CAP and Comprehensive Plan Update, both of which are taking longer than originally anticipated, have not been optimally aligned for coordination; therefore, it has been challenging to align the policy framework of the two plans as well as the quantitative analysis of GHG emission reductions.
- PCE has not had the resources to gather and track meaningful metrics and is currently developing (especially for mobility issues like transit, mode shift to cycling or walking, and parking) a data management system to provide quantifiable evidence for program effectiveness and outcomes.

#### ###

**Supplemental Materials:** For more information about the work being done by PCE to guide the preservation and development of Palo Alto, please explore the website to the Comprehensive Plan: Our Palo Alto 2030: <u>http://www.paloaltocompplan.org/</u>.

Department Name: Public Works – Engineering Services & Public Services

**Background:** The Public Works department is committed to building, managing and operating City buildings and infrastructure in a sustainable manner. This includes libraries, community centers, theatres, fire stations, the Regional Water Quality Control Plant, offices and other buildings, parks, athletic fields, roads, bridges sidewalks and the Urban Forest. Sustainable practices are incorporated into major building renovations, maintenance, infrastructure projects and everyday work practices.

**Strategy:** Public Works assesses the performance of City-owned facilities, identifies areas for improvement, and develops phased improvement programs to be optimized through monitoring energy and resource use to provide high quality service to the Palo Alto community. Optimization is achieved through improved building management systems and regular assessments of these systems.

**Goals:** The overarching operational objective of Public Works is to design, construct and renovate efficient and healthful City facilities and infrastructure, and to operate and maintain them in good order for the comfort and productivity of occupants and users. By optimizing operations, the department seeks to reduce operating costs and the reliability of the building systems through continuous improvement of resource efficiency and extend the useful life of the buildings consistent with these goals.

**Initiatives and Activities:** Through various Capital Improvement Projects, Public Works is working to use energy more efficiently and reduce water usage. Parks renovations include drought-tolerant landscaping and trees and more efficient irrigation systems. Building projects are utilizing efficient LED lighting, more efficient HVAC systems, cool roofing materials, and water saving fixtures. Street resurfacing and related concrete work are utilizing recycled aggregates and other waste products such as tire rubber and fly ash. We are following the best business practices for recycling of construction related debris on all projects. Storm water capture and pollution control measures are being implemented in building, parks and street projects.

Green infrastructure is defined as storm drain infrastructure on public and private lands, such as roads and parking lots, that includes low impact development such as infiltration, biofiltration, and/or storage and use of best management practices to collect, retain, or detain stormwater runoff to limit the discharge of pollutants from streets to the storm drain system. Green infrastructure provides amenities with many benefits beyond water quality improvement and groundwater replenishment, including creation of attractive streetscapes, habitat, reduction of heat island effect, and bicycle and pedestrian accessibility. Palo Alto has completed a Green Infrastructure project in the Southgate Neighborhood. We have installed full trash capture devices on Storm Drain mains identified as potentially having high trash content on Park Boulevard at Ventura Ave and a second location at Park Boulevard. The City's stormwater discharge is permitted by the Municipal Regional Stormwater Permit (MRP), a regional permit covering 76 Bay Area municipalities. The permit was reissued in 2016 and includes requirements for Green Infrastructure planning and development. The permit includes requirements to develop a Council-approved framework, a mechanism to prioritize projects and criteria, a list of prioritized projects, design guidelines/standard specifications, ordinance changes, and a funding plan. The permit also requires an update of relevant planning documents (such as comprehensive plan, specific plan, transportation plans, storm drain master plan, pavement work plan, and urban forestry plan).

Sustainability Initiative	Objective	Outcome
Benchmark City buildings	Create benchmarks to	Utility Track Software has been
for comparison of resource	compare City building	acquired and installed in
use and cost	performance with similar	Facilities Management. Building
	buildings in the state and the	performance data will be shared
	nation, and identify and	with Engineering Services to
	prioritize opportunities for	identify opportunities for
	improvement.	improvement.
Install solar canopies and	Utilize an RFP process to	A lease including installation of
electric vehicle chargers at	select a private entity to	solar canopies on four City
City facilities	install solar canopies and EV	garages, as well as 18 Level 2 EV
	chargers at City-owned	charger ports and electrical
	garages	infrastructure for an additional
		80 charger ports, was negotiated
		and approved by City Council.
		Planning and building permit
		submittals were made and are
		under review.
Water Efficiency Efforts	Reduce use of potable water	Public Works construction
	in construction activities	projects require use of recycled
		water for dust control and other
		applications.
		Requirements for basement
		construction dewatering were
		strengthened in 2016. Basement
		dewatering sites must provide
		"fill stations" to allow filling of
		water trucks, hire a truck one
		day per week to water
		landscaping at sites identified by
		the City, and allow use by
		neighbors of shallow non-
		potable groundwater that is

#### Top Sustainability Initiatives in 2016

		otherwise discharged to the
		storm drain system.
Implementation of Title 24	Incorporate sustainable work	Mechanical improvements
Building Energy Efficiency	practices for building system	include the use of cool roofing
Standards	maintenance, including	materials to meet Title 24
	improvements in mechanical,	Building Energy Efficiency
	electrical, and plumbing	Standards, replacing air
	systems.	conditioning units with more
		energy efficient units (when
		existing units need replacement)
		and using Building Management
		Systems (BMS) to control and
		monitor and mechanical and
		electrical equipment (including
		lighting) via computers in some
		facilities. Electrical
		Improvements include the use of
		LED lighting, the use of
		lighting for parking garages
		Dumbing improvements include
		the use of low flow urinals and
		low flow toilets
Park Renovation Projects	Incorporate sustainable	Five existing traffic circles were
	landscaping and turf	rebuilt in 2016, with removal of
	elimination in park	impervious asphalt surfaces and
	renovation projects managed	addition of landscaping.
	by Public Works to conserve	Irrigation is provided with water
	water whenever possible.	trucks using recycled water.
Procurement and Use of	Include recycled aggregate in	Major arterials are being paved
Environmentally Preferable	the asphalt mix and base rock	with rubberized asphalt utilizing
<b>Construction Materials</b>	in street resurfacing projects.	recycled tire rubber. Sidewalks,
		curbs and gutters are replaced
		with concrete that contains
		approximately 25% fly ash by
		volume. Paving work on Alma
		Street and Middlefield Road in
		2016 used 3,985 tons of
		rubberized asphalt.
Procurement and Use of	Use City's sustainable	City facilities are cleaned with
Environmentally Preferable	purchasing guidelines.	environmentally friendly Green
Consumables		Seal Certified cleaning chemicals
		and no chlorine and post-

are supplied in restrooms. Pest
management also focuses on
prevention and then using non-
toxic pesticides.

#### Top Sustainability Initiative for 2017

Sustainability Initiative	Objective	Anticipated Outcome(s)
Develop a City-wide energy	Develop an energy	Approve and implement an
management plan	management plan to guide	energy management plan as part
	the acquisition and	of the Sustainability/Climate
	installation of energy	Action Plan.
	conservation measures in City	
	-owned buildings	

# Challenges:

- As stated in previous reports, as existing building systems are renovated or replaced, air conditioning is being added where it previously didn't exist. This additional system tends to flatten the overall potential energy savings of the newer more efficient heating systems and lighting. (On the other hand, the more efficient systems mitigate the demand of the added air conditioning.) At Rinconada Library, geothermal wells were used to help mitigate this challenge.
- Historical preservation requirements are also a challenge. At Rinconada Library, the large grass lawn was a key historic feature of the overall site. It was therefore not possible to convert this to drought-tolerant landscaping and reduce irrigation needs. However, the project installed "purple pipe" so that it can easily be converted to recycled water when that system is expanded throughout the City.
- Public Works has completed a third party independent Facilities Management Organizational Study (conducted by Matrix Consulting) to evaluate the efficiency of our maintenance of Facilities. In the study, Matrix called out 10 recommendations related to Energy Management. Our newly appointed Facilities Manager will be analyzing these recommendations with the Engineering Services Division in the coming months. Staff anticipates development of new processes to identify replacement priorities, standards for replacements and use of energy audits to guide continuous improvement. In this regard, reducing the energy and water usage is an important consideration. Energy and water usage can be tracked through our Utility Track software to determine the impact of efficiency and conservation initiatives.

#### Department: Public Works- Fleet Division

**Overview:** The Public Works Fleet Division is responsible for maintenance, repairs, and compliance of all City of Palo Alto vehicles and equipment. The division is charged with meeting all local, state, and federal air pollution requirements and vehicle safety standards. It also conducts the proper disposal of declared surplus and acquisition of replacement vehicles and equipment. The division's mandate is to:

- Maintain fleet availability by providing the vehicles and equipment to all of the departments daily in order for the departments to be able to provide the services to the city of Palo Alto.
- Work with all operators, managers and departments to prevent air pollution by training the drivers on reducing idle time as well as demonstrate the proper and safe use and operation of the vehicles and equipment
- Perform preventive maintenance inspections and repairs on a daily basis to all of the vehicles and equipment
- Ensure regulatory compliance with the BAAQMD, BAR, CHP, DOORS, OSHA and CAL OSHA
- Perform vehicle and equipment usage analysis to be able to identify underutilized vehicles and equipment and recommend right-sizing the number of vehicles and equipment needed in the city of Palo Alto.

**Strategy:** Improve fleet efficiency and reduce vehicle and equipment emission by electrifying the fleet, maintaining it in top operating conditions, and training staff in safe and efficient operation.

**Goals:** The Fleet Division is moving toward a low-emission transportation future with these department goals:

- Identify new technologies and bold strategies to reduce fleet GHG emissions.
- Reduce unleaded fuel consumption by at least 10% each year, by scheduling replacement of all vehicles older than 10 years with current electric or low emissions models.
- Meet or exceed all regulatory requirements for air pollution reduction and air emissions required by BAAQMD, BAR, DOORS, PERP and EPA while providing an increasingly high level of service to all members of the Palo Alto community.

**Initiatives and Activities:** Fleet Services has been replacing gasoline-powered vehicles and other equipment with cars and trucks that use alternative fuels, such as compressed natural gas, or electric vehicles (EV). Vehicles and equipment approved for replacement are downsized whenever possible and economically feasible. The City's Vehicle and Equipment Use, Maintenance, and Replacement Policy stipulates that the City will acquire plug-in electric vehicles (PEV) upon replacement or for new needs when they are available, and meet needed range, load, and emergency response requirements. When a PEV does not meet these

requirements, and another type of low emission vehicle (LEV) does, the other LEV shall be purchase. PEVs are preferable over LEVs because, in Palo Alto, they have no GHG emissions or "carbon footprint".

The City's award-winning green purchasing program has "greened" performance criteria for several purchase categories, including City fleet. The City invested in a compressed natural gas (CNG) fueling station at the Municipal Service Center for the 10% CNG vehicles in the fleet. However, choices for vehicle types are limited from manufacturers.

Sustainability	Objective	Outcome
Reduce Greenhouse Gas emissions	Monitor and reduce GHG emissions associated with vehicles and equipment	Achieved a 28.7% GHG emissions reduction from 2005 baseline year through 2016 (not including CNG consumption for non-city operations) as a result of decreased consumption across all fuel types. This is an additional 5% reduction from 2015. Despite serving a larger service population, vehicle miles traveled decreased slightly.
Reduce unleaded and diesel fuel consumption in the fleet	Establish policy and procedure for the operators to minimize the idle time on the vehicle and equipment they are using. Reduce the number of vehicles and equipment in the fleet by performing a vehicle utilization analysis and identify those vehicles that could be declared surplus and sold at auction.	The City has been steadily decreasing its unleaded fuel and diesel consumption. In addition, the City's overall propane consumption is down due in part to modernization steps taken in Fleet. Additional measures are needed to reduce the Fleet Services' reliance on fossil fuels—which can best be achieved by replacing older vehicles with current—and, where possible, alternative fuel—models. The City fleet currently has 51 alternative fuel vehicles, with 27% of nonemergency vehicles using

# Top Sustainability Initiatives in 2016:

#### Data:



Figure 1: Fuel Use by Type<sup>17</sup> (Gallons), 2005-2016<sup>18</sup>

<sup>&</sup>lt;sup>17</sup> GreenWaste is the solid waste collection and processing provider that took over from PASCO in 2009

<sup>&</sup>lt;sup>18</sup> CNG Consumption for non-city operations increased in 2016 due to GreenWaste obtaining 9 new CNG trucks at the end of 2015



Figure 2: Fleet GHG Emissions (Metric Tons of Carbon Dioxide Equivalents, CO<sub>2</sub>e), 2005-2016<sup>19</sup>

#### Table 1: Fleet GHG Emissions (Metric Tons of Carbon Dioxide Equivalents, CO<sub>2</sub>e), 2005-2016

Fuel Type	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016
Total	2,833	2,784	2,875	2,877	2,652	2,845	2,909	2,543	2,399	2,344	2,160	2,020
Emissions <sup>20</sup>												
(excluding												
PASCO												
/GreenWaste,												
PAUSD)												
Percent Change		-1.8%	1.5%	1.6%	-6.4%	0.4%	2.7%	-10.2%	-15.3%	-17.3%	-23.7%	-28.7%
from 2005												
baseline <sup>21</sup>												

<sup>&</sup>lt;sup>19</sup> PASCO / GreenWaste and PAUSD are not directly operated by the City, therefore their GHG emissions are not included in overall Fleet GHG Emissions. They are included in this graph for informational purposes only.

<sup>&</sup>lt;sup>20</sup> These numbers differ slightly from last year's Earth Day Report. Staff discovered calculation errors resulting in a few numbers being off by 1. The largest error was in 2015 Total Emissions. Last year's table erroneously listed emissions totals that included PASCO and PAUSD emissions. This table has been corrected to exclude PASCO / GreenWaste and PAUSD emissions. PASCO / GreenWaste and PAUSD are not directly operated by the City, therefore their GHG emissions are not included based on operational control reporting criterion.

<sup>&</sup>lt;sup>21</sup> The 2015 percent change from 2005 baseline was incorrectly calculated in last year's Earth Day Report. This year's table has been corrected to show a -23.7% change from 2005 baseline instead of the -10.1% that was listed in last year's table.
## **Challenges:**

- The City hired Mercury and Associates, a fleet management consulting organization to conduct a cost recovery analysis and vehicle replacement schedule study. At the time of this writing, the final report has not been completed, but is expected to be finished in July 2017. The preliminary recommendations from the Mercury Study are for the City to spend \$ 6 – 8 million to catch up in replacing older vehicles/equipment.
- The average age of the fleet is currently at 12.9 years. The ideal fleet age needs to be less than 10 years. The older the age of the fleet averages the more it costs to operate and maintain. It also contributes to a higher level in GHG emissions. The city currently averages 40 vehicles and equipment being replaced each year. To bring the fleet average to 10 years or less, the city needs to increase the number of units being replaced.
- Programs designed for traditional fleet maintenance goals haven't been focused on meeting the bold target of 80% GHG reduction by 2030; the department needs to develop new programs and manage its performance to achieve its incremental annual reduction targets.
- Electrifying the City Fleet requires a robust and adequate EV charging station infrastructure. Due to a variety of factors, the City is below target for alternative fuel vehicles, with only 51 alternative fuel vehicles out of a target of 67.

# # #

## Supplemental Materials:

- Greenhouse Gas Reduction from Fleet Division: Section 12 in 2015 Clean Bay Plan, available at <u>cleanbay.org</u>.
- Reduced unleaded and diesel fuel consumption in the fleet: Section 12 in 2015 Clean Bay Plan, available at <u>cleanbay.org</u>.
- Compliance with regulatory and policy requirements to reduce other priority air pollutants in the atmosphere: 2015 CleanBay Plan report, located at <u>cleanbay.org</u>.

**Department:** Public Works–Watershed Protection & Regional Water Quality Control Plant

**Background:** The Public Works–Watershed Protection Division, in collaboration with the Regional Water Quality Control Plant (RWQCP), works to reduce pollutants entering the San Francisco Bay through award-winning pollution prevention, pretreatment, stormwater, water quality, and air quality management programs. Since 1990, the goals of the RWQCP and Watershed Protection have been to:

- Treat wastewater from the RWQCP six-community service area of East Palo Alto Sanitary District, Los Altos, Los Altos Hills, Palo Alto, Mountain View, and Stanford;
- Work with industry and businesses to prevent pollution;
- Ensure regulatory compliance with the RWQCP wastewater discharge permit, air quality permit, and the City's stormwater permit; and
- Provide residential services and education to prevent pollution in Palo Alto's creeks and San Francisco Bay.

**Strategy:** Given strict stormwater and wastewater permit requirements, Palo Alto must explore all feasible methods of reducing its metals and toxic organic pollutant discharges to San Francisco Bay. Similarly, given strict air quality permit requirements, Palo Alto must explore all feasible methods of reducing air pollutants such as greenhouse gases, nitrous oxides, and volatile organic compounds from its stationary sources. After initially focusing on pretreatment programs at major industrial facilities, the RWQCP expanded its efforts to include commercial and residential programs. Strategies to meet sustainability goals in the next 1 – 5 years include:

- Commercial and industrial pretreatment program that integrates pollution prevention into business requirements via ordinance and incentives such as the Clean Bay Business Program;
- Residential pretreatment program that provides programs with collection services for pollutants of concern (e.g., pharmaceuticals and sharps) and extensive public outreach, including classroom presentations throughout the RWQCP service area; ongoing informational campaigns coordinated locally, regionally and state-wide; and workshops, tours and special events;
- Leverage opportunities to improve and expand recycled water use and infrastructure; and
- Evaluate opportunities to improve and/or replace aging treatment process infrastructure and equipment (e.g., decommission sewage sludge incinerators).

**Goals:** Watershed Protection had several 2016 goals to reduce industrial and residential pollutants for stormwater and wastewater, including the following higher-profile efforts:

- Identify strategies to reduce greenhouse gases (GHGs) associated with wastewater treatment;
- Promote the use of RWQCP recycled water through the Truck-Fill Program, salinity reduction efforts, regional collaborations, and pipeline expansion efforts;
- Meet or exceed the RWQCP and Watershed Protection Program permit requirements for pollutant reduction.

For a complete summary of 2016 pollution prevention efforts see the 2017 Clean Bay Plan report located at <u>cleanbay.org</u>.

#### **Initiatives and Activities:**

#### **RWQCP GHG Emissions**

The RWQCP GHG emissions stem from the treatment of wastewater collected from the City of Palo Alto as well as its partner agencies (Mountain View, East Palo Alto Sanitary District, Los Altos, Los Altos Hills, and Stanford). The RWQCP has five major sources of GHG emissions: electricity usage, natural gas combustion for office heating, sewage sludge incineration (natural gas, landfill gas, and biosolids combustion), biological treatment of wastewater, and baylands conversion of wastewater discharge (Figure 1).

RWQCP GHG emissions decreased by more than 60% since 1990 mainly due to the purchase of green natural gas beginning in 2015, purchase of 100 percent green power electricity since 2013, use of landfill gas as a replacement for natural gas in the incinerator afterburner since 2005, and decreased incinerator hearth natural gas usage due to regular incinerator tuning (Figure 2).

RWQCP GHG emissions as reported to the California Air Resources Board and United States Environmental Protection Agency may differ from the values presented in Table 1 due to different high heat values, global warming potentials, and/or emission factors. RWQCP GHG emissions contained in this report were calculated using a static document, the Local Government Operations Protocol, Version 1.1 (2010) for analysis of historical trends and reductions; in contrast, the state and federal agencies periodically update their GHG calculation methods to better reflect recent advances in science and federal regulations.

#### **Recycled Water Expansion**

RWQCP total recycled water usage remained relatively constant from 2015 to 2016 with a 1% decrease from 220 million gallons in 2015 to 218 million gallons in 2016 (Figure 3). Despite the relatively constant total usage of recycled water, active recycled water permits significantly increased (Figure 4). In 2016, 85 active recycled water permits were reviewed and approved for use; this is a 40% increase from 2015 when 61 recycled water permits were active.

RWQCP routinely monitors the quality of the recycled water it produces for numerous parameters. One such parameter is salinity. Salinity is of particular concern for use of recycled water to irrigate salt-sensitive vegetation (such as Redwood Trees) as well as for use in industrial cooling towers. The RWQCP analyzes Recycled Water salinity using numerous metrics: total dissolved solids (TDS), sodium adsorption ratio (SAR), and specific conductivity. RWQCP and its partner agencies (referenced above in "Background") are taking efforts to decrease salinity entering the RWQCP from their collection systems (Figure 5). In addition, Watershed Protection has collaborated with the Santa Clara Valley Water District, City of Mountain View, and ReNew Water, LLC to undertake a feasibility study and pilot project evaluating advanced water purification treatment systems at the RWQCP to reduce salinity in recycled water. These projects were started in 2016 and are scheduled for completion in 2017.

#### **Permit Compliance**

PWD–Watershed Protection has a robust pretreatment program, Stormwater Pollution Prevention program for businesses and industry, and residential programs and outreach that are coordinated to reduce or prevent pollution releases.

Sustainability Initiative	Objective	Outcome(s)
RWQCP Greenhouse	Continue to reduce,	RWQCP 2016 GHG emissions were
Gas Reductions	track, and report GHG	approximately 17,000 metric tons of carbon
	emissions associated	dioxide equivalents (MT CO2e), representing
	with wastewater	more than a 60% reduction since 1990.
	treatment.	<ul> <li>2016 was the first full year that the RWQCP</li> </ul>
		purchased natural gas from the City's green gas
		portfolio. The RWQCP continues to purchase
		carbon-neutral power from the City's electricity
		portfolio.
		• In November 2016, the construction project to
		build a new sludge dewatering and loadout
		facility was released for contractors to
		competitively bid on. This represents the next
		step needed to phase out the City's sewage
		sludge incinerators as soon as possible. This is
		expected to greatly reduce RWQCP GHG
		emissions.
		<ul> <li>A GHG and Energy Factsheet was updated in</li> </ul>
		2016 to provide concise information regarding
		historical and projected GHG emissions as well
		as capture the newly adopted reduction goal of
		80% community-wide reduction of 1990
		emissions by 2030.
		Note: For more information, see the 2017 Clean
De suele d'Mateur	Due weete the weeterd	Bay Plan available at <u>cleanbay.org.</u>
Recycled Water	Promote the use and	In 2016, Watershed Protection staff worked
Expansion		closely with the Santa Clara Valley Water
	Drogram as a	District, the City of Mountain View, and the
	riugidiii ds d	city of Paio Alto's utility Department to
	alternative source of	PWOCD's Recycled Water Program
	water	NVVQCP'S Recycleu vvdler Program.
	water.	<ul> <li>In 2016, located large source of saline</li> </ul>

Top Three Sustainability Initiatives in 2016:

		<ul> <li>groundwater entering the sewer system on a large 72-inch interceptor. Leak is scheduled for repair in 2017.</li> <li>In 2016, the RWQCP expanded its truck-fill program to 85 permittees, a 40% increase from 2015</li> <li>Watershed Protection Staff, in collaboration with the Santa Clara Valley Water District and City of Mountain View, have moved forward with a feasibility study of enhancing the quality of the RWQCP recycled water by adding an advanced treatment system such as reverse osmosis. An advanced treatment system is expected to significantly decrease recycled water salinity amongst other water quality improvements.</li> </ul>
		Bay Plan available at <u>cleanbay.org.</u>
Trash Reduction in creeks, streets, and along Bay	<ul> <li>Meet Bay Area Municipal Regional Permit performance guideline of 60% trash reduction by 2016. Attempt to meet in 2016 a 70% trash reduction requirement set for July 1, 2017.</li> <li>Expand Palo Alto's Plastic Foam Ordinance to prohibited retail</li> </ul>	<ul> <li>The City of Palo Alto not only met the 60% trash reduction guideline, but also met the 70% trash reduction requirement one year ahead of schedule by reducing trash 84% by July 2016. Trash reduction is currently quantified based on on-land visual assessments (i.e. monitoring of trash reduction activity success) and the success of product bans.</li> <li>In December 2015, Council expanded the current plastic foam ordinance to prohibit retail sale or distribution of foam ice chests, foodware, packaging materials and egg cartons. Food service establishments have been prohibited from using plastic foam since 2010. The ordinance will go into affect on</li> </ul>
	prohibited retail sale or distribution of plastic foam products.	<ul> <li>2010. The ordinance will go into effect on March 1, 2016.</li> <li>* More info located in the Long-Term Trash Plan<sup>22</sup> and the 2015-16 Stormwater Annual Report<sup>23</sup></li> <li>** For more information, see Section 7 in 2016</li> </ul>

<sup>&</sup>lt;sup>22</sup>https://www.cityofpaloalto.org/civicax/filebank/documents/38421
<sup>23</sup>http://www.swrcb.ca.gov/rwqcb2/water\_issues/programs/stormwater/MRP/2016\_AR/Santa\_Clara/Palo\_Alto\_2
015-16\_MRP\_AR.pdf

	Clean Bay Plan available at <u>cleanbay.org</u> .

Data:

**Figure 1: RWQCP 2016 Greenhouse Gas Emissions by Anthropogenic Source** (contains estimates for November & December 2016 natural gas usage; data not available at time of this writing)



**Figure 2: Historical RWQCP Greenhouse Gas Emissions as Calculated by the Local Government Operations Protocol, Version 1.1 (2010)** (contains estimates for November & December 2016 natural gas usage; data not available at time of this writing)







Figure 3: Historical Recycled Water Usage.

Figure 4: Historical Active Recycled Water Permits.







Top Three Sustainability initiatives for 2017:	Тор	Three	Sustaina	bility	Initiatives	for 2017:
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Sustainability Initiative	Objective	Anticipated Outcome(s)
RWQCP Greenhouse	Continue to reduce,	• Track and report GHG emissions to City,
Gas Reduction	track, and report GHG	state, and federal agencies.
	emissions associated	<ul> <li>Update the GHG Factsheet to accurately</li> </ul>
	with wastewater	disperse information
	treatment.	<ul> <li>Continue to make progress in</li> </ul>
		decommissioning the sewage sludge
	Develop a sea level rise	incinerators by 2019, including building the
	policy for the City of	Dewater and Loadout Facility.
	Palo Alto operations.	<ul> <li>Continue to purchase carbon-neutral</li> </ul>
		electricity and green natural gas for use at
		the RWQCP.
		<ul> <li>Adopt a sea level rise policy in 2017.</li> </ul>

Recycled Water Expansion	Promote the use and expansion of the RWQCP Recycled Water Program as a sustainable and reliable alternative source of water.	<ul> <li>Continue to review and approve permit applications for use of the truck-fill station.</li> <li>Promote the Recycled Water Program using a newly updated factsheet.</li> <li>Continue to collaborate with other agencies to evaluate appropriate expansion opportunities under the Northwest County Recycled Water Strategic Plan.</li> <li>Complete the Advanced Water Purification System Feasibility Study to evaluate appropriate salinity-reducing treatment technologies.</li> <li>Further evaluate and repair the 72-inch interceptor for saline groundwater infiltration and corrosion.</li> </ul>
Green Stormwater Infrastructure (GSI)	Establish a new stormwater management approach that considers GSI as a non-structural tool that helps to treat and infiltrate stormwater, rather than it entering the City's conveyance system to the Bay.	<ul> <li>Per the 2015 Municipal Regional Stormwater NPDES Permit (MRP), a Bay Area-wide permit issued by the San Francisco Bay Regional Water Quality Control Board (Regional Board), the following deadlines must be met:</li> <li>Complete City-wide GSI Plan framework by July 1, 2017.</li> <li>Complete City-wide GSI Plan by July 1, 2019.</li> </ul>

## Challenges:

• Future GHG Reductions: The RWQCP has made large reductions in GHG emissions over the past 5 years due to incinerator tuning, landfill gas replacement of natural gas in the afterburner, aeration basin optimization, installation of variable frequency drive lift pump controls for the trickling filters, as well as purchasing greener energy options. Ongoing RWQCP optimization will continue, however the major GHG reductions from optimization projects have already occurred. RWQCP GHG emissions associated with biological treatment and baylands conversion are expected to gradually increase over time as water conservation increases and the service area population and economy grow. Future GHG reductions will be largely contingent on future plans to phase out sewage sludge incineration expected in 2019, the new biosolids treatment process expected in 2025, and the availability/quality of landfill gas as a replacement for natural gas in the incinerator (Figure 6).





- Drought and Increased Economic Activity: Drought conditions in the service area have increased water conservation efforts and significantly decreased flows entering the RWQCP. Additionally, the recent economic recovery and growth in the service area increases the daytime population that increases inputs to the RWQCP from toilet flushing versus more dilute inputs such as showering. Decreased flows combined with increased daytime populations have a combined impact of increased loads and concentrations of pollutants such as ammonia and total dissolved solids (salinity). Higher pollutant loading and concentrations strain the current treatment process that was originally designed for treating more dilute wastewater. This issue is anticipated to pose continued challenges with meeting permit limits and internal goals (such as salinity reduction) should drought become more common with predicted climate change.
- **Recycled Water:** One of the challenges with recycled water is that its quality is very dependent upon the quality of the wastewater that is sent to the RWQCP for treatment. Leaky sewer pipes increase the salinity that must be removed at the RWQCP for future expanded use of recycled water. Locating and subsequently relining these leaky pipes is challenging and requires not only special evaluations but also cross-departmental collaboration. Another challenge with the expansion of the RWQCP's Recycled Water Program is the required expansion of the recycled water transmission pipelines. Current pipelines are limited to the area adjacent to the RWQCP. Expanding this pipeline is expensive and may not be cost effective depending on the expected demand for recycled water.

Green Stormwater Infrastructure (GSI): The City of Palo Alto must adhere to requirements addressed in the 2015 MRP, which has identified particular activities and pollutants that the City (in addition to other Bay area cities) must address in order to manage stormwater discharges into creeks, the Bay, and other waterbodies. In order to reduce stormwater flows and pollutants to the City's stormwater conveyance system (and later into the Bay) as well as erosion of nearby creeks, the MRP requires municipalities to incorporate, where possible, green stormwater infrastructure features in the public right-of-way and facilities. The methodology for doing so will be outlined in a framework that is due to the Regional Water Board on July 1, 2017. In order to successfully identify an effective, long-term implementation approach, various City Departments and staff must buy in and take ownership of this new perspective of stormwater management. This culture shift will take time, energy and resources, though staff anticipates progress in 2017 due to the City's successful 2015 GSI project in the Southgate neighborhood. In addition, the Community Services Department's parks maintenance staff, who has been maintaining the Southgate project (with a contractor's assistance), has limited funds to maintain additional GSI features. Thus, City staff will need to be creative in identifying funding sources and partnerships for both implementation and maintenance of GSI features. Though these sources will not need to be identified until the 2019 GSI Plan, staff will start to discuss various options in 2017.

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## **Supplemental Materials:**

- <u>2017 Clean Bay Plan<sup>24</sup></u>
- <u>Regional Water Quality Control Website: www.cleanbay.org</u>

<sup>&</sup>lt;sup>24</sup> http://www.cityofpaloalto.org/news/displaynews.asp?NewsID=1527&TargetID=65

**Department Name**: Public Works Environmental Services Division, Zero Waste and Landfill Operations

**Background:** The City of Palo Alto adopted a Zero Waste policy in 2005. Since then, the City as a whole has dramatically reduced the amount of material going into landfills. The City now has a waste diversion rate of 80 percent, up from a 63 percent diversion rate in 2005.

The City's solid waste related greenhouse gas emissions stem primarily from two sources: (1) the fugitive emissions from the landfill where materials are buried; and (2) the emissions that result from having to mine or fabricate new resources (e.g., aluminum, glass, paper, plastic, etc.) instead of recovering these resources from recycled materials. Programs that have helped the City progress towards its greenhouse gas emissions reduction goals as well as zero waste goals include: simplifying the residential recycling collection process, collecting and composting commercial food scraps, and engaging the community with effective zero waste marketing campaigns.

While economic activity and construction have an impact on the overall amount of material disposed, Zero Waste programs have helped keep tens of thousands of tons of material out of the landfill. In 2008, 68,228 tons were disposed in landfills. By 2015, that amount was reduced to 47,155 tons, a 31% reduction. Many more tons are now recycled or composted at homes, businesses, and construction sites. The amount of recyclable materials collected and diverted from the landfill increased from about 13,000 tons diverted in 2008 to 19,232 tons in 2015. Commercial compost collection, which started in 2009, and single-family residential customers' compost collection, which started in 2009, and single-family residential customers' compost collection, which began in 2015, diverted over 17,975 tons per year of food scraps and food soiled paper from the landfill as compared to 11,582 in 2014 – an increase of over 6,000 tons in one year. For new construction, 75 percent of all material must be recycled or reused on site as part of the City's Green Building Program put into place in 2013, superseding the Construction and Demolition Debris Ordinance of 2004.

The Palo Alto Landfill is owned, monitored and maintained by the City of Palo Alto. The municipal solid waste landfill operated from the 1930's to 2011 and is now in the post-closure phase. The long-planned end use of the landfill is parkland. The Environmental Services Division in the Public Works Department is responsible for the post-closure care of the landfill. By law, the City is required to monitor the landfill for a minimum of 30 years to assure it does not pose an environmental hazard resulting from the release of landfill gas or the creation/release of *leachate*—the liquid that is created inside the landfill that must be pumped to the Palo Alto Regional Water Quality Control Plant (RWQCP) for treatment. Landfill gas is collected and either combusted in the RWQCP sludge incinerator facility or flared.

**Strategy:** The zero waste strategy seeks to eliminate the generation of waste wherever possible, and then manage, through reuse and recycling, the discards that are created. Most cities tend to focus on "end of pipe" solutions to recover materials for recycling and/or composting; Palo Alto goes even further by emphasizing the elimination of waste with

programs like the food waste reduction program and environmentally preferred purchasing policies.

For the landfill, staff has pursued two strategies to reduce greenhouse gas emissions: 1) capping the landfill; and, 2) beneficially reusing the landfill gas.

#### Goals:

- <u>Divert 95% of waste from landfills by 2030, and ultimately achieve zero waste to</u> <u>landfillsAchieve a 90 percent diversion rate by 2021.</u>
- Improve consumption habits and reduce the total amount material sent to the landfill.
- Provide local recycling and composting resources.
- Finalize landfill closure and conversion to parkland
- Maximize the amount of landfill gas sent to the Regional Water Quality Control Plant.

**Initiatives and Activities:** In April 2016, the City began implementing the first phase of the Recycling and Composting Ordinance that required all large businesses and institutions, food service establishments, and multifamily complexes to subscribe to compost services. The City anticipates that this ordinance will dramatically increase the amount of food scraps composted and kept from the landfill. Enforcement of second phase of the ordinance began in January 2017 and covers medium sized customers (commercial customers with two cubic yards of garbage service per week). The third and final phase of the ordinance requires all commercial customers to subscribe to compost service by January 1, 2018. The ordinance also requires all residents, businesses, and visitors to their sort waste properly.

The City is also engaged in strategies to reduce waste. The City has partnered with GoBox to provide an easy to use "to go" container for downtown Palo Alto lunchtime eaters. The City has also partnered with Rethink Disposables to provide technical support to local restaurants on how they can save money and reduce their environmental footprint by switching from disposable food service ware to reusables.

The landfill closure work was completed in November 2015. The closure work included constructing a new alterative design cap called an evapotranspirative cap. Completion of the cap is expected to reduce the amount of fugitive landfill gas emissions. In addition the landfill continues to send landfill gas to the Regional Water Quality Control Plant where it is used in their incinerator. This reduces the amount of carbon dioxide emitted by the combustion of landfill gas.

Sustainability Initiative	Objective	Outcome
Food Waste Reduction	Deliver outreach messages and	The quantity of waste diverted is
program	tools to residents and businesses on how to reduce the amount of	not currently measured by the City's implementation partner.

#### Top Three Sustainability Initiatives in 2016

	food wasted.	
Cap the landfill	Cap the entire landfill. Expect fugitive landfill gas emissions to continue to go down.	The entire landfill has been capped. The capping work was completed in November 2015.
Increase beneficial reuse of landfill gas	Modify controls at the flare station and incinerator	Better control and metering of landfill gas to the incinerator

# Data:

Annual Diversion Rate, 1995-2014



## Historical City of Palo Alto Landfill GHG Emissions, 2005 (baseline) - 2015



Overall the trend in the City of Palo Alto GHG emissions is downward. Fluctuations in GHG emissions are likely the result of closure activities. The closure activities include years of decreased waste acceptance followed by a year of increased waste placement, expansion of the gas collection system and completion of cover operations.

# Forecast: Solid Waste Related GHG Emissions in metric tons (MT) carbon dioxide equivalents (CO<sub>2</sub>e) for the Palo Alto Landfill.

Emissions Source	2017 Emissions	2018 Emissions	2019 Emissions
Palo Alto Landfill GHG emissions during the vear	6,5000	6,5000	6,000
<b>y</b>			

With the completion of the landfill cap and upgrades to the landfill gas collection system the City expects the Palo Alto Landfill GHG emissions to continue to trend downwards over the next 30 years. The rate of the drop in GHG emissions is difficult to estimate this early in the completion of the cap but as time goes on the rate should be more predictable.

#### Trend: Solid Waste Related GHG Emissions in metric tons (MT) carbon dioxide equivalents (CO<sub>2</sub>e).

Emissions Source	2005 Emissions <sup>1</sup> ( <i>baseline</i> )	2013 Emissions	2014 Emissions	2015 Emissions <i>(current)</i>	2016 Emissions (current)	Difference (current- baseline)	Percent Difference
Palo Alto Landfill emissions during the year <sup>2</sup>	9,900	5,110	9,427	8,617	6,527	(1,283)	-13%

Life cycle fugitive emissions <sup>3</sup>	2,883	1,931	1,919	1,986	1,850	(1,033)	-36%
Landfilling recyclable materials <sup>3</sup>	13,650	8,934	8,892	9,910	9,905	(3,745)	-27%

<sup>1</sup>2005 GHG Emissions are baseline calculations.

<sup>2</sup>Code of Federal Regulations (CFR) Title 40, Part 98, Subpart HH model used to calculate greenhouse gas emissions produced by Palo Alto Landfill.

<sup>3</sup>EPA Waste Reduction Model (WARM) using CalRecycle landfill data used to calculate greenhouse gas emissions produced by handling and disposal of City generated solid waste and includes the capture of recyclables at the Sunnyvale Material Recovery and Transfer Station. The data has been revised to use the latest EPA WARM version 14.

#### **Challenges:**

- The Regional Water Quality Control Plant incinerator beneficially reuses some but not all of the landfill gas. The system is still being optimized to increase the amount of landfill gas the plant can use.
- Product design and packaging development is largely outside of the City's control. The City has implemented a number of internal programs to reduce packaging and waste including the banning polystyrene packaging for City purchases, and can further encourage residents and businesses to join us in these efforts.
- The audience with the most control over waste sorting--janitorial and custodial staff--is difficult to reach, train, and keep informed of new programs. To address this audience, staff, along with Spanish-language support from the City's contract trash hauler GreenWaste of Palo Alto, conducts regular trainings for employees of City facilities.
- In keeping with a City-wide "we go first" strategy, the municipal diversion rate should be
  equal or higher to the residential and commercial waste streams. Staff is providing
  training and improved signage to City departments, and has begun internal
  benchmarking to build awareness and engagement.

# Attachment E: Sustainability Policy and Organization Structure

Shown below is the City's Sustainability Policy approved by the Council in 2007.

# **POLICY AND PROCEDURES 5-01/MGR**

First adopted in April, 2000 Revised June 18, 2007 CMR: 260:07

# SUPPORT FOR SUSTAINABILITY

# POLICY STATEMENT

It is the intent of the City of Palo Alto to be a sustainable community – one which meets its current needs without compromising the ability of future generations to meet their own needs. In adopting this policy, the City of Palo Alto accepts its responsibility, through its operations, programs and services to:

**Economy:** Maintain a healthy, thriving and well-balanced economy comprising a blend of large and small business, which encourages the development of independent businesses and is resilient to the economic changes common to California's economy

**Social Equity:** Continuously improve the quality of life for all Palo Alto community members without adversely affecting others

**Environment:** Enhance the quality of the air, water, land and other natural resources by minimizing human impacts on local, regional and global ecosystems through greater conservancy, reduced pollution, increased efficiency, and protection of native vegetation, fish, wildlife habitats and other ecosystems.

In working toward these goals, the City will, when appropriate, align and partner with community groups, businesses, non-profits, and neighboring communities.

NOTE: Questions and/or clarification of this policy should be directed to the City Manager's Office.

### Organizational Structure to Facilitate Sustainability Actions and to Achieve Goals

City Manager determined that the City's many cross-departmental environmental sustainability activities requires a clear organizational structure to succeed. In preparation for the recruitment of the new position of Chief Sustainability Officer (CSO), roles and responsibilities for each part of the organization was established.

<u>Sustainability Board</u>: Comprising of Directors from key departments, will establish the vision and goals for the overall effort, approve the CSO's work plan, and identify and approve resources to complete the work plan tasks.

<u>Sustainability Executive Advisory Group</u>: To solicit input from outside the City, the City Manager will organize and lead such an ad hoc group, whose membership will include key executives from Palo Alto institutions, community leaders, and representatives from Stanford and large companies. The function of the group is to give advice and feedback to the City Manager, get input from the "real world", forge and leverage international relationships/partnerships, build excitement, and model and motivate behavioral changes.

<u>Chief Sustainability Officer</u>: The CSO will report to the City Manager and take direction from the Sustainability Board. A critical task of the CSO is to develop the long-term sustainability work plan and prioritize tasks for each fiscal year. The CSO will work with a larger group of individuals from many City departments to complete the tasks on the work plan. That larger group, <u>the Sustainability Team</u>, will organize itself into committees to implement the work plan as prioritized by the CSO. Participants in the Sustainability Team will be embedded in job descriptions and annual appraisals to ensure that team members understand that the sustainability work plan tasks are key City priorities. The CSO will also be responsible for community outreach on sustainability efforts and will act as the co-chair of community based <u>Community Environmental Action Partnership</u> (CEAP).

<u>Green Team</u>: This is a long standing individual employee initiative driven team with voluntary membership. The Green Team includes employees from many work groups and has historically been project-based with the goal to complete projects and a bias towards action. This group of engaged employees will be a valuable asset for the CSO to work with as they act as ambassadors to their own work groups and spread the word on sustainability throughout the City. Many Green Team members will also be on the Sustainability Team. The CSO will act as the liaison to the Green Team co-chairs and will convey information to and from the Sustainability Board.

One of the key tasks for the CSO and the Sustainability Board, the Sustainability Team and the Green Team is to update the 2007 Climate Protection Plan. In addition, measuring performance with respect to the goals of the plan must be done on an annual basis.

Attached is the line-diagram of the proposed governance structure.



#### **City of Palo Alto Sustainability Policies**

Since 1991, the Palo Alto City Council, City Manager, and City of Palo Alto Departments have adopted policies, plans, ordinances, resolutions, and principles that have helped to increase the sustainability of Palo Alto. In addition, the City of Palo Alto is currently integrating sustainability principles in the Comprehensive Plan.

#### **Council Policies**

- Energy Risk Management Policies October 21, 2002, Revised October 2005
- Extended Producer Responsibility Policy December 2009 (CMR 456:09)
- <u>Green Building Policy for City Buildings April 21, 2003</u>, <u>Revised December 23</u>, 2007 (CMR 436:07)
- Integrated Pest Management October 2001 (CMR 343:01)
- <u>Recycled Water Salinity Reduction Policy December 2009</u> (CMR 111:10)
- Single-Use Plastic Policy April 2009, Revised September 22, 2016 (CMR 215:09)
- Support for Sustainability April 2000, Revised June 18, 2007 (CMR 260:07)

#### **Council Approved Plans**

- Baylands Master Plan 2008
- Bicycle and Pedestrian Transportation Plan July 2012
- Bicycle Transportation Plan May 2003
- Carbon Neutral Plan for the Electric Supply Portfolio March 4, 2013 (Staff Report 3550)
- <u>Clean Bay Pollution Prevention Plan 2014</u>
- <u>Climate Protection Plan December 3, 2007</u> (CMR 435:07)
- Disinfection Alternatives Work Plan August 2005
- Gas Utility Long-Term Plan April 23, 2012 (Staff Report 2552)
- Local Solar Plan April 21, 2014 (Staff Report 4608)
- Long Term Energy Acquisition Plan (LEAP) April 16, 2012 (Staff Report 2710)
- Palo Alto Comprehensive Plan 2015 (Staff Report 5969)
- <u>Recycled Water Facility Plan December 2008</u>
- Sustainability and Climate Action Plan November 28, 2016 (Staff Report 7304)
- Urban Forest Master Plan May 11, 2015 (Staff Report 1332)
- Urban Water Management Plan (2010) June 2011
- Urban Water Management Plan (2015) June 2016
- Utilities 2011 Strategic Plan July 18, 2011, Revised August 5, 2013
- Zero Waste Strategic Plan October 2005

#### Ordinances

- Disposable Checkout Bag Ordinance May 6, 2013 (See website for more information) (Staff Report 3065)
- <u>Electric Vehicle Supply Equipment Ordinance 5263</u> Effective September 2014 through 06/19/2015
- Energy Reach Code Ordinance 5383 Effective 01/01/2017
- Energy Reach Code Ordinance 5345 Effective 09/10/2015 through 12/31/2016
- Green Building Ordinance 5393 Effective 01/01/2017
- Green Building Ordinance 5324 Effective 06/22/2015 through 12/31/2016
- Green Building Ordinance 5220 Effective December 2013 through 06/19/2015

- Polystyrene Reduction Ordinance May 11, 2009, Revised April 29, 2010 (See website for more information) (CMR 201:09) (CMR 206:10)
- <u>Recycled Water Infrastructure Ordinance May 12, 2008</u> (CMR 203:08)
- Sewer Use Ordinance June 21, 2010 (CMR 252:10)
- Smoking Ordinance October 3, 1995, updated December 5, 2016 (Staff Report 7544)
- Stormwater Pollution Prevention Ordinance January 10, 2011

#### **Resolutions and Adopted Principles**

- <u>Ahwahnee Water Principles Resolution No. 8560 2005</u> (Modified Ahwahnee Water <u>Principles</u>)
- Bay Friendly Landscaping Resolution January 22, 2008
- <u>Carbon Neutral Plan for the Electric Supply Portfolio Resolution No. 9322 March 4, 2013</u>
- Establishing a Local Solar Plan Resolution No. 9402 April 21, 2014
- Green Business Program Resolution No. 7877 July 19, 1999
- Palo Alto Energy Risk Management Policy Resolution No. 9454 October 6, 2014
- Potential Impacts of Climate Change and Externality Costs Resolution No. 9013 December 7, 2009
- <u>State and National Extended Producer Responsibility Actions Resolution No. 9017 –</u> December 14, 2009