STAFF REPORT

City Council
Meeting Date: 12/10/2019
Staff Report Number: 19-266-CC

Study Session: Update on the current Climate Action Plan and potential scope for developing a Climate Action Plan 2.0

Recommendation
This is a study session and the City Council may provide general direction on the Climate Action Plan however no action is required.

Policy Issues
The City’s Climate Action Plan (CAP) was approved by the City Council in 2009, and was designed to meet a 27 percent greenhouse gas (GHG) reduction target by 2020.

Background
The Climate Action Plan (CAP) was first approved by the City Council in 2009. It remains a guiding document for all community policies, programs, and projects to reduce greenhouse gas (GHG) emissions that contribute to climate change. From time to time, the CAP has been updated with strategies to reflect technology and regional/state legislative advancements. The most recent update to the CAP strategies occurred in 2018 (Attachment A).

The CAP includes an inventory of GHG emissions from fossil fuels consumed by vehicles and buildings, and produced by waste in the community. The City Council also adopted a GHG reduction target of 27 percent below 2005 levels by 2020. The most current data from 2017 shows an 18.6 percent reduction in GHG emissions.

Climate change refers to the alternation of the earth’s atmospheric conditions due to human consumption and use of fossil fuels that create GHG emissions such as, carbon dioxide from gasoline in vehicles and natural gas in buildings, and methane produced from landfilled waste. GHG emissions from the production and transport of goods and services are also important to consider, such as the GHG footprint of plastics, meat and disposable food ware. However, they are challenging and difficult to analyze due to unavailable data.

These activities result in an overall warming of the planet that changes weather patterns resulting in displacement/extinction of species and people, affects agriculture, reduces the availability of freshwater water, increases floods and wildfires, and threatens coastal communities through sea level rise. These changes affect all life now and in the future on the planet to varying degrees. It also impacts economies and equity in culture and society.

The Environmental Quality Commission’s (EQC) work plan includes providing advice to the City Council on adopting a new greenhouse gas reduction target beyond 2020 and identifying strategies to achieve the new
reduction target. The EQC has researched and prepared advice on updating the CAP beyond 2020 for the City Council (Attachment B). In response to working with the EQC, staff has developed a potential scope for creating a Climate Action Plan 2.0 that includes a structured process and defines limited stakeholder outreach so the project can be completed in one year. See Attachment C for details on the project scope. Broader community outreach would likely result in a longer delivery window of a recommendation on updating the CAP.

The purpose of this study session is to inform and receive feedback from the City Council on developing a CAP 2.0 in regards to a new GHG reduction target, potential strategies, and a process to develop the plan. Staff advises that the City Council consider this project in the annual work plan/goal setting process in January 2020 to ensure alignment with other sustainability and community priorities, and adequate resourcing is available.

Analysis
Menlo Park Implementation Progress to Date
Progress has been made on greenhouse gas (GHG) reduction strategies, such as (but not limited to) the adoption of a Community Zero Waste Plan, renewable energy installations on city facilities, installation of public electric vehicle charging stations, formation of Peninsula Clean Energy (PCE), and inclusion of green design standards in the General Plan. This year the City Council also adopted reach codes which require new buildings to be nearly all-electric to maximize use of clean and renewable electricity available in the community. In addition, formation of a Transportation Management Association is being evaluated as a method to reduce GHG emissions from commuters.

Menlo Park Community Greenhouse Gas Inventory Results and Limitations
In 2005, the community generated 349,284 tons of GHG emissions\(^1\) in three categories: transportation, solid waste and building energy use. The City Council has a GHG reduction goal of 27 percent below 2005 levels by 2020. This means Menlo Park’s 2020 GHG emission target is 254,977 tons or a 94,307-ton reduction.

The most recent data shows the City has achieved notable emission reductions in the face of continued development but has yet to reach its target. Between 2005 and 2017, communitywide greenhouse gas emissions have decreased to 284,378. This reflects an 18.6 percent decrease, and can be attributed to reductions from:

- Waste related emissions due to the installation of efficient gas capture devices at Ox Mountain landfill (\(-13,321\) tons)
- Building energy related emissions (\(-72,643\) tons) due to:
  - State mandates requiring energy providers, such as Pacific Gas & Electric to obtain power with lower emissions\(^2\) and from renewable sources\(^3\).
  - Menlo Park subscribing all residents and businesses to a community choice aggregate organization (CCA), Peninsula Clean Energy\(^2\) that provides 90 percent clean and renewable electricity. It should be noted this single measure reduced energy related emissions by 19,637 tons in one year (2016-2017).

---

\(^1\) The industry standard unit for GHG emissions is metric tons carbon dioxide equivalent (MT CO2e). These terms can be used interchangeably.

\(^2\) Assembly Bill 32, the California Global Warming Solutions Act (2006) arb.ca.gov/cc/ab32/ab32.htm

\(^3\) Senate Bill X1-2, Renewables Portfolio Standard (2011) leginfo.ca.gov/pub/11-12/bill/sen/sb_0001-0050/sbx1_2_bill_20110412_chaptered.pdf
Figure 1 shows annual communitywide emissions with percentage contribution by category. As shown, the most significant source of 2017 emissions is transportation (55.8 percent) followed by building energy use (41.24 percent). Inventory data for 2018 and 2019 will not be available until 2020/2021. Attachment D provides a detailed analysis of the inventory broken down by category and 2035 projections for some categories.

Economic/development events are also noted, such as the Great Recession, Facebook’s move to Menlo Park, installation of gas capture devices at Ox Mountain Landfill, and city implemented reduction strategies (adoption of local ordinances, automatic enrollment in Peninsula Clean Energy).

These noteworthy events show while local strategies can affect communitywide greenhouse gas emissions, they can also be influenced by external factors outside the City’s purview (e.g., economic event, state or regional efforts, etc.). Staff recommends using another methodology for measuring impacts of local strategies to determine success toward meeting a GHG reduction goal. This will allow for the most efficient use of city resources while providing better data to the community and City Council. The GHG inventory is helpful in determining where to focus policy or program efforts, but is not reflective of measuring progress as a result of local action. This is described in more detail below under “Debrief of Other Cities and counties Climate Action Plan 1.0.”
Based on the inventory and projections analysis in Attachment D, waste and transportation emissions are expected to increase due to development. Thus, the three big focus areas to consider for the next CAP are:

1. Reducing 80,000 tons of natural gas related GHG emissions in the existing building stock
2. Preventing 100,000 tons of waste related GHG emissions by achieving the zero waste goal by 2035
3. Preventing 200,000 tons of transportation related GHG emissions through shifts to low carbon fuel alternatives

Debrief of Other Cities and counties Climate Action Plan 1.0

Many cities are on track to meeting their 2020 goals. However, this progress is not necessarily a result of local action but from regional, state and federal standards/opportunities, such as fuel efficiency standards and state legislation that requires cleaner sources of energy by power providers.

Local government actions that are attributable to reduced greenhouse gas emissions were from waste by offering composting services instead of landfilling organic waste and creation of community choice aggregation (CCA) organizations that provide clean and renewable energy to communities.

These findings are accurate for Menlo Park where the largest reductions since 2005 have been in the waste and building energy category. Although for waste, this was through improved capture of methane at Ox Mountain Landfill rather than composting services. Menlo Park also subscribed all residents and businesses to clean electricity through the formation of Peninsula Clean Energy (a CCA).

The challenges and barriers that cities and counties have faced in implementing their CAP 1.0 include:

- Lack of staffing, funding and political will
- Lack of ability to track implementation efforts
- Difficulty in influencing transportation emission reductions
- Issues in maintaining and developing greenhouse gas inventories that are unable to clearly show gains or reductions related to local government actions. For example, less than 1/5 of total GHG emission reductions in Santa Barbara were attributed to local actions. External factors played a larger role, such as trends in the marketplace/technology, economy, consumer choices, state and regional action, and legislation.

Going forward cities and counties have taken the lessons learned from their first CAP to adopt the following features in their CAP 2.0:

- Reducing the number of GHG reduction measures. For example, adopting 10 key measures/goals instead of 80.
- Less emphasis on identifying specific measures in order to build in flexibility that accommodates technological and legislative advances, such as de-carbonizing buildings and creating electric ready communities instead of stating specific measures, such as an anti-idling policy.
- Targeting deep GHG reductions through comprehensive and systemic changes by avoiding focus on low hanging fruit (such as converting streetlights to LED lights or public education) to focus more on challenging policies and programs that would yield greater GHG reductions (e.g., reach codes, zero waste policies, and/or electric vehicle charging station infrastructure).
- Design measures so implementation metrics can be quantified and monitored to showcase success.
- Specify and fund required staff resources to carry out the plan.
- Addition of consumption based inventory (full life cycle analysis of GHG impacts), equity and adaption elements. Leaders in incorporating equity in CAP include San Antonio, Detroit and Cleveland.

The Carbon Neutral Cities Alliance (CNCA) is a collaboration of leading global cities working to cut greenhouse gas emissions by 80 percent to 100 percent. In their report titled “Game Changers: Bold Actions by Cities to Accelerate Progress Toward Carbon Neutrality” (Attachment E), several game changers
for local governments are listed as:
1. Adopt a zero emissions standard for new buildings, which means all energy use for a building is efficient and comes from renewable energy sources. This can also be applied to additions and alterations to existing buildings.
2. Build electric vehicle charging infrastructure
3. Mandate the recovery of organic material
4. Electrify buildings heating and cooling systems
5. Designate car-free and low-emission vehicle zones
6. Empower local producers and buyers of renewable electricity
7. Set a city climate budget to drive de-carbonization

Each one of these actions has a subset of steps to achieve this goal. For example, in building electric vehicle (EV) charging infrastructure, step one includes conducting an analysis of future EV infrastructure needs of the community and design the infrastructure accordingly. It also includes addressing equity in the form of access to charging stations. This was an action item in the 2020 Menlo Park Climate Action Plan, but was not completed due to limited staff resources to focus on the reach codes and Heritage Tree Ordinance update.

**Environmental Quality Commission Advice**

The Environmental Quality Commission has been actively discussing the update of the Climate Action Plan over the last few months. In October, the EQC took formal action to advise the City Council to adopt a new reduction target of carbon neutral (zero emissions) by 2030. This would be defined as a 90 percent reduction of community GHG emissions (fossil fuel use in building energy use and transportation, and methane from waste) with the remaining 10 percent to be sequestered through carbon sinks (e.g., trees, vegetation, wetlands, etc.).

This goal is bolder and more progressive than the state goal of 40 percent by 2030 and 80 percent by 2050, but it would be difficult to achieve. Not only does it require significant staff resources and funding, it also requires advancements and alignment with external factors such as technology and state legislation advancements to be fully realized. Carbon neutrality can be achieved over time with careful attention to external factors and timing local policy and program opportunities accordingly.

The EQC advises this bolder reduction goal because the risk of severe climate change impacts are becoming more accelerated. The state’s goal roughly aligns with those set out by the United Nation’s 2018 Intergovernmental Panel on climate change (IPCC) report. The IPCC states that these reductions are required to have a 50 percent chance of keeping global temperatures below 1.5˚C to avoid severe impacts.

However, the IPCC’s more recent 2019 report states that certain effects of climate change are happening faster than predicted in the 2018 report. It is likely that the state’s targets will prove to be too weak to keep global temperatures below 1.5˚C. The EQC advises that due to this great risk and Menlo Park’s demographics and location in the technology capital, there is a unique and timely opportunity for Menlo Park to lead the Bay Area and the state in developing model and innovative policies and programs that can be replicated to mitigate climate change impacts.

To meet this bold GHG reduction goal, the EQC also advises the following 10 strategies for including in the CAP 2.0:
1. 100 percent carbon-free electricity through Peninsula Clean Energy membership
2. Completely electrify existing buildings
3. Reduce vehicle miles traveled (VMT)
4. Electrify vehicles, reduce gasoline sales and increase EV infrastructure
5. Reduce carbon emissions from construction
6. Electrify all municipal buildings and fleet vehicles
7. Implement Community Zero Waste Plan and catalyze a circular economy
8. Avoid installing appliances/structures that will be abandoned due to climate change (e.g., gas water heaters).
9. Sequester residual carbon emissions through direct carbon sinks (urban canopy, increased landscaped areas, etc.)
10. Prepare the City for climate change through adaption measures.

Staff Resource Constraints and Successes
The current resources of the Sustainability Division can only support one to two new policy and programs per year. In addition, each new policy and program requires implementation support or adds to sustainability or other departments’ baseline operations. This can further reduce the capacity to undertake new programs, policies or efforts.

The last CAP strategic update occurred in 2018 (Attachment C), and included the following strategies for 2018-2020 based on the advice provided by the Environmental Quality Commission (EQC) that was approved by the City Council:
1. Incorporating green design standards from the ConnectMenlo area to the El Camino Real/Downtown Specific Plan. This was later traded off for developing building electrification reach codes; and
2. Developing a community wide electric vehicle charging infrastructure (EVCI) master plan that would provide guidance on policies and programs to address infrastructure barriers to electric vehicle purchases. This was not completed due to limited staff resources that were dedicated to completing the Heritage Tree Ordinance update (City Council Priority No.4). The updated ordinance was adopted in November 2019. However, another six months of work is necessary to prepare for the implementation of the new rules and standards.

In addition, implementation of the zero waste plan (which is a climate action plan strategy) has also been delayed due completing higher priority City council work plan items, implementation of prior approved policies and programs, and maintaining baseline operations in the Sustainability Division. However, maintaining a high focus on one or two progressive policies such as an all-electric building reach code has placed the city as a leader in the state, creating a ripple effect in encouraging other cities to develop similar policies that accelerate GHG reductions beyond Menlo Park’s borders.

Other Communities Approach to Funding and Staff Resourcing
Many cities are updating their climate action plan to 2030 and 2050, known as CAP 2.0. In addition, given the urgency of climate change, cities are considering and approving increasing staff capacity and funding to expedite climate action plan strategies.

For example, Mountain View approved in October to spend $4.6 million on 10 new staff positions over the next three years to implement climate action plan 2.0 strategies plus an additional $3 million dedicated to implementing/supporting programs. Two positions will be dedicated to zero waste plan implementation. In Sunnyvale, three new positions will be added totaling $500,000 per year to implement strategies in their Climate Action Plan 2.0.

Some cities are using its general fund to support the dedicated staff, and others are considering or using dedicated taxes/fees, for example:
- Boulder, Colorado has had a tax dedicated to addressing climate change since 2006, which has paved the way for leadership in addressing climate change, such as requiring energy efficiency upgrades in all existing buildings. It generates $1.8 million per year and is levied on city residents and businesses
based on the amount of electricity they consume. Annual average is $21 for residential, $94 for commercial, and $9,600 large industrial customers. The tax has been extended through March 2023.

- The City of Watsonville adopted a Carbon Fund Ordinance in 2015 that establishes a carbon fee on all development projects except single family residential alternations, temporary buildings, and building area that is not conditioned. The goal is to encourage implementation of renewable energy in development projects and fund citywide greenhouse gas reduction projects.

Currently, Menlo Park dedicates two full time employees and $100,000 per year to Climate Action Plan Strategies, and $100,000 to implementation of zero waste strategies.

Potential Scope for Developing a CAP 2.0
Staff advises that the City Council consider this project in the annual work plan/goal setting process in January 2020 to ensure alignment with other sustainability and community priorities, and adequate resourcing is available.

If the project is included in the 2020 City Council work plan, Attachment C provides a high level overview of the potential process to adopting a CAP 2.0. It outlines the potential general framework, roles and responsibilities, and method of community engagement, which could be targeted consultation with key stakeholders, such as relevant city commissions and local nonprofits. This means feedback may or may not be used in the final CAP 2.0. The rationale for limited community engagement is to provide a pathway for the project to be completed in one year.

Impact on City Resources
Updating the Climate Action Plan would not require additional resources at this time. However, updating the Climate Action Plan would be the only climate initiative in addition to implementing three Zero Waste Plan strategies for the Sustainability Division in 2020.

This would mean that other measures, such as electric vehicle infrastructure readiness opportunities for the community, electrification of existing buildings, energy storage, or GHG free transportation initiatives (e-scooter/bike share) could not be pursued with current resources until 2021. This would result in missed opportunities particularly in electric vehicle infrastructure readiness as there are funding and regional opportunities occurring in 2020. The City Council would need to allocate funding and staff resources to work on more than one climate initiative in 2020.

Environmental Review
An analysis of impacts under the California Environmental Quality Act will be performed prior to adoption a Climate Action Plan 2.0.

Public Notice
Public notification was achieved by posting the agenda, with the agenda items being listed, at least 72 hours prior to the meeting.
Attachments
A. Hyperlink – Climate Action Plan update 2018: menlopark.org/ArchiveCenter/ViewFile/Item/8360
B. October Environmental Quality Commission Recommendation report
C. Climate Action Plan Project on a Page and Scope
D. Community Greenhouse Gas Analysis Memorandum
E. Hyperlink – Game Changers: Bold Actions by Cities to Accelerate Progress Toward Carbon Neutrality by Carbon Neutral Cities Alliance:

Report prepared by:
Rebecca L. Lucky, Sustainability Manager
MEMORANDUM

Date: 10/16/2019
To: Environmental Quality Commission
From: Climate Action Plan subcommittee
Re: Review and discuss subcommittee’s climate action plan memorandum and consider a recommendation to City Council for developing a climate action plan 2.0

The Environmental Quality Commission (EQC) climate action plan (CAP) subcommittee continues its work on its portion of a new CAP for Menlo Park. We strive to work as quickly and as thoroughly as possible, acknowledging the urgency of the problem we seek to address.

In the latest phase of our work, we have reviewed CAPs from 11 other North American cities, some close to home and others further afield, but almost all at the cutting edge of climate change mitigation and adaptation. We have also considered best practices for climate action, proposed by relevant research organizations such the Rocky Mountain Institute (www.rmi.org) and ICLEI (www.iclei.org).

Based on that research and an initial assessment of the specific climate-related risks faced by Menlo Park, we have begun to hone in on those targets and strategies that would be best suited for Menlo Park to adopt. The subcommittee is now prepared to propose both greenhouse gas emissions targets and underlying climate strategies for the EQC’s consideration.

This memo includes:
- An overview of key findings
- Proposed greenhouse gas (GHG) reduction targets
- Ten high-level strategies to support GHG targets
- Potential obstacles
- Co-benefits of recommended strategies
- Proposed next steps

Key findings

- Many cities in California drafted their first climate action plans in 2007-2009 and have updated their plans roughly every 5 years since.
- Many cities in California are now on their second or third update.
- As warnings from scientists become more dire, especially recently, cities have made significant changes to their climate action plans, deepening their commitments to reduce greenhouse gas emissions.
- Most climate action plans now include specific plans for adapting to climate change, in addition to ongoing efforts to mitigate climate change through greenhouse gas reduction. Adaptation includes preparing cities for: sea level rise, drought, wildfires, extreme weather events, power outages and more.
- Most cities with climate action plans are now setting a date by which they will achieve “net zero” carbon emissions, which is the point at which greenhouse gas emissions (minus new carbon sinks) for the entire city equals zero. Many cities and states in the US define “carbon neutrality” to be 80 percent greenhouse gas reductions, relative to 1990 levels.
Some “low hanging fruit” actions, like converting traffic lights to LEDs and promoting energy efficiency through rebates, have been exhausted and cities now face more challenging tasks.

The next steps required for significant greenhouse gas reductions require more money, more direct action by residents and significantly more political will.

While these next steps will be a “heavy lift” for cities, collaborating with key stakeholders (e.g., Peninsula Clean Energy) whose interests are aligned with ours offers Menlo Park the potential for significant cost savings and reduction in programmatic burden.

In general, climate action plans have become much more public-facing documents: less dense, less technical, easier to read and more aspirational, as they require much more public buy-in to implement.

Framing the climate action plan

While a growing percentage of Americans (roughly 70 percent) report that they are concerned about climate change, most have not yet accepted that in order for us to meet our Paris Climate Accord commitments and keep global temperature rise below 2°C. We must quickly transition away from burning fossil fuels. The question is no longer if we will stop burning fossil fuels but when and how. It is time for the public to start grappling with that truth, so that they can prepare to act.

The good news is that we have all of the technology we need to eliminate 90 percent of fossil fuel consumption, today. This is a fact that most Americans do not understand, in large part because entrenched interests have sought to confuse the public, so that they can maintain their subsidies and profits. It is time for leaders to confidently declare that we do not need to wait for a future solution to climate change. The technology solutions are here. They are affordable. All that remains is for us to act.

The sooner we act, the more time we buy ourselves to adapt to the significant climate changes coming our way. Coming changes in climate will affect every aspect of our lives and no one will be immune. As an example, sea level rise is expected to flood significant portions of Menlo Park’s Belle Haven neighborhood as soon as the 2060s. While not all of us live in Belle Haven, all of us will be impacted by the suffering of our neighbors and the eventual flooding of the approach to the Dumbarton Bridge. As a city, we may have to choose between building expensive sea walls to protect homes and infrastructure, and watching whole neighborhoods be engulfed by water. Even if we choose to build sea walls or levees, we must accept that levees are not fool proof. They can be breached with catastrophic consequences, such as those witnessed during Hurricane Katrina in New Orleans.

The more deeply and swiftly we make reductions to our carbon emissions, the more time we give for other cities around the country to realize what is possible and to follow our lead. As we have seen recently with the adoption of bold Reach Codes by cities following us, like San Jose, leadership matters. Our bold action can catalyze action by larger cities. Broader collective action in turn increases the chances that climate catastrophe will be averted, or at least reduced. Although none of this is guaranteed, taking bold action may in fact be our only real chance of averting the dire consequences of climate change and so we believe that it is a goal worth pursuing with all of our might.

Every day we wait to enact change, we increase the costs that will most certainly be paid later, either by us or our children. While the next steps required to fight climate change will seem expensive and daunting to many citizens, on the order of $30,000 per household to retrofit buildings and switch cars, those costs and efforts must be weighed
against the billions of dollars that will certainly be lost in the value of private property or spent on adaptation efforts in Menlo Park if we don’t act.

- Menlo Park enjoys a relatively privileged position among US cities, being located in a hot-bed of technical innovation and in one of the top 10 wealthiest counties in the nation. Given those advantages, we must ask ourselves: If we can’t muster the motivation to aggressively tackle climate change, who else can we expect to do so?

Greenhouse gas emissions targets

2013 – Greenhouse gas emissions estimates from the City’s last climate action plan update

- In 2013, Menlo Park estimated its greenhouse gas emissions to be **360,247 tons** of CO₂e (carbon dioxide equivalents) per year, broken down as follows:
  - **40 percent** from fossil fuels used in transportation, which includes a mix of passenger cars and trucks of various duty types: light-, medium- and heavy-duty
  - **39 percent** from burning fossil fuels for heat and electricity in commercial buildings (includes “Direct Access” utility customers that buy from third party energy companies)
  - **16 percent** from burning fossil fuels for heat and electricity in residences
  - **4 percent** from off-gassing methane in Bedwell Park, the site of the city’s former landfill
  - **1 percent** from solid waste management
- That translates to **approximately 11 tons of CO₂ per resident per year**
- Excluded from the city’s 2013 greenhouse gas inventory are:
  - Embodied CO₂ emissions from construction materials in buildings, significant especially for concrete and steel
  - Embodied CO₂ emissions from the goods and services purchased by businesses and residences, which includes the manufacture of the goods as well as the shipping of those goods to customers
  - Emissions associated with water and sewer treatment
  - Emissions associated with air travel by residents
  - Emissions associated with the agriculture and livestock that becomes food for residents
  - Emissions associated with upstream activities related to producing natural gas and gasoline (though these are naturally reduced whenever we reduce the use of the fuels)

2019 – Greenhouse gas emissions today

- The City’s exact carbon emissions today are not known. City staff is preparing to complete a new greenhouse gas inventory and will provide a date by which that inventory will be available.
- A rough estimate of Menlo Park’s greenhouse gas emissions (using categories similar to the 2013 estimate) suggest that the City’s emissions may have decreased by as much as 100,000 tons, primarily due to the switch from PG&E to Peninsula Clean Energy for our electricity supply.

2030 —Greenhouse gas emissions target

- The State of California has set the following targets:
- California’s targets roughly align with those set out by the Intergovernmental Panel on Climate Change (IPCC) in its 2018 report. The IPCC states that these reductions are what is **required** to have approximately 50 percent chance of keeping global temperatures below 1.5°C.
- The IPCC’s more recent 2019 report states that certain effects of climate change are happening faster than predicted, even in its 2018 report, and so it is possible, or even likely, that California’s targets will prove to be too weak to keep global temperatures below 1.5°C.
- If the City wishes to lead other cities in mitigating climate change, it should adopt a Climate Action Plan so bold that, if all cities adopted it, would solve climate change

**Given the likely lag time between our own actions and the actions of cities that choose to follow us, the CAP subcommittee recommends that Menlo Park adopt a target of 90 percent CO₂e reduction by 2030 from 2005 levels, with the remaining 10 percent of CO₂e sequestered by direct carbon sinks**

**Recommended Strategies**

1. 100% carbon-free electricity through Peninsula Clean Energy membership
2. Completely electrify existing buildings
3. Reduce vehicle miles traveled (VMT)
4. Electrify vehicles, reduce gasoline sales, and increase EV infrastructure
5. Reduce carbon emissions from construction
6. Electrify all municipal buildings and fleet vehicles
7. Implement Zero Waste Plan and catalyze a circular economy
8. Avoid installing appliances/structures that will be abandoned due to climate change (e.g. gas water heaters).
9. Sequester residual carbon emissions through direct carbon sinks (urban canopy, increased landscaped areas, etc.)
10. Prepare the city for climate change through adaption measures #11

**Rationale for strategies**

- Affordable carbon-free electricity forms the foundation of all other efforts to reduce the City’s carbon emissions, including vehicle electrification and electrification of home heating. Fortunately, the City has a strong partner in Peninsula Clean Energy, which has independently committed to achieving 100 percent carbon-free electricity for all customers in San Mateo County by 2021.
- Reducing VMT in the City will reduce carbon emissions and simultaneously **reduce traffic congestion**, which consistently ranks as one of residents’ top complaints in Menlo Park.
- By swiftly electrifying its own buildings and vehicle fleet, the City will set an example and create learning opportunities for City staff and policy makers, as they prepare to ask residents and business to follow suit. Any lessons learned can be incorporated into effective City policies.
- We should anticipate that burning natural gas in buildings will eventually be banned. That is inherent in our stated goal of eliminating the burning of fossil fuels, in order to achieve carbon neutrality.
In Northern California, as PG&E customers convert their gas heating appliances to electric, natural gas will become increasingly cost prohibitive, as PG&E attempts to recover costs for maintaining its gas pipelines from fewer and fewer customers.

Therefore, continuing to allow residents and businesses to install gas appliances is a set-up for failure, waste and economic hardship, in a future that few members of the public can imagine today.

In order to follow the IPCC’s “model pathway” for avoiding the worst impacts of climate collapse, we must immediately begin reducing emissions with strategies that are: rapid, far reaching, and unprecedented. In other words, we must radically shorten the transition time to 90 percent emissions reductions.

We must come to understand that the times of slow and gentle transition have now ended.

Potential obstacles

- **Cost.** Every effort should be made to ensure that any strategy implemented by the City is done in the most cost effective way possible. Members of the CAP subcommittee are working diligently to come up with creative solutions for funding the suggested strategies. It is clear that many of the strategies could be made significantly more affordable through collaboration with partners such as: Peninsula Clean Energy, San Mateo County, other cities, local employers, appliance manufacturers and local community colleges. As an example, one potential obstacle to converting large numbers of gas furnaces to heat pumps within a short period of time is a shortage of skilled labor. To address this issue, the CAP subcommittee is exploring the possibility of partnering with Peninsula Clean Energy and local community colleges to develop training programs for heat pump installers. It is further possible that the programmatic burden of any related rebate programs could be shouldered by Peninsula Clean Energy, which stands to benefit from expanded home electrification. Even more savings may be achieved by negotiating bulk discounts on purchases of desired appliances, such as heat pumps. Every cost reduction measure will be explored and maximized.

- **Resistance to change.** Change is difficult and often the obstacles are more psychological than physical. Even when someone is presented with compelling information to support change, they may hesitate at the idea. After all, the old way of doing things is familiar and known. Any new policies considered by the City that require change on the part of residents should be accompanied by effective education and media campaigns, which convey information but also address psychological resistance to change. The City’s proximity to Stanford offers rich opportunities for relevant academics and thought leaders to instruct residents and business owners on the science and economics behind key climate change mitigation strategies. Those policies that are anticipated to be most difficult for residents to adopt should be carefully designed and supported by effective programs, such as rebates and incentives.

- **Pressure from entrenched interests.** The City should anticipate that entrenched interests such as fossil fuel companies and developers may apply significant pressure to halt proposed changes. Theirs is a natural reaction to a situation that potentially threatens their profit margins. However, given that the property and safety of our residents is directly threatened by climate change, concerns for the profitability of entrenched interests must take a back seat. Climate change mitigation is worth pursuing with all of our might.

- **Opposition from a vocal minority.** While it is likely that vast majority of Menlo Park residents share the concern of about 70 percent of Americans, who say they feel concerned about climate change, City officials may still face opposition from a vocal, but
perhaps ill-informed, minority on the issue. Some of that opposition may be addressed through effective information campaigns and education programs, such as expert talks by respected academics. However, we should recognize that the issue of climate change has unfortunately moved from that of national bi-partisan concern in the 1990s to one that is now colored by both bitter partisan politics and the influence of powerful entrenched interests. Partisan messages have been crafted to stoke visceral fear and opposition to change in a way that makes some groups difficult to reach, even with the best information. While City officials should anticipate these visceral, emotional responses to some of the change proposed, and while every measure should be taken to minimize the chances of such opposition, some may simply be unavoidable. As some of the co-benefits of addressing climate change, such as improved air quality, become apparent, opposition is likely to recede.

- **Limited staff resources and time.** Adopting the proposed strategies will require additional headcount, both in a coordinating functions, but also dispersed throughout the City’s existing departments. For example, strategies such as significantly reduce VMT and working with employers to install EV charging stations for employees may require new headcount in the City’s transportation department. Wherever possible, collaboration with outside entities should be used to minimize the City’s ongoing programmatic burden, recognizing that some additional headcount cannot be avoided.

**Co-Benefits of proposed strategies**

Enacting the 11 proposed strategies will have significant positive co-benefits that include:

- **Traffic congestion will be reduced**, through efforts to reduce VMT
- **Outdoor air quality** throughout the City **will improve** significantly, due to elimination of gas vehicles in favor of electric
- **Residents’ health could improve** through increased active transportation, such as walking and biking
- **Indoor air quality** will be significantly improved by eliminating the burning of fossil fuels in homes
- Risk of gas **pipeline explosions**, like that which occurred in San Bruno, will be completely **eliminated**
- Retrofitting heating equipment in existing buildings will **boost the local economy** and **create new jobs**, which can eventually be exported to other cities around the country as they electrify their building stock
- Collaborating with local employers to build EV charging infrastructure in their parking lots will encourage daytime charging, which in turn **lowers the State’s carbon emissions** by shifting electrical load to daytime hours when renewable electricity is plentiful and cheap
- Reducing waste and a catalyzing a circular economy will **extend the life of the City’s landfill**, which **saves residents money**
- Resiliency measures, such as installing solar plus storage on homes and municipal buildings, will provide **peace of mind** to residents who fear the effects of power blackouts and other climate-related events
- Residents will receive **peace of mind**, knowing that the City has a plan to address climate change
- Public **costs** of gas pipeline maintenance will eventually be completely **eliminated**
- Efforts to improve pedestrian and biking infrastructure will **increase the City’s village feel**, steering it away from the prospect of ever increasing sprawl and traffic congestion, and **returning it to its small-town roots**
- If the City is able to identify nearby opportunities for carbon sinks, such as reforestation projects on Peninsula Open Space Trust (POST)-owned land, residents could be afforded **opportunities to enjoy those reforested lands** with the knowledge that their City’s commitment to climate change mitigation created those opportunities

**Next steps**

- Request that the City Council place climate action on their 2020 work plan
- Complete a greenhouse gas inventory for Menlo Park
- Budget for additional staff resources in 2020
- Create an FAQ on the economics and carbon reduction potential of electrifying home space and water heating and post on the City’s website
- Organize meetings between City leaders and key stakeholders, e.g., Peninsula Clean Energy, to assess degree of alignment and interest in collaborating on key strategies
- Meet with key staff and commissions in the City to brief them on the climate action plan and gather their input
- Estimate costs associated with each key strategy proposed above
- Present greenhouse gas reduction targets to City Council for approval
- Present draft of climate action plan to city staff by December 1
- Begin implementation of critical CAP strategies, as soon as high-level framework is approved by City Council
- Create a plan for answering residents’ questions about Reach Codes and other climate change mitigation measures on social media
- Come up with a plan for proactively informing property owners in Belle Haven that their property is at risk
- Meet with POST to explore the possibility of investing in carbon sinks (e.g., new forest) on nearby land that they own
Project Summary

There is an urgency to address climate change at all levels of government as the latest United Nation’s Intergovernmental Panel on Climate Change (IPCC) reports there is only 10 years left to mitigate the severest climate change impacts. Menlo Park would directly experience many of these impacts that include increased power shut offs due to wildfires, sea level rise in the Belle Haven neighborhood, and water shortages as a result of extended droughts.

Climate change refers to the alternation of the earth’s atmospheric conditions due to human consumption and use of fossil fuels which create greenhouse gas (GHG) emissions, such as carbon dioxide from the use of gasoline in vehicles and natural gas in buildings, and methane from waste that is landfilled.

The City’s Climate Action Plan was first approved by the City Council in 2009, and includes strategies to reduce GHG emissions. It also includes a GHG reduction target of 27 percent by 2020. Menlo Park is on track to achieving this goal. However, deeper reductions are needed to mitigate the impacts described in the IPCC report.

In order to address this urgency, a Climate Action Plan 2.0 will be developed and consider by the City Council in 2020. It will set forth a new GHG reduction goal and strategies to address climate change at a local level. The desired outcome is to succeed at reaching the new goal, and implement new strategies that will not only reduce Menlo Park’s GHG emissions but help catalyze technology advancements and other local, state, and/or federal policies and programs to aggregate GHG reductions and benefits beyond Menlo Park.

Key Project Activities and Timeline

Phase I- Project Planning, Preparation, and Research (January to April 2020)
- Sign-off on project planning documents
- Formalize executive interdepartmental team
- Obtain initial input/ideas from relevant commissions
- Engage with key community stakeholders regarding initial ideas, concerns, or areas of support
- Research best practices in other communities
- Hire consultant for analysis or environmental review support is needed

Phase II- Program Analysis for CAP 2.0 (April to June 2020)
- Perform program analysis for goal, strategies, stakeholder concerns, and funding/resources
- Develop draft plan or outline
- City Council study session for direction and guidance

Phase III- Adopt CAP 2.0 (July to November 2020)
- Finalize draft plan
- Present to relevant commissions and key stakeholder for consultation
- City Council adoption

Related Existing Policies, Programs, Future Projects

Zero Waste Plan, Transportation Master Plan, General Plan, and Willow Village.

Key Relationships

<table>
<thead>
<tr>
<th>Project Team</th>
<th>Internal Stakeholders</th>
<th>Community Engagement</th>
</tr>
</thead>
<tbody>
<tr>
<td>Executives from City Manager, Community Services, Community Development, Administrative Services, and Public Works</td>
<td>City Attorney</td>
<td>Complete Streets Commission, Environmental Quality Commission, Planning Commission, Chamber of Commerce, key developers, property managers, environmental non-profit groups, and energy providers</td>
</tr>
<tr>
<td>Division managers from engineering, building, planning, and transportation</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

General Project Scope for Climate Action Plan 2.0
Community Engagement: This will be a consult type of community engagement where information about the scope and draft Climate Action Plan 2.0 will be posted on the City’s website, and any member of the public can provide feedback that may influence the final recommendation and decision.

Targeted consult engagement will be limited to key commissions, organized interest groups (such as the Chamber of Commerce, MenloSpark, MenloTogether, etc.), and other key stakeholders that have significant economic or quality of life influence in the community (such as Facebook, Tarlton properties, etc.).

Commissions will be required to provide advice on the final draft plan. In addition, the meetings would be notified and open to the public to allow for additional feedback and input.

Staff will keep records of the general feedback for the City Council to review. City Council will receive advice from relevant commissions regarding the plan. The City Council will be the final decision maker on the Climate Action Plan 2.0.

General Framework:

• Develop a Climate Action Plan 2.0 that includes a new goal of carbon neutrality, strategies, and resiliency
• Use the Environmental Quality Commission (EQC) and the Carbon Neutral Cities Alliance proposed strategies as the foundation for developing the draft Climate Action Plan 2.0:
  - EQC proposed:
    1. 100% carbon-free electricity through Peninsula Clean Energy membership
    2. Completely electrify existing buildings
    3. Reduce vehicle miles traveled (VMT)
    4. Electrify vehicles (EV), reduce gasoline sales, and increase EV infrastructure
    5. Reduce carbon emissions from construction
    6. Electrify all municipal buildings and fleet vehicles
    7. Implement City adopted Zero Waste Plan and catalyze a circular economy
    8. Avoid installing appliances/structures that will be abandoned due to climate change (e.g. gas water heaters)
    9. Sequester residual carbon emissions through direct carbon sinks (urban canopy, increased landscaped areas, etc.)
    10. Prepare the city for climate change through adaption measures
  - Carbon Neutral Cities Alliance:
    1. Adopt a zero emissions standard for new buildings, which means all energy use for a building is efficient and comes from renewable energy sources. This can also be applied to additions and alterations to existing buildings
    2. Build electric vehicle charging infrastructure
    3. Mandate the recovery of organic material
    4. Electrify buildings heating and cooling systems
    5. Designate car-free and low-emission vehicle zones
    6. Empower local producers and buyers of renewable electricity
    7. Set a city climate budget to drive de-carbonization
• Explore redefining how the greenhouse reduction goal is measured by using specific goals for each strategy to increase accuracy, efficiency, and minimize staff time and resources. Focus on defining carbon neutral in terms of sector/category specific targets/indicators instead of relying on a communitywide greenhouse gas inventory, such as number of electric vehicle charging stations per capita
• Analyze staff resources and funding needs to implement the plan
• Providing general examples or steps for each strategy that are measurable and will ultimately meet the desired outcome of each strategy
• Incorporate equity issues/goals in the climate action plan update, including outreach
• Consider prioritization of strategies with the following three-year short term focus areas:
  1. Electrify existing buildings
2. Communitywide electric vehicle infrastructure
3. Develop and implement zero waste policies and programs

Key Roles and Responsibilities of City Staff:
• Carry out community engagement activities as identified in the community engagement section above.
• Form an interdepartmental team of executive and management team members to support development of the plan
• Provide advice and research to the community and decision makers
• Track feedback and provide general results to the City Council
• Serve as information-givers, using technical expertise, and professional experience to describe options as well as their pros and cons, benefits, and implications
• Review best practices in other communities
• Perform analysis to ensure that program is structured and achievable
• Draft a Climate Action Plan 2.0 for City Council consideration and approval
• Implement the Climate Action Plan

Key Roles and Responsibilities of the City Council:
• Consider and review feedback from the community
• Provide, guide, and clarify policy, program, and scope direction
• Consider the recommendations put forward by staff
• Determine the level of community engagement needed
• Determine the final goal, strategies, and general prioritization of the Climate Action plan

Key Roles and Responsibilities of Stakeholders:
• Work in partnership with staff while advocating for their particular interest or concern
• Manage conflict by listening to differing values, concerns and experiences, and work through them to find and propose middle ground solutions
• Review the background materials in advance of meetings if provided
• Recommend strategies and offer ideas on criteria to prioritize strategies
• If a commission, provide advice to the City Council on whether to approve or modify the draft Climate Action Plan 2.0 by end of 2020.
• Assist with communitywide engagement

Givens (non-negotiable):
• The City Council is the final decision maker
• Staff recommendations may differ from commissions, members of the public, or key stakeholders based on evidence, unintended impacts, or to remain apolitical. However, staff will practice due diligence to reach agreement to the maximum extent possible with stakeholders
• The plan must be implementable
MEMORANDUM

Date: 11/21/2019
To: City Council
From: Sustainability Division
Re: 2005-2017 Greenhouse Gas Inventory

Overview

The City Council adopted its Climate Action Plan in 2009 and has been implementing greenhouse gas (GHG) emission reduction strategies and programs to promote environmentally-sound practices. In order to track progress of these strategies and programs, the City calculates and tracks its GHG emissions. In 2005, the community generated 349,284 tons of GHG emissions in three categories: transportation, solid waste, and building energy use. The City Council has a GHG reduction goal of 27 percent below 2005 levels by 2020. This means Menlo Park’s 2020 GHG emission target is 254,977 tons or a 94,307-ton reduction.

The most recent data shows the City has achieved notable emission reductions in the face of continued development but has yet to reach its target. Between 2005 and 2017, communitywide greenhouse gas emissions have decreased to 284,378. This reflects an 18.6 percent decrease. This can be attributed to reductions from:

- Waste related emissions due to the installation of gas capture devices at Ox Mountain landfill (-13,321 tons)

- Building energy related emissions (-72,643 tons) due to:
  - State mandates requiring energy providers, such as Pacific Gas & Electric to obtain power with lower emissions and from renewable sources.
  - Menlo Park subscribing all residents and businesses to a community choice aggregate organization, Peninsula Clean Energy that provides 90% clean and renewable electricity. It should be noted this single measure reduced energy related emissions by 19,637 tons in one year (2016-2017).

While there have been significant decreases in solid waste and building energy use related greenhouse gas emissions, transportation emissions continue to rise. Between 2005 and 2017, transportation emission increased by 15.3 percent or 21,058 tons. Moreover, solid waste related emissions show an increase, up from 5,478 tons in 2013 to 8,424 tons in 2017. This is largely due to the development growth over the last few years.

Community greenhouse gas emissions inventory results

A communitywide greenhouse gas emissions inventory involves measuring the energy, fuel, and solid waste consumed/generated in the community and calculating the resulting quantity of greenhouse gases. The City completed an inventory of its 2005 communitywide greenhouse gas emissions, which serves as its baseline for future years. The initial 2005 inventory was conducted in conjunction with ICLEI-Local.

---

1 The industry standard unit for GHG emissions is metric tons carbon dioxide equivalent (MT CO2e). These terms can be used interchangeably.
2 Assembly Bill 32, the California Global Warming Solutions Act (2006) arb.ca.gov/cc/ab32/ab32.htm
3 Senate Bill X1-2, Renewables Portfolio Standard (2011) leginfo.ca.gov/pub/11-12/bill/sen/sb_0001-0050/sbx1_2_bill_20110412_chaptered.pdf
Governments for Sustainability, an organization that specializes in climate change and greenhouse gas inventories for cities and counties. To maintain consistency, staff has continued to use the ICLEI methodology, transitioning from Clean Air and Climate Protection (CACP) software to the ClearPath software suite. Staff used ClearPath to update inventories between 2005 and 2017. There were methodology changes that resulted in slightly different data than previously reported in the past. Attachment A describes the changes in detail.

Greenhouse gas emissions in Menlo Park were measured from:
- Estimated fuel consumption
- Reported solid waste sent to the landfill
- Building energy usage by account type

Figure 1 shows annual communitywide emissions with percentage contribution by category. As shown in Figure 1, the most significant source of 2017 emissions is transportation (55.8 percent), followed by building energy use (41.24 percent). Inventory data for 2018 and 2019 will not be available until 2020/2021.

Figure 1- Community greenhouse gas emission 2005-2017 by category

---

4 Refer to attachment B for a detailed breakdown by energy account type.
Economic/development events are also noted, such as the Great Recession, Facebook’s move to Menlo Park, installation of gas capture devices at Ox Mountain Landfill, and city implemented reduction strategies (adoption of local ordinance, automatic enrollment in Peninsula Clean Energy).

These noteworthy events show while local strategies can affect communitywide greenhouse gas emissions, they can also be influenced by factors outside the City’s purview (e.g. economic event, state or regional efforts, etc.). If the City elects to continue using greenhouse gas inventories as a measure of progress, staff suggests maximizing the impact of local strategies by creating generalized measurable targets or goals by sector (specifically transportation, solid waste, and building energy). This will allow for the most efficient use of City resources and the flexibility to take advantage of economy of scales for participation in region wide efforts or technological innovations.

Potential Focus Areas for Next Climate Action Plan

From 2005 to 2017 emissions related building energy use has consistently been trending downward. Conversely, transportation and waste related emissions have consistently increased since 2014. A summary of each category’s related emissions is detailed in Attachment B, and shows projected growth.

Based on building permit trends and the number of new developments in the planning phase, Menlo Park may experience over the upcoming code cycle (2020-2023) the replacement and rebuild of 100 new homes and the addition of 21 new buildings that include high-rise residential, retail, office and hotels (if approved).

This includes such projects as the proposed 59-acre redevelopment project commonly referred to as the Willow Village Master Plan. This increase in square footage will drive residential and workforce population growth, in turn increasing waste generation and vehicles on the road. However, the City has implemented emissions reduction strategies that staff expects will continue reductions in the building energy use sector that include:

1. Automatic enrollment of all Menlo Park electric energy customers in Peninsula Clean Energy that provides 90 percent greenhouse gas free electricity and a goal of 100 percent by 2022
2. City Council adoption of the 2020 Reach Codes that prevent the installation of natural gas powered appliances in all new buildings

Both measures are predicted to continue reducing building energy use related emissions modestly, though reductions are anticipated to plateau. To continue achieving significant reductions related to building energy use, natural gas usage in existing building stock will also have to reduced.

After 2013, waste related emissions began to rise and are at risk of continued increase due an increased population (both residential and employee) producing more waste. Without the implementation of zero or waste reduction strategies, staff predicts an increase over 50 percent of GHG emissions from 2017 to 2035. The full implementation of the City Council adopted Community Zero Waste Plan can prevent over 100,000 tons of waste related emissions when the City achieves its zero waste goal.

---

5 Peninsula Clean Energy is a community choice aggregate which provides its customers with electricity from renewable sources: menlopark.org/1083/Peninsula-Clean-Energy
6 The Menlo Park reach codes are a local amendment to the State Building Code that requires electricity as the only fuel source for new buildings (no natural gas): menlopark.org/1583/Reach-codes
7 The Community Zero Waste Plan outlines a goal to recycle and/or compost at least 73 percent of waste by 2035. To achieve this goal, the community will need to reduce the amount of landfilled materials generated to 3.1 pounds per person per day. menlopark.org/1132/Community-Zero-Waste-Plan
Staff also predicts without **improvements in transportation demand management or shifts to low carbon fuel alternatives**, overall community greenhouse gas emissions will increase significantly. Estimates of a business as usual case using most recent transportation emissions factors derived from national averages provided by ICLEI-Local Governments for Sustainability\(^8\), predicts transportation related emissions can increase over 40 percent by 2035. This will add over 200,000 tons of transportation related emissions, roughly 70 of total communitywide greenhouse gas emissions in 2017.

In total, without policy or program measures related to existing buildings, waste, and transportation, the community greenhouse gas inventory is expected to increase 300,000 tons by 2035 as a result of development. In addition, targeting existing development will also be needed if the city seeks carbon neutrality.

Attachment A- Detailed greenhouse gas inventory data by year and methodology changes

Attachment B- GHG Emissions summary by category

\(^8\) National averages produced by ICLEI using U.S. Energy Information Administration data and 2015 Bureau of Transportation Statistic study.
Attachment A- Greenhouse gas inventory data by year and methodology changes

Communitywide greenhouse gas emissions 2005-2017

<table>
<thead>
<tr>
<th>Year</th>
<th>Total emissions CO2e (tons)</th>
<th>% change CO2e (tons) year by year</th>
<th>% change CO2e (tons) over baseline</th>
</tr>
</thead>
<tbody>
<tr>
<td>2005</td>
<td>349,284</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2006</td>
<td>364,090</td>
<td>4.24%</td>
<td>4.24%</td>
</tr>
<tr>
<td>2007</td>
<td>387,731</td>
<td>6.49%</td>
<td>11.01%</td>
</tr>
<tr>
<td>2008</td>
<td>376,435</td>
<td>-2.91%</td>
<td>7.77%</td>
</tr>
<tr>
<td>2009</td>
<td>348,934</td>
<td>-7.31%</td>
<td>-0.10%</td>
</tr>
<tr>
<td>2010</td>
<td>329,777</td>
<td>-5.49%</td>
<td>-5.58%</td>
</tr>
<tr>
<td>2011</td>
<td>314,412</td>
<td>-4.66%</td>
<td>-9.98%</td>
</tr>
<tr>
<td>2012</td>
<td>316,761</td>
<td>0.75%</td>
<td>-9.31%</td>
</tr>
<tr>
<td>2013</td>
<td>313,981</td>
<td>-0.88%</td>
<td>-10.11%</td>
</tr>
<tr>
<td>2014</td>
<td>305,845</td>
<td>-2.59%</td>
<td>-12.44%</td>
</tr>
<tr>
<td>2015</td>
<td>300,834</td>
<td>-1.64%</td>
<td>-13.87%</td>
</tr>
<tr>
<td>2016</td>
<td>297,239</td>
<td>-1.20%</td>
<td>-14.90%</td>
</tr>
<tr>
<td>2017</td>
<td>284,378</td>
<td>-4.33%</td>
<td>-18.58%</td>
</tr>
</tbody>
</table>

Changes in methodology and measurements

Since the City’s last reported inventory in 2013, the calculation of greenhouse gas emissions has been refined. The City has the ability to calculate emissions generated by the community related to water and wastewater emissions, fugitive point sources, landfill process emissions, rail transportation, and more. However, staff elected to calculate greenhouse gas emissions in the three categories (transportation, solid waste, and building energy use) to provide the most accurate measure of progress over the sectors under the City’s purview and will receive the greatest impact from local action.

The original 2005 emission inventory showed that the community generated 382,153 MT CO2e. When updating the communitywide greenhouse gas emission in 2019, the 2005 baseline was recalculated as 349,284 MT CO2e. As a result, in addition to calculating greenhouse gas inventories for 2014 to 2017, staff updated all previously calculated inventories (2005 to 2013).

Table 2 compares previously calculated totals, updated inventories with percentage difference, and include 2014-2017 inventories.
### Comparison of communitywide greenhouse gas emissions

<table>
<thead>
<tr>
<th>Year</th>
<th>CACP software GHG emissions (tons)</th>
<th>ClearPath software GHG emissions (tons)</th>
<th>Percent difference GHG emissions (tons)</th>
</tr>
</thead>
<tbody>
<tr>
<td>2005</td>
<td>382,153</td>
<td>349,284</td>
<td>-9.41%</td>
</tr>
<tr>
<td>2006</td>
<td>387,036</td>
<td>364,090</td>
<td>-6.30%</td>
</tr>
<tr>
<td>2007</td>
<td>408,692</td>
<td>387,731</td>
<td>-5.41%</td>
</tr>
<tr>
<td>2008</td>
<td>392,203</td>
<td>376,435</td>
<td>-4.19%</td>
</tr>
<tr>
<td>2009</td>
<td>381,028</td>
<td>348,934</td>
<td>-9.20%</td>
</tr>
<tr>
<td>2010</td>
<td>383,543</td>
<td>329,777</td>
<td>-16.30%</td>
</tr>
<tr>
<td>2011</td>
<td>377,669</td>
<td>314,412</td>
<td>-20.12%</td>
</tr>
<tr>
<td>2012</td>
<td>356,521</td>
<td>316,761</td>
<td>-12.55%</td>
</tr>
<tr>
<td>2013</td>
<td>360,427</td>
<td>313,981</td>
<td>-14.79%</td>
</tr>
<tr>
<td>2014</td>
<td>Not calculated</td>
<td>305,845</td>
<td>Not calculated</td>
</tr>
<tr>
<td>2015</td>
<td>Not calculated</td>
<td>300,834</td>
<td>Not calculated</td>
</tr>
<tr>
<td>2016</td>
<td>Not calculated</td>
<td>297,239</td>
<td>Not calculated</td>
</tr>
<tr>
<td>2017</td>
<td>Not calculated</td>
<td>284,378</td>
<td>Not calculated</td>
</tr>
</tbody>
</table>

The 32,869 ton variation in greenhouse gas inventories can be attributed to staff’s decision to remove methane emissions from the decommissioned Marsh Road Landfill (Bedwell Bayfront Park) from the communitywide inventory. In previous community inventories, this emissions source was included, but going forward emissions related to the closed landfill will tracked in the City’s municipal (city government) operations inventory only. Staff made this decision as no new material (trash) is being introduced, emissions related to the closed landfill (Bedwell Bayfront Park) will only continue to decrease over time as waste continues to breakdown, with no new measures being undertaken.

It is also important to note that any greenhouse gas emissions inventory represents an estimate using the best available data and calculation methodologies at the time it was conducted. These estimates are subject to change as better data and calculation methodologies become available.
Attachment B- Greenhouse gas Emissions Summary by Category

Transportation

Transportation related emissions 2005-2017

The transportation category includes emissions related to passenger vehicle travel within Menlo Park. The transportation related emissions are estimated using both vehicle miles travel estimates from the California Department of Transportation (Caltrans) Highway Performance Monitoring System data and estimated fuel usage derived from fuel vehicle sales tax reported to State of California Board of Equalization- Sales Tax Generator and average gas prices. These data sets (vehicle miles traveled and fuel usage) are used to estimate different transportation related greenhouse gases:

- Estimated vehicle miles traveled are used to calculate methane (CH4) and nitrous oxide (N2O) emissions
- Estimated fuel usage is used to calculate carbon dioxide (CO2) emissions

It should be noted, vehicle miles traveled or fuel usage have been used in past inventories to approximate total transportation related emissions independently to prevent double counting. However, this calculation method allows for the use of both since they calculate different GHG emissions.

<table>
<thead>
<tr>
<th>Year</th>
<th>GHG emissions(tons)</th>
<th>%change (year to year)</th>
</tr>
</thead>
<tbody>
<tr>
<td>2005</td>
<td>137,628</td>
<td></td>
</tr>
<tr>
<td>2006</td>
<td>144,795</td>
<td>5.21%</td>
</tr>
<tr>
<td>2007</td>
<td>140,176</td>
<td>-3.19%</td>
</tr>
<tr>
<td>2008</td>
<td>131,917</td>
<td>-5.89%</td>
</tr>
<tr>
<td>2009</td>
<td>141,478</td>
<td>7.25%</td>
</tr>
<tr>
<td>2010</td>
<td>144,892</td>
<td>2.41%</td>
</tr>
<tr>
<td>2011</td>
<td>147,475</td>
<td>1.78%</td>
</tr>
<tr>
<td>2012</td>
<td>145,627</td>
<td>-1.25%</td>
</tr>
<tr>
<td>2013</td>
<td>142,897</td>
<td>-1.87%</td>
</tr>
<tr>
<td>2014</td>
<td>146,885</td>
<td>2.79%</td>
</tr>
<tr>
<td>2015</td>
<td>140,111</td>
<td>-4.61%</td>
</tr>
<tr>
<td>2016</td>
<td>153,518</td>
<td>9.57%</td>
</tr>
<tr>
<td>2017</td>
<td>158,686</td>
<td>3.37%</td>
</tr>
</tbody>
</table>
The Bay Area has experienced a period of increased development. In addition to development completed in 2018 and 2019, the City expects the replacement and rebuild of 100 new homes and the addition of 21 new buildings that include high-rise residential, retail, office and hotels over the next three years (2020 to 2023). The estimated daytime (resident and employee) population is estimated to be 64,152 by the end this code cycle (2023).

Without a shift to carbon free fuels or significant reduction in single occupied vehicles, staff predicts a business as usual scenario will result transportation related emissions increasing by 30.4 percent relative to 2017 inventory at the end of this code cycle (2023). Figure 3 shows emission forecast for transportation related emission if no new measures (e.g. transportation demand management, vehicle electrification, etc.) in this category are undertaken over the study period (2017-2035). Emissions factors are based on 2015 national averages.

Estimated transportation related emissions 2005-2017

It is important to note, that while the State has had established vehicle emissions reduction requirements since 20029 and in 2012 the California Air Resources Board (CARB) adopted mandates for emissions standards10, these program affect new vehicles only. As of 2019, the average age of cars on the road in California is estimated to be 11.2 years11. Average car age in the United States has increased since this metric started being tracked and is predicted to increase especially in regions, like the Bay Area, where the cost of living is higher than average.

---

9 California Assembly Bill 1493 Vehicular emissions: greenhouse gas emissions (also known as the Pavely legislation) establishing emissions standards for new passenger vehicles manufactured in 2009-2016
10 Advanced Clean Car Programs a set of regulations to control emissions from passenger vehicles arb.ca.gov/our-work/programs/advanced-clean-cars-program/about
11 Estimate published by Auto Alliance, and Alliance of Automobile Manufacturers using reports and data sets also sourced by U.S. Energy, Vehicles Technologies Office autoalliance.org/in-your-state/CA/pdf/?export
Solid Waste

Solid waste related emissions 2005-2017

The solid waste category reflects emissions related to total community waste sent to landfill reported to California Department of Resources Recycling and Recovery (CalRecycle).

In 2017, City Council adopted the Community Zero Waste Plan. This plan could reduce waste related emissions by over 50 percent over 2017 levels. This is predicted to prevent approximately 6,000 tons GHG emissions annually. Figure 5 shows emissions forecasts for both status quo (no new measures undertaken) and fully implementation of the Community Zero Waste Plan (reduction of waste per capita from 5.0 to 3.1 pounds per person per day).

### Solid Waste

<table>
<thead>
<tr>
<th>Year</th>
<th>GHG emissions(tons)</th>
<th>%change (year to year)</th>
</tr>
</thead>
<tbody>
<tr>
<td>2005</td>
<td>21,745</td>
<td></td>
</tr>
<tr>
<td>2006</td>
<td>32,970</td>
<td>51.62%</td>
</tr>
<tr>
<td>2007</td>
<td>29,672</td>
<td>-10.00%</td>
</tr>
<tr>
<td>2008</td>
<td>27,187</td>
<td>-8.37%</td>
</tr>
<tr>
<td>2009</td>
<td>6,077</td>
<td>-77.65%</td>
</tr>
<tr>
<td>2010</td>
<td>5,717</td>
<td>-5.92%</td>
</tr>
<tr>
<td>2011</td>
<td>6,715</td>
<td>17.46%</td>
</tr>
<tr>
<td>2012</td>
<td>5,572</td>
<td>-17.02%</td>
</tr>
<tr>
<td>2013</td>
<td>5,478</td>
<td>-1.69%</td>
</tr>
<tr>
<td>2014</td>
<td>6,034</td>
<td>10.15%</td>
</tr>
<tr>
<td>2015</td>
<td>6,199</td>
<td>2.73%</td>
</tr>
<tr>
<td>2016</td>
<td>6,816</td>
<td>9.95%</td>
</tr>
<tr>
<td>2017</td>
<td>8,424</td>
<td>23.59%</td>
</tr>
</tbody>
</table>
Estimated solid waste related emissions 2017-2035

%change solid waste emissions 2017-2035 scenarios
estimates relative to 2017 inventory

GHG emissions (CO2e)

-29.4% -34.6% -40.5% -46.2% -51.6% -54.3%

2017 2020 2023 2026 2029 2032 2035

- Status Quo
- Zero Waste Implementation
Building energy use

Building energy use related emissions 2005-2017

The building energy use category includes both electricity and natural gas consumption reported by Pacific Gas & Electric and Peninsula Clean Energy (2016 and 2017 inventories only). All electricity customers in the City of Menlo Park are automatically enrolled in Peninsula Clean Energy service. Automatic enrollment was a phased, countywide process. Beginning in Fall of 2016, all municipal accounts, small and medium businesses, and 20 percent of residential accounts in San Mateo County were switched to Peninsula Clean Energy service. In April 2017, all San Mateo County electricity customers were switched. As of September 2019, Peninsula Clean Energy services 97.5 percent of all electricity customers in Menlo Park.

Emissions related to electricity consumption will continue to decrease as energy sources increasingly become carbon neutral or free. The emissions related to natural gas are likely to remain unchanged until natural gas powered appliances in existing building stock are replaced. Figure 6 shows the percentage of total building energy use separated by electricity and natural gas.

<table>
<thead>
<tr>
<th>Year</th>
<th>GHG emissions (tons)</th>
<th>%change (year to year)</th>
</tr>
</thead>
<tbody>
<tr>
<td>2005</td>
<td>189,911</td>
<td></td>
</tr>
<tr>
<td>2006</td>
<td>186,325</td>
<td>-1.89%</td>
</tr>
<tr>
<td>2007</td>
<td>217,883</td>
<td>16.94%</td>
</tr>
<tr>
<td>2008</td>
<td>217,331</td>
<td>-0.25%</td>
</tr>
<tr>
<td>2009</td>
<td>201,379</td>
<td>-7.34%</td>
</tr>
<tr>
<td>2010</td>
<td>179,168</td>
<td>-11.03%</td>
</tr>
<tr>
<td>2011</td>
<td>160,222</td>
<td>-10.57%</td>
</tr>
<tr>
<td>2012</td>
<td>165,562</td>
<td>3.33%</td>
</tr>
<tr>
<td>2013</td>
<td>164,746</td>
<td>-0.49%</td>
</tr>
<tr>
<td>2014</td>
<td>152,926</td>
<td>-7.17%</td>
</tr>
<tr>
<td>2015</td>
<td>154,524</td>
<td>1.04%</td>
</tr>
<tr>
<td>2016</td>
<td>136,905</td>
<td>-11.40%</td>
</tr>
<tr>
<td>2017</td>
<td>117,268</td>
<td>-14.34%</td>
</tr>
</tbody>
</table>
### Total building energy use emissions 2005-2017
(electricity versus natural gas)

<table>
<thead>
<tr>
<th>Year</th>
<th>GHG emissions (tons)</th>
<th>% change (year to year)</th>
</tr>
</thead>
<tbody>
<tr>
<td>2005</td>
<td>87,617</td>
<td></td>
</tr>
<tr>
<td>2006</td>
<td>82,715</td>
<td>-5.59%</td>
</tr>
<tr>
<td>2007</td>
<td>114,718</td>
<td>38.69%</td>
</tr>
<tr>
<td>2008</td>
<td>113,712</td>
<td>-0.88%</td>
</tr>
<tr>
<td>2009</td>
<td>98,368</td>
<td>-13.49%</td>
</tr>
<tr>
<td>2010</td>
<td>76,142</td>
<td>-22.59%</td>
</tr>
<tr>
<td>2011</td>
<td>55,203</td>
<td>-27.50%</td>
</tr>
<tr>
<td>2012</td>
<td>63,677</td>
<td>15.35%</td>
</tr>
<tr>
<td>2013</td>
<td>61,342</td>
<td>-3.67%</td>
</tr>
<tr>
<td>2014</td>
<td>62,891</td>
<td>2.53%</td>
</tr>
<tr>
<td>2015</td>
<td>66,150</td>
<td>5.18%</td>
</tr>
<tr>
<td>2016</td>
<td>46,217</td>
<td>-30.13%</td>
</tr>
<tr>
<td>2017</td>
<td>21,528</td>
<td>-53.42%</td>
</tr>
</tbody>
</table>

### Total building energy use: electricity

- **2005**: 46.14%
- **2006**: 44.39%
- **2007**: 52.65%
- **2008**: 52.32%
- **2009**: 48.85%
- **2010**: 42.50%
- **2011**: 34.45%
- **2012**: 38.46%
- **2013**: 37.23%
- **2014**: 41.13%
- **2015**: 42.81%
- **2016**: 33.76%
- **2017**: 18.36%

### Total building energy use: natural gas

- **2005**: 53.86%
- **2006**: 55.61%
- **2007**: 47.35%
- **2008**: 47.68%
- **2009**: 51.15%
- **2010**: 57.50%
- **2011**: 65.55%
- **2012**: 61.54%
- **2013**: 62.77%
- **2014**: 58.88%
- **2015**: 57.19%
- **2016**: 66.24%
- **2017**: 81.64%

**Key Events**
- **2008**: Adoption of Reach Codes: increased energy efficiency standards
- **2009**: Menlo Park switches to Peninsula Clean Energy
- **2009**: Great Recession

---

City of Menlo Park  701 Laurel St., Menlo Park, CA 94025  tel 650-330-6600  www.menlopark.org
Total building energy use emissions by account type

Below is details of building energy use by account type.
The commercial energy category includes both electricity and natural gas consumption reported by Pacific Gas & Electric and Peninsula Clean Energy (2017 inventory only). As of 2017 emissions related to commercial energy use represent approximately 65 percent of building energy use related emissions.

As of September 2019, Peninsula Clean Energy services 1,742 commercial customers and 1 industrial customer (included in commercial energy category). This data also includes usage from customers who opt out (decline) Peninsula Clean Energy service.

Emissions related to electricity consumption will continue to decrease as energy sources increasingly become carbon neutral or free. The emissions related to natural gas are likely to remain unchanged until natural gas-powered appliances in existing building stock is replaced.
The direct access energy category reflects electricity consumption reported by Pacific Gas & Electric and Peninsula Clean Energy for direct access customers. As of 2017 emissions related to direct access energy use represent approximately 3 percent of building energy use related emissions.

Emissions related to electricity consumption will continue to decrease as energy sources increasingly become carbon neutral or free.
Residential energy related emissions 2005-2017

The residential energy category includes both electricity and natural gas consumption reported by Pacific Gas & Electric and Peninsula Clean Energy (2017 inventory only). As of 2017 emissions related to residential energy use represent approximately 33 percent of building energy use related emissions.

As of September 2019, Peninsula Clean Energy services 13,728 residential customers. This data also includes usage from customers who opt out (decline) Peninsula Clean Energy service.

Emissions related to electricity consumption will continue to decrease as energy sources increasingly become carbon neutral or free. The emissions related to natural gas are likely to remain unchanged until natural gas-powered appliances in existing building stock is replaced.

<table>
<thead>
<tr>
<th>Year</th>
<th>GHG emissions (tons)</th>
<th>Percent change in emissions</th>
</tr>
</thead>
<tbody>
<tr>
<td>2005</td>
<td>56,775</td>
<td></td>
</tr>
<tr>
<td>2006</td>
<td>55,610</td>
<td>-2.05%</td>
</tr>
<tr>
<td>2007</td>
<td>61,553</td>
<td>10.69%</td>
</tr>
<tr>
<td>2008</td>
<td>62,028</td>
<td>0.77%</td>
</tr>
<tr>
<td>2009</td>
<td>60,442</td>
<td>-2.56%</td>
</tr>
<tr>
<td>2010</td>
<td>54,734</td>
<td>-9.44%</td>
</tr>
<tr>
<td>2011</td>
<td>54,643</td>
<td>-0.17%</td>
</tr>
<tr>
<td>2012</td>
<td>54,618</td>
<td>-0.05%</td>
</tr>
<tr>
<td>2013</td>
<td>54,280</td>
<td>-0.62%</td>
</tr>
<tr>
<td>2014</td>
<td>45,824</td>
<td>-15.58%</td>
</tr>
<tr>
<td>2015</td>
<td>46,659</td>
<td>1.82%</td>
</tr>
<tr>
<td>2016</td>
<td>46,006</td>
<td>-1.40%</td>
</tr>
<tr>
<td>2017</td>
<td>39,189</td>
<td>-14.82%</td>
</tr>
</tbody>
</table>